


	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

DECLARATION OF COMPLIANCE - SAR RF EXPOSURE EVALUATION (FCC)

Test Lab Information	Name	CELLTECH LABS INC.			
	Address	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada			
Test Lab Accreditation(s)	A2LA	ISO/IEC 17025:2005 (A2LA Test Lab Certificate No. 2470.01)			
Applicant Information	Name	KENWOOD USA CORPORATION			
	Address	3970 Johns Creek Court, Suite 100, Suwanee, GA 30024 United States			
Application Type(s)	FCC	TCB Certification			
Standard(s) Applied	FCC	47 CFR §2.1093			
	FCC	KDB 643646 D01v01 - SAR Test Reduction Considerations for Occupational PTT Radios			
Procedure(s) Applied	FCC	OET Bulletin 65, Supplement C	FCC	KDB 447498 D01v04	
	IEEE	1528-2003	IEC	62209-1:2005	
Device Classification(s)	FCC	Licensed Non-Broadcast Transmitter Held to Face (TNF) - FCC Part 90			
Device Identifier(s)	FCC ID:	ALH431000			
Device Model(s) Tested	NX-320-K3				
Test Sample Serial No.	No. 10 (Identical Prototype)				
Hardware / Firmware Revision No.s	Hardware	Revision 1.0		Firmware	Revision 1.0
Date of Sample Receipt	December 15, 2010		Date(s) of SAR Evaluations	January 4, 6, 26-28, 31, 2011	
Device Description	Portable FM UHF-H Push-To-Talk (PTT) Radio Transceiver				
Transmit Frequency Range	FCC	450.0 - 512.0 MHz			
Manuf. Rated Output Power	5 Watts (Conducted)		Manuf. Tolerance Specification	+/- 0 dB	
Antenna Type(s) Tested	Detachable Stub	450.0 - 490.0 MHz	Length = 80 mm	P/N: KRA-23M	A
	Detachable Stub	470.0 - 512.0 MHz	Length = 80 mm	P/N: KRA-23M2	B
	Detachable Whip	450.0 - 490.0 MHz	Length = 149 mm	P/N: KRA-27M	C
	Detachable Whip	470.0 - 512.0 MHz	Length = 139 mm	P/N: KRA-27M2	D
Battery Type(s) Tested	Lithium-Ion	7.4 V	2000 mAh	P/N: KNB-57L	a
	Lithium-Ion	7.4 V	1480 mAh	P/N: KNB-55L	b
	Nickel-Metal Hydride	7.2 V	1400 mAh	P/N: KNB-56N	c
	Alkaline Case	9 V	6 x AA	P/N: KBP-5	d
Body-worn Accessories Tested	Belt-Clip (contains metal)			P/N: KBH-12	1
	Swivel Belt-Loop (contains metal)			P/N: KBH-13DS	2
Audio Accessories Tested	Category 1: Headset	Category 2: Earpiece	Category 3: Palm-Mic	Category 4: Speaker-Mic	
	P/N: KHS-10-BH (Default)	P/N: KHS-27 (Default)	KHS-9BL (Default)	KMC-48GPS (Default)	
	P/N: KHS-10-OH	P/N: KHS-23	KHS-8BL	KMC-21	
	P/N: KHS-21	P/N: KHS-25	-	KMC-45	
	P/N: KHS-22	P/N: KHS-26	-	-	
	P/N: KHS-7	P/N: KEP-2	-	-	
	P/N: KHS-7A	-	-	-	
	Note: All audio accessories can be used in any accessory combination (antenna, battery & body-worn accessory)				
Max. SAR Level(s) Evaluated	Face-held	3.98 W/kg	1g	50% PTT duty cycle	Occupational / Controlled Exposure
	Body-worn	7.55 W/kg	1g	50% PTT duty cycle	Occupational / Controlled Exposure
FCC Spatial Peak SAR Limit	Head/Body	8.0 W/kg	1g	50% PTT duty cycle	Occupational / Controlled Exposure
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 for the Occupational / Controlled Exposure environment. The device was tested in accordance with the measurement procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005. 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.					
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.					
Test Report Approved By			Sean Johnston	Lab Manager	Celltech Labs Inc.

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 1 of 253





 Testing and Engineering Services Lab	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

TABLE OF CONTENTS


1.0 INTRODUCTION	4
2.0 SAR MEASUREMENT SYSTEM	4
3.0 RF CONDUCTED OUTPUT POWER MEASUREMENTS	4
4.0 FCC POWER THRESHOLDS FOR PTT DEVICES ($F < 0.5$ GHZ)	5
5.0 SAR PROBE CALIBRATION & MEASUREMENT FREQUENCIES	5
6.0 NO. OF TEST CHANNELS (N_c)	6
7.0 MANUFACTURER'S DISCLOSED ACCESSORY LISTING	6
8.0 FLUID DIELECTRIC PARAMETERS	7
FLUID DIELECTRIC PARAMETERS (CONT.)	8
FLUID DIELECTRIC PARAMETERS (CONT.)	9
FLUID DIELECTRIC PARAMETERS (CONT.)	10
FLUID DIELECTRIC PARAMETERS (CONT.)	11
FLUID DIELECTRIC PARAMETERS (CONT.)	12
FLUID DIELECTRIC PARAMETERS (CONT.)	13
9.0 SAR MEASUREMENT SUMMARY	14
SAR MEASUREMENT SUMMARY (CONT.)	15
SAR MEASUREMENT SUMMARY (CONT.)	16
SAR MEASUREMENT SUMMARY (CONT.)	17
SAR MEASUREMENT SUMMARY (CONT.)	18
SAR MEASUREMENT SUMMARY (CONT.)	19
SAR MEASUREMENT SUMMARY (CONT.)	20
SAR MEASUREMENT SUMMARY (CONT.)	21
SAR MEASUREMENT SUMMARY (CONT.)	22
SAR MEASUREMENT SUMMARY (CONT.)	23
SAR MEASUREMENT SUMMARY (CONT.)	24
SAR MEASUREMENT SUMMARY (CONT.)	25
10.0 SAR SCALING (TUNE-UP TOLERANCE)	26
SAR SCALING (TUNE-UP TOLERANCE) (CONT.)	27
11.0 RATIONALE FOR PROCEDURES APPLIED (FCC KDB 643646)	28
12.0 DETAILS OF SAR EVALUATION	29
13.0 SAR EVALUATION PROCEDURES	29
14.0 SYSTEM PERFORMANCE CHECK	30
15.0 SIMULATED EQUIVALENT TISSUES	31
16.0 SAR LIMITS	31
17.0 ROBOT SYSTEM SPECIFICATIONS	32
18.0 PROBE SPECIFICATION (ET3DV6)	33
19.0 BARSKI PLANAR PHANTOM	33
20.0 DEVICE HOLDER	33
21.0 TEST EQUIPMENT LIST	34
22.0 JUSTIFICATION FOR EXTENDED SAR DIPOLE CALIBRATION	34
23.0 MEASUREMENT UNCERTAINTIES	35
24.0 REFERENCES	36
APPENDIX A - SAR MEASUREMENT PLOTS	37
APPENDIX B - SYSTEM PERFORMANCE CHECK PLOTS	165
APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS	178
APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS	185
APPENDIX E - DIPOLE CALIBRATION	251
APPENDIX F - PROBE CALIBRATION	252
APPENDIX G - BARSKI PLANAR PHANTOM CERTIFICATE OF CONFORMITY	253


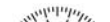

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 2 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

REVISION HISTORY			
REVISION NO.	DESCRIPTION	IMPLEMENTED BY	RELEASE DATE
1.0	Initial Release	Jon Hughes	February 10, 2011
1.1	1. Revised footnotes in Section 8 2. Added Section 21	Jon Hughes	March 09, 2011
1.2	1. Added audio accessory note on pg 1	Jon Hughes	March 24, 2011
	2. Added Section 11 - "Rationale for Procedures Applied (FCC KDB 643646)"		
	3. Moved "Fluid Dielectric Parameters" to Section 8		

TEST REPORT SIGN-OFF			
DEVICE TESTED BY	REPORT PREPARED BY	QA REVIEW BY	REPORT APPROVED BY
Scott Kulifaj	Scott Kulifaj	Jon Hughes	Sean Johnston

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 3 of 253

 Testing and Engineering Services Ltd.	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	  ACCREDITED
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				

1.0 INTRODUCTION

This measurement report demonstrates that the Kenwood USA Corporation Models: NX-320-K3 Portable FM UHF-H PTT Radio Transceiver complies with the SAR (Specific Absorption Rate) RF exposure requirements FCC 47 CFR §2.1093 (see reference [1]) for the Occupational / Controlled Exposure environment. The measurement procedures described in FCC OET Bulletin 65, Supplement C 01-01 (see reference [2]), IEEE Standard 1528-2003 (see reference [3]) and IEC Standard 62209-1:2005 (see reference [4]) were employed. A description of the device, 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 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 head 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 a controller with a built in VME-bus computer.


3.0 RF CONDUCTED OUTPUT POWER MEASUREMENTS



MEASURED RF CONDUCTED OUTPUT POWER LEVELS

Radio Model	Test Frequency	Mode	dBm	Watts	Method
NX-320-K3	450.0 MHz	CW	37.0	5.0	Average Conducted
	463.3 MHz	CW	36.9	4.9	Average Conducted
	470.0 MHz	CW	36.9	4.9	Average Conducted
	476.7 MHz	CW	36.9	4.9	Average Conducted
	484.0 MHz	CW	36.9	4.9	Average Conducted
	490.0 MHz	CW	36.9	4.9	Average Conducted
	498.0 MHz	CW	37.0	5.0	Average Conducted
	512.0 MHz	CW	37.1	5.1	Average Conducted

Notes

- The test channels were selected in accordance with the procedures specified in FCC KDB 447498 Section 6) c) (see reference [5]).
- The RF conducted output power levels of the DUT were measured by Celltech prior to the SAR evaluations using a Gigatronics 8652A Universal Power Meter at the external antenna connector of the radio in accordance with FCC 47 CFR §2.1046 (see reference [11]).

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 4 of 253

	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

Test Lab Certificate No. 2470.01

4.0 FCC POWER THRESHOLDS FOR PTT DEVICES ($f \leq 0.5$ GHz)

FCC SAR Evaluation Power Thresholds for PTT Devices, $f \leq 0.5$ GHz*			Manufacturer's Rated RF Output Power	
Exposure Conditions	P mW (General Population)	P mW (Occupational)	100% PTT Duty Cycle	50% PTT Duty Cycle
Held to face, $d \geq 2.5$ cm	250	1250	5 Watts	2.5 Watts
Body-worn, $d \geq 1.5$ cm	200	1000		
Body-worn, $d \geq 1.0$ cm	150	750		
1. The time-averaged output power, corresponding to the required PTT duty factor, is compared with these thresholds. 2. The closest distance between the user and the device or its antenna is used to determine the power thresholds. * Per FCC KDB 447498 D01v04 Section 5)b)i) (see reference [5]).			1. The conducted output power level of the DUT exceeds the FCC threshold for SAR evaluation requirement.	

5.0 SAR PROBE CALIBRATION & MEASUREMENT FREQUENCIES

The following procedures are recommended for measurements at 150 MHz - 3 GHz to minimize probe calibration and tissue dielectric parameter discrepancies. In general, SAR measurements below 300 MHz should be within ± 50 MHz of the probe calibration frequency. At 300 MHz to 3 GHz, measurements should be within ± 100 MHz of the probe calibration frequency. Measurements exceeding 50% of these intervals, ± 25 MHz < 300 MHz and ± 50 MHz ≥ 300 MHz, require additional steps (per FCC KDB 450824 D01v01r01, SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz - see reference [7]).

Probe Calibration Freq.			Device Measurement Freq.		Frequency Interval			±50 MHz (≥ 300 MHz)			
450 MHz					450.0 MHz		0 MHz		< 50 MHz ¹		
					463.3 MHz		13.3 MHz		< 50 MHz ¹		
					470.0 MHz		20 MHz		< 50 MHz ¹		
					476.7 MHz		26.7 MHz		< 50 MHz ¹		
					484.0 MHz		34 MHz		< 50 MHz ¹		
					490.0 MHz		40 MHz		< 50 MHz ¹		
					498.0 MHz		48 MHz		< 50 MHz ¹		
					512.0 MHz		62 MHz		> 50 MHz ²		
1. The probe calibration and measurement frequency interval is < 50 MHz; therefore the additional steps were not required.											
2. The probe calibration and measurement frequency interval is > 50 MHz; therefore the following additional steps were implemented (per FCC KDB 450824 D01v01r01 - see reference [7]): <i>The measured 1-g SAR may be compensated with respect to +5% tolerances in ϵ_r and -5% tolerances in σ, computed according to valid SAR sensitivity data, to reduce SAR underestimation and maintain conservativeness.</i> SAR sensitivity data is per SPEAG DASY4 Manual (see reference [12]).											
Probe Calibration Frequency = 450 MHz					Target Parameters:			Head 43.5 ϵ_r / 0.87 σ		Body = 56.7 ϵ_r / 0.94 σ	
Test Freq.	Tissue	σ	Coeff.	Sens.	ϵ_r	Coeff.	Sens.	% Change	Compensated SAR at 512 MHz		
512 MHz	Body	4.60%	0.43	1.98%	n/a	-0.46	n/a	1.98%	7.22 W/kg	1g	50% ptt d/c
Parameter											
ϵ											

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 5 of 253

6.0 NO. OF TEST CHANNELS (N_c)

Antenna Part No.	Antenna Freq. Range	Test Freq. Range	N_c	Test Frequencies
A KRA-23M	440.0 - 490.0 MHz	450.0 - 490.0 MHz	4	450.0, 463.3, 476.7, 490.0 MHz
B KRA-23M2	470.0 - 520.0 MHz	470.0 - 512.0 MHz	4	470.0, 484.0, 498.0, 512.0 MHz
C KRA-27M	440.0 - 490.0 MHz	450.0 - 490.0 MHz	4	450.0, 463.3, 476.7, 490.0 MHz
D KRA-27M2	470.0 - 520.0 MHz	470.0 - 512.0 MHz	4	470.0, 484.0, 498.0, 512.0 MHz

Note: The number of test channels (N_c) were calculated in accordance with the procedures specified in FCC KDB 447498 Section 6) c) (see reference [5]).

7.0 MANUFACTURER'S DISCLOSED ACCESSORY LISTING

Part No.	Description	Acc. Type
KRA-23M	Detachable Stub (440-490 MHz)	Antenna
KRA-23M2	Detachable Stub (470-520 MHz)	
KRA-27M	Detachable Whip (440-490 MHz)	
KRA-27M2	Detachable Whip (470-520 MHz)	
KNB-57L	Lithium-ion, 2000 mAh, 7.4 V	Battery
KNB-55L	Lithium-ion, 1480 mAh, 7.4 V	
KNB-56N	Nickel-Metal Hydride, 1400 mAh, 7.2 V	
KBP-5	Alkaline Battery Case, 6xAA, 9 V	
KBH-12	Belt-Clip (contains metal)	Body-worn
KBH-13DS	Swivel Belt-Loop (contains metal)	
KHS-10-BH	Noise Reduction Headset (Behind the head)	Audio
KHS-10-OH	Noise Reduction Headset (Over the head)	
KHS-21	Lightweight Headset – no VOX or PTT controls	
KHS-22	Behind-the-Head Headset w/ Boom Mic & PTT	
KHS-7	Single Muff Headset w/ Boom Mic	
KHS-7A	Single Muff Headset w/ Boom Mic & PTT	
KHS-23	2-Wire Ear-Bud w/ mic/PTT - Vox Ready	
KHS-25	Earhook w/ Mini Boom Mic	
KHS-26	Clip Mic w/ Earphone	
KHS-27	D-Ring Ear Hanger w/ PTT & Mic	
KEP-2	Earphone Kit (for use w/ KMC-21 & KMC-45)	
KHS-8BE/BL	2-Wire Palm Mic w/ Earphone	
KHS-9BE/BL	3-Wire Lapel Microphone w/ Earpiece	
KMC-21	Slim-Line Speaker-Microphone	
KMC-45	Heavy Duty Speaker-Microphone	
KMC-48GPS	Speaker-Microphone with Integral GPS Unit	



Notes:

1. Manufacturer's disclosed accessory listing information was provided by Kenwood USA Corporation.

8.0 FLUID DIELECTRIC PARAMETERS

FLUID DIELECTRIC PARAMETERS						
Date: 01/04/2011		Frequency: 450 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.350	60.17	0.85	56.7	0.94	6.12%	-9.57%
0.360	60.61	0.86	56.7	0.94	6.90%	-8.51%
0.370	60.23	0.85	56.7	0.94	6.23%	-9.57%
0.380	59.86	0.87	56.7	0.94	5.57%	-7.45%
0.390	59.86	0.87	56.7	0.94	5.57%	-7.45%
0.400	59.60	0.88	56.7	0.94	5.11%	-6.38%
0.410	59.25	0.88	56.7	0.94	4.50%	-6.38%
0.420	59.06	0.90	56.7	0.94	4.16%	-4.26%
0.430	59.51	0.91	56.7	0.94	4.96%	-3.19%
0.440	59.84	0.91	56.7	0.94	5.54%	-3.19%
0.450	58.76	0.93	56.7	0.94	3.63%	-1.06%
0.460	59.45	0.91	56.7	0.94	4.85%	-3.19%
0.4633*	59.10	0.92	56.7	0.94	4.23%	-2.13%
0.470	58.45	0.94	56.7	0.94	3.09%	0.00%
0.4767*	58.50	0.94	56.7	0.94	3.17%	0.00%
0.480	58.49	0.94	56.7	0.94	3.16%	0.00%
0.484*	58.40	0.95	56.7	0.94	3.00%	1.06%
0.490	58.38	0.96	56.7	0.94	2.96%	2.13%
0.498*	58.40	0.96	56.7	0.94	3.00%	2.13%
0.500	58.46	0.96	56.7	0.94	3.10%	2.13%
0.510	58.58	0.97	56.7	0.94	3.32%	3.19%
0.512*	58.50	0.972	56.7	0.94	3.17%	3.40%
0.520	57.95	0.98	56.7	0.94	2.20%	4.26%
0.530	57.96	0.98	56.7	0.94	2.22%	4.26%
0.540	57.90	0.99	56.7	0.94	2.12%	5.32%
0.550	57.48	1.00	56.7	0.94	1.38%	6.38%

*interpolated using DASY4 software



	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

FLUID DIELECTRIC PARAMETERS (CONT.)

FLUID DIELECTRIC PARAMETERS						
Date: 01/06/2011		Frequency: 450 MHz			Tissue: Head	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.350	48.20	0.81	43.5	0.87	10.80%	-6.90%
0.360	48.37	0.82	43.5	0.87	11.20%	-5.75%
0.370	47.65	0.82	43.5	0.87	9.54%	-5.75%
0.380	47.19	0.84	43.5	0.87	8.48%	-3.45%
0.390	47.20	0.84	43.5	0.87	8.51%	-3.45%
0.400	47.25	0.86	43.5	0.87	8.62%	-1.15%
0.410	46.40	0.86	43.5	0.87	6.67%	-1.15%
0.420	45.95	0.86	43.5	0.87	5.63%	-1.15%
0.430	45.60	0.87	43.5	0.87	4.83%	0.00%
0.440	45.47	0.87	43.5	0.87	4.53%	0.00%
0.450	45.61	0.88	43.5	0.87	4.85%	1.15%
0.460	45.56	0.88	43.5	0.87	4.74%	1.15%
0.470	45.31	0.88	43.5	0.87	4.16%	1.15%
0.480	44.72	0.89	43.5	0.87	2.80%	2.30%
0.490	44.84	0.90	43.5	0.87	3.08%	3.45%
0.500	44.86	0.90	43.5	0.87	3.13%	3.45%
0.510	44.68	0.91	43.5	0.87	2.71%	4.60%
0.512*	44.60	0.91	43.5	0.87	2.53%	4.60%
0.520	44.37	0.91	43.5	0.87	2.00%	4.60%
0.530	44.00	0.93	43.5	0.87	1.15%	6.90%
0.540	44.05	0.95	43.5	0.87	1.26%	9.20%
0.550	43.95	0.96	43.5	0.87	1.03%	10.34%

*interpolated using DASY4 software

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 8 of 253


	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



Test Lab Certificate No. 2470.01

FLUID DIELECTRIC PARAMETERS (CONT.)

FLUID DIELECTRIC PARAMETERS						
Date: 01/26/2011		Frequency: 450 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.350	59.28	0.81	56.7	0.94	4.55%	-13.83%
0.360	58.27	0.81	56.7	0.94	2.77%	-13.83%
0.370	57.79	0.83	56.7	0.94	1.92%	-11.70%
0.380	58.74	0.83	56.7	0.94	3.60%	-11.70%
0.390	57.80	0.85	56.7	0.94	1.94%	-9.57%
0.400	58.39	0.85	56.7	0.94	2.98%	-9.57%
0.410	57.87	0.86	56.7	0.94	2.06%	-8.51%
0.420	57.69	0.88	56.7	0.94	1.75%	-6.38%
0.430	57.68	0.87	56.7	0.94	1.73%	-7.45%
0.440	58.15	0.88	56.7	0.94	2.56%	-6.38%
0.450	57.69	0.91	56.7	0.94	1.75%	-3.19%
0.460	57.99	0.91	56.7	0.94	2.28%	-3.19%
0.4633*	57.60	0.913	56.7	0.94	1.59%	-2.87%
0.470	56.94	0.92	56.7	0.94	0.42%	-2.13%
0.4767*	56.90	0.927	56.7	0.94	0.35%	-1.38%
0.480	56.89	0.93	56.7	0.94	0.34%	-1.06%
0.484*	56.90	0.93	56.7	0.94	0.35%	-1.06%
0.490	56.86	0.93	56.7	0.94	0.28%	-1.06%
0.498*	57.10	0.946	56.7	0.94	0.71%	0.64%
0.500	57.20	0.95	56.7	0.94	0.88%	1.06%
0.510	57.36	0.96	56.7	0.94	1.16%	2.13%
0.512*	57.20	0.96	56.7	0.94	0.88%	2.13%
0.520	56.80	0.96	56.7	0.94	0.18%	2.13%
0.530	56.78	0.99	56.7	0.94	0.14%	5.32%
0.540	56.88	0.98	56.7	0.94	0.32%	4.26%
0.550	56.31	1.00	56.7	0.94	-0.69%	6.38%

*interpolated using DASY4 software

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 9 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	




Test Lab Certificate No. 2470.01

FLUID DIELECTRIC PARAMETERS (CONT.)

FLUID DIELECTRIC PARAMETERS						
Date: 01/27/2011		Frequency: 450 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.350	58.93	0.83	56.7	0.94	3.93%	-11.70%
0.360	58.83	0.83	56.7	0.94	3.76%	-11.70%
0.370	58.61	0.84	56.7	0.94	3.37%	-10.64%
0.380	59.35	0.85	56.7	0.94	4.67%	-9.57%
0.390	58.68	0.87	56.7	0.94	3.49%	-7.45%
0.400	58.73	0.87	56.7	0.94	3.58%	-7.45%
0.410	58.48	0.88	56.7	0.94	3.14%	-6.38%
0.420	58.29	0.89	56.7	0.94	2.80%	-5.32%
0.430	58.31	0.90	56.7	0.94	2.84%	-4.26%
0.440	58.46	0.90	56.7	0.94	3.10%	-4.26%
0.450	58.19	0.91	56.7	0.94	2.63%	-3.19%
0.460	58.23	0.92	56.7	0.94	2.70%	-2.13%
0.4633*	58.00	0.923	56.7	0.94	2.29%	-1.81%
0.470	57.48	0.93	56.7	0.94	1.38%	-1.06%
0.4767*	57.20	0.93	56.7	0.94	0.88%	-1.06%
0.480	57.00	0.93	56.7	0.94	0.53%	-1.06%
0.484*	57.10	0.934	56.7	0.94	0.71%	-0.64%
0.490	57.22	0.94	56.7	0.94	0.92%	0.00%
0.498*	57.50	0.948	56.7	0.94	1.41%	0.85%
0.500	57.62	0.95	56.7	0.94	1.62%	1.06%
0.510	57.26	0.97	56.7	0.94	0.99%	3.19%
0.512*	57.10	0.968	56.7	0.94	0.71%	2.98%
0.520	56.70	0.96	56.7	0.94	0.00%	2.13%
0.530	57.11	0.98	56.7	0.94	0.72%	4.26%
0.540	57.01	0.98	56.7	0.94	0.55%	4.26%
0.550	56.68	1.00	56.7	0.94	-0.04%	6.38%

*interpolated using DASY4 software

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 10 of 253



	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				

FLUID DIELECTRIC PARAMETERS (CONT.)

FLUID DIELECTRIC PARAMETERS						
Date: 01/28/2011		Frequency: 450 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.350	60.24	0.86	56.7	0.94	6.24%	-8.51%
0.360	60.20	0.86	56.7	0.94	6.17%	-8.51%
0.370	59.64	0.87	56.7	0.94	5.19%	-7.45%
0.380	59.70	0.87	56.7	0.94	5.29%	-7.45%
0.390	59.43	0.89	56.7	0.94	4.81%	-5.32%
0.400	59.78	0.89	56.7	0.94	5.43%	-5.32%
0.410	59.31	0.90	56.7	0.94	4.60%	-4.26%
0.420	58.71	0.91	56.7	0.94	3.54%	-3.19%
0.430	59.07	0.91	56.7	0.94	4.18%	-3.19%
0.440	58.74	0.92	56.7	0.94	3.60%	-2.13%
0.450	58.85	0.93	56.7	0.94	3.79%	-1.06%
0.460	58.99	0.93	56.7	0.94	4.04%	-1.06%
0.470	58.77	0.93	56.7	0.94	3.65%	-1.06%
0.480	58.64	0.95	56.7	0.94	3.42%	1.06%
0.484*	58.50	0.954	56.7	0.94	3.17%	1.49%
0.490	58.26	0.96	56.7	0.94	2.75%	2.13%
0.498*	58.10	0.968	56.7	0.94	2.47%	2.98%
0.500	58.02	0.97	56.7	0.94	2.33%	3.19%
0.510	57.87	0.98	56.7	0.94	2.06%	4.26%
0.512*	57.90	0.98	56.7	0.94	2.12%	4.26%
0.520	57.92	0.98	56.7	0.94	2.15%	4.26%
0.530	57.86	1.00	56.7	0.94	2.05%	6.38%
0.540	57.54	1.00	56.7	0.94	1.48%	6.38%
0.550	57.59	1.00	56.7	0.94	1.57%	6.38%

*interpolated using DASY4 software

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 11 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



Test Lab Certificate No. 2470.01

FLUID DIELECTRIC PARAMETERS (CONT.)

FLUID DIELECTRIC PARAMETERS						
Date: 01/31/2011		Frequency: 450 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.350	60.18	0.85	56.7	0.94	6.14%	-9.57%
0.360	60.19	0.85	56.7	0.94	6.16%	-9.57%
0.370	59.70	0.86	56.7	0.94	5.29%	-8.51%
0.380	60.14	0.87	56.7	0.94	6.07%	-7.45%
0.390	59.41	0.89	56.7	0.94	4.78%	-5.32%
0.400	59.38	0.88	56.7	0.94	4.73%	-6.38%
0.410	59.96	0.91	56.7	0.94	5.75%	-3.19%
0.420	59.49	0.92	56.7	0.94	4.92%	-2.13%
0.430	59.91	0.92	56.7	0.94	5.66%	-2.13%
0.440	59.17	0.93	56.7	0.94	4.36%	-1.06%
0.450	59.31	0.93	56.7	0.94	4.60%	-1.06%
0.460	58.91	0.94	56.7	0.94	3.90%	0.00%
0.470	58.58	0.95	56.7	0.94	3.32%	1.06%
0.480	59.45	0.96	56.7	0.94	4.85%	2.13%
0.484*	59.40	0.964	56.7	0.94	4.76%	2.55%
0.490	59.35	0.97	56.7	0.94	4.67%	3.19%
0.498*	59.50	0.978	56.7	0.94	4.94%	4.04%
0.500	59.50	0.98	56.7	0.94	4.94%	4.26%
0.510	58.00	0.98	56.7	0.94	2.29%	4.26%
0.512*	58.20	0.98	56.7	0.94	2.65%	4.26%
0.520	58.76	0.98	56.7	0.94	3.63%	4.26%
0.530	58.84	1.00	56.7	0.94	3.77%	6.38%
0.540	58.90	1.01	56.7	0.94	3.88%	7.45%
0.550	58.74	1.02	56.7	0.94	3.60%	8.51%

*interpolated using DASY4 software

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 12 of 253



	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

FLUID DIELECTRIC PARAMETERS (CONT.)

Test Date	Fluid Type	Ambient Temp.	Fluid Temp.	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
Jan 04	450 Body	23.0°C	22.4°C	≥ 15 cm	101.1 kPa	35%	1000
Jan 06	450 Head	23.5°C	22.5°C	≥ 15 cm	101.1 kPa	40%	1000
Jan 26	450 Body	23.3°C	22.7°C	≥ 15 cm	101.1 kPa	35%	1000
Jan 27	450 Body	23.1°C	22.4°C	≥ 15 cm	101.1 kPa	35%	1000
Jan 28	450 Body	24.0°C	23.1°C	≥ 15 cm	101.1 kPa	40%	1000
Jan 31	450 Body	24.1°C	23.2°C	≥ 15 cm	101.1 kPa	40%	1000

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 13 of 253

	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	





9.0 SAR MEASUREMENT SUMMARY

FACE-HELD SAR EVALUATION RESULTS

FACE-HELD SAR EVALUATION RESULTS																			
C	Test Date: January 06, 2011			1		2		3		4		5		6		7		8	
R	Antenna Part No. & Test Freq. Range (MHz)	Test Freq. (MHz)	Cond. Pwr (W)	SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g	
				Default Battery KNB-57L (a)				Battery KNB-55L (b)				Battery KNB-56N (c)				Battery KBP-5 (d)			
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f	
				Drift (dB)		50%+droop		Drift dB		50%+droop		Drift dB		50%+droop		Drift dB		50%+droop	
1	ANT. A KRA-23M (450-490)	450.0	5.0	F1	5.28	2.64		N/A				N/A				N/A			
2			0.071		-														
3		463.3	4.9	N/A				N/A				N/A				N/A			
4		476.7	4.9	N/A				N/A				N/A				N/A			
5		490.0	4.9	N/A				N/A				N/A				N/A			
6	ANT. B KRA-23M2 (470-512)	470.0	4.9	N/A				N/A				N/A				N/A			
7		484.0	4.9																
8		498.0	5.0	N/A				N/A				N/A				N/A			
9		512.0	5.1	F2	5.82	2.91		N/A				N/A				N/A			
10						-0.188	3.04												
11	ANT. C KRA-27M (450-490)	450.0	5.0	F3	5.79	2.90		N/A				N/A				N/A			
12			-0.129		2.99														
13		463.3	4.9	N/A				N/A				N/A				N/A			
14		476.7	4.9	N/A				N/A				N/A				N/A			
15		490.0	4.9	N/A				N/A				N/A				N/A			
16	ANT. D KRA-27M2 (470-512)	470.0	4.9	N/A				N/A				N/A				N/A			
17		484.0	4.9	N/A				N/A				N/A				N/A			
18		498.0	5.0	N/A				N/A				N/A				N/A			
19		512.0	5.1	F4	7.33	3.67		F5	7.20	3.60		F6	6.57	3.29		F7	5.81	2.91	
20						-0.357	3.98			-0.260	3.82			-0.475	3.67			-1.21	3.84
SAR LIMITS				HEAD				SPATIAL PEAK				RF EXPOSURE CATEGORY							
FCC 47 CFR 2.1093				8.0 W/kg				1 gram average				Occupational / Controlled							
Notes																			
Test Mode = CW (Unmodulated Continuous Wave)								Phantom = Barski Planar Phantom											
DUT Spacing to Planar Phantom per Battery (see Appendix D)								Antenna Distance to Planar Phantom per Battery (see Appendix D)											
KNB-57L (a)		KNB-55L (b)		KNB-56N (c)		KBP-5 (d)		KNB-57L (a)		KNB-55L (b)		KNB-56N (c)		KBP-5 (d)					
2.5 cm		2.5 cm		2.5 cm		2.5 cm		3.7 cm		3.7 cm		3.7 cm		3.7 cm					
C = Column; R = Row				F1-F7 (F = Face) denotes the corresponding Face SAR Plot # as shown in Appendix A															
Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [6])																			
1. For face-held configuration, the highest capacity battery was selected as the default battery (battery "a").																			
2. The SAR evaluations commenced at the highest output power channel per antenna and frequency range.																			
3. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 4.0 W/kg (C2R1, C2R10, C2R12, C2R20), testing of the required immediately adjacent channel(s) is not necessary. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 3.5 W/kg (50% PTT duty factor), testing of all other required channels is not necessary.																			
4. When the SAR for all antennas tested using the default battery is ≤ 4.0 W/kg (C2R1, C2R10, C2R12, C2R20), test additional batteries using the antenna and channel configuration that resulted in the highest SAR (C2R20, C4R20, C6R20, C8R20).																			
5. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).																			

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 14 of 253

 Testing and Engineering Services Lab	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

SAR MEASUREMENT SUMMARY (CONT.)

BODY-WORN SAR EVALUATION RESULTS (with Belt-Clip & Default Audio Accessory P/N: KHS-10-BH)

C	Test Date(s): Jan. 4, 26, 2011			1		2		3		4		5		6		7		8	
R	Antenna Part No. & Test Freq. Range (MHz)	Test Freq. (MHz)	Cond. Pwr (W)	SAR W/kg 1g		SARW/kg1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SARW/kg1g		SAR W/kg 1g		SAR W/kg 1g	
				Battery KNB-57L (a)				Default Battery KNB-55L (b)				Battery KNB-56N (c)				Battery KBP-5 (d)			
				Belt-Clip KBH-12 (1)				Belt-Clip KBH-12 (1)				Belt-Clip KBH-12 (1)				Belt-Clip KBH-12 (1)			
				Audio KHS-10-BH (default)				Audio KHS-10-BH (default)				Audio KHS-10-BH (default)				Audio KHS-10-BH (default)			
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f	
				Drift dB		50%+droop		Drift dB		50%+droop		Drift dB		50%+droop		Drift dB		50%+droop	
1	ANT. A KRA-23M (450-490)	450.0	5.0	N/A			B1	8.32	4.16		N/A			N/A					
2									-0.124	4.28									
3		463.3	4.9	B5	9.95	4.98	B2	9.24	4.62		B6	8.93	4.47	B7	7.60	3.80			
4					-0.145	5.15		-0.306	4.96	-0.326		4.81	-1.23		5.04				
5		476.7	4.9	N/A			B3	7.74	3.87		N/A			N/A					
6				-0.681	4.53														
7		490.0	4.9	N/A			B4	5.43	2.72		N/A			N/A					
8				-0.303	2.91														
9	ANT. B KRA-23M2 (470-512)	470.0	4.9	N/A			N/A			N/A			N/A						
10		484.0	4.9	N/A			N/A			N/A			N/A						
11		498.0	5.0	N/A			B9	6.60	3.30		N/A			N/A					
12				-0.480	3.69														
13		512.0	5.1	B10	7.87	3.94	B8	8.94	4.47		B11	8.09	4.05	B12	6.85	3.43			
14					-0.475	4.39		-0.091	4.56	-0.311		4.35	-1.13		4.45				
15	ANT. C KRA-27M (450-490)	450.0	5.0	N/A			B13	7.94	3.97		N/A			N/A					
16									-0.480	4.43									
17		463.3	4.9	N/A			B14	9.73	4.87		N/A			N/A					
18				-0.228	5.13														
19		476.7	4.9	B17	9.10	4.55	B15	9.46	4.73		B18	9.52	4.76	B19	7.58	3.79			
20					-0.228	4.80		-0.428	5.22	-0.384		5.20	-1.17		4.96				
21		490.0	4.9	N/A			B16	7.85	3.93		N/A			N/A					
22												-0.349	4.25						
23	ANT. D KRA-27M2 (470-512)	470.0	4.9	B27	10.7	5.35	B23	10.2	5.10		B31	11.6	5.80	B35	8.67	4.34			
24					0.009	-		-0.141	5.27	-0.306		6.22	-1.07		5.55				
25		484.0	4.9	B26	12.1	6.05	B22	11.3	5.65		B30	11.6	5.80	B34	9.09	4.55			
26					-0.272	6.45		-0.262	6.00	-0.475		6.47	-1.29		6.12				
27		498.0	5.0	B25	11.9	5.95	B21	12.1	6.05		B29	12.0	6.00	B33	9.78	4.89			
28					-0.292	6.36		-0.305	6.49	-0.414		6.60	-1.23		6.49				
29		512.0	5.1	B24	12.9	6.45	B20	12.7	6.35		B28	12.5	6.25	B32	10.7	5.35			
30					-0.169	6.71		-0.261	6.74	-0.541		7.08	-1.20		7.05				

SAR LIMITS	BODY	SPATIAL PEAK	RF EXPOSURE CATEGORY
FCC 47 CFR 2.1093	8.0 W/kg	1 gram average	Occupational / Controlled

Notes

Audio accessory does not contain any built-in radiating element

Test Mode = CW (Unmodulated Continuous Wave)

Phantom = Barski Planar Phantom

DUT Spacing to Planar Phantom per Battery (see Appendix D)



Antenna Distance to Planar Phantom per Battery (see Appendix D)

KNB-57L (a)	KNB-55L (b)	KNB-56N (c)	KBP-5 (d)	KNB-57L (a)	KNB-55L (b)	KNB-56N (c)	KBP-5 (d)
1.6 cm	1.5 cm	1.7 cm	1.7 cm	2.7 cm	2.6 cm	2.8 cm	2.8 cm

C = Column; R = Row

B1-B35 (B = Body) denotes the corresponding Body SAR Plot # as shown in Appendix A

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 15 of 253


	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



SAR MEASUREMENT SUMMARY (CONT.)

BODY-WORN SAR EVALUATION RESULTS (Continued) (with KBH-12 Belt-Clip & Default Audio Accessory KHS-10-BH Headset)

Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [6])

1. For body-worn configuration, the thinnest standard battery was selected as the default battery (battery "b").
2. The SAR evaluations commenced at the highest output power channel per antenna and frequency range.
3. When the body SAR of an antenna tested on the highest output power channel with the default battery, default body-worn accessory and default audio accessory is > 4.0 W/kg and ≤ 6.0 W/kg (C4R2, C4R14, C4R16), body SAR should be measured for that antenna on the required immediately adjacent channels (C4R4, C4R12, C4R18). For the remaining channels that cannot be excluded, which still require consideration, the 3.5 W/kg exclusion and 4.0 W/kg exclusion may be applied recursively with respect to the highest output power channel among the remaining channels; measure the SAR of the remaining channels that cannot be excluded (C4R6, C4R8, C4R20, C4R22).
4. When the body SAR of an antenna tested on the highest output power channel with the default battery, default body-worn accessory and default audio accessory is > 6.0 W/kg (C4R30), test all required channels for that antenna (C4R24, C4R26, C4R28).
5. When the highest SAR of an antenna tested with the thinnest (default) battery is > 4.0 W/kg and ≤ 6.0 W/kg (C4R4, C4R14, C4R20), test additional batteries with the default body-worn and audio accessory on the channel that resulted in the highest SAR for that antenna (C2R4, C6R4, C8R4, C2R14, C6R14, C8R14, C2R20, C6R20, C8R20).
6. When the SAR of an antenna tested with the default battery and/or additional batteries is > 6.0 W/kg (C4R26, C4R28, C4R30), test that battery and antenna combination with the default body-worn and audio accessory on the required immediately adjacent channels (C2R23, C2R26, C2R28, C2R30, C6R24, C6R26, C6R28, C6R30, C8R24, C8R26, C8R28, C8R30).
7. If the SAR measured in #6 above is > 7.0 W/kg (C6R30, C8R30), test that battery, antenna, body-worn and audio accessory combination on all required channels.
8. The Noise Reduction Headset (Behind-the-Head) P/N: KHS-10-BH (Audio Accessory Category 1) was selected as the default audio accessory based on preliminary evaluations resulting in the most conservative SAR of all the disclosed audio accessories.
9. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 16 of 253

 Testing and Engineering Services Lab	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

SAR MEASUREMENT SUMMARY (CONT.)

BODY-WORN SAR EVALUATION RESULTS (with Belt-Loop & Default Audio Accessory P/N: KHS-10-BH)

C	Test Date(s): Jan. 4, 2011			1		2		3		4		5		6		7		8		
R	Antenna Part No. & Test Freq. Range (MHz)	Test Freq. (MHz)	Cond. Pwr (W)	SAR W/kg 1g		SARW/kg1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		SAR W/kg 1g		
				Battery KNB-57L (a)				Default Battery KNB-55L (b)				Battery KNB-56N (c)				Battery KBP-5 (d)				
				Belt-Loop KBH-13DS (2)				Belt-Loop KBH-13DS (2)				Belt-Loop KBH-13DS (2)				Belt-Loop KBH-13DS (2)				
				Audio KHS-10-BH (default)				Audio KHS-10-BH (default)				Audio KHS-10-BH (default)				Audio KHS-10-BH (default)				
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		
				Drift dB		50%+droop		Drift dB		50%+droop		Drift dB		50%+droop		Drift dB		50%+droop		
31	ANT. A KRA-23M (450-490)	450.0	5.0	N/A				B36	1.91		0.955		N/A				N/A			
32						0.253			-											
33		463.3	4.9	N/A				N/A				N/A				N/A				
34		476.7	4.9	N/A				N/A				N/A				N/A				
35		490.0	4.9	N/A				N/A				N/A				N/A				
36	ANT. B KRA-23M2 (470-512)	470.0	4.9	N/A				N/A				N/A				N/A				
37		484.0	4.9	N/A				N/A				N/A				N/A				
38		498.0	5.0	N/A				N/A				N/A				N/A				
39		512.0	5.1	N/A				B37	2.78		1.39		N/A				N/A			
40									-0.161		1.44									
41	ANT. C KRA-27M (450-490)	450.0	5.0	N/A				B38	2.44		1.22		N/A				N/A			
42						-0.053			1.23											
43		463.3	4.9	N/A				N/A				N/A				N/A				
44		476.7	4.9	N/A				N/A				N/A				N/A				
45		490.0	4.9	N/A				N/A				N/A				N/A				
46	ANT. D KRA-27M2 (470-512)	470.0	4.9	N/A				N/A				N/A				N/A				
47		484.0	4.9	N/A				N/A				N/A				N/A				
48		498.0	5.0	N/A				N/A				N/A				N/A				
49		512.0	5.1	N/A				N/A				N/A				N/A				
50																				
				B40	4.82	2.41	B39	4.75	2.38	B41	4.81	2.41	B42	4.00	2.00					
				-0.152	2.50	-0.238		2.51	-0.444		2.66	-1.16		2.61						

SAR LIMITS

BODY

SPATIAL PEAK

RF EXPOSURE CATEGORY

FCC 47 CFR 2.1093

8.0 W/kg

1 gram average

Occupational / Controlled

Notes

Audio accessory does not contain any built-in radiating element

Test Mode = CW (Unmodulated Continuous Wave)

Phantom = Barski Planar Phantom

DUT Spacing to Planar Phantom per Battery (see Appendix D)

Antenna Distance to Planar Phantom per Battery (see Appendix D)

KNB-57L (a)	KNB-55L (b)	KNB-56N (c)	KBP-5 (d)	KNB-57L (a)	KNB-55L (b)	KNB-56N (c)	KBP-5 (d)
4.7 cm	4.7 cm	4.7 cm	4.7 cm	5.7 cm	5.7 cm	5.7 cm	5.7 cm



C = Column; R = Row

B36-B42 (B = Body) denotes the corresponding Body SAR Plot # as shown in Appendix A

Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [6])

- For body-worn configuration, the thinnest standard battery was selected as the default battery (battery "b").
- The SAR evaluations commenced at the highest output power channel per antenna and frequency range.
- When the body SAR of an antenna tested on the highest output power channel with the default battery is ≤ 3.5 W/kg (C4R31, C4R40, C4R42, C4R50), testing of all other required channels is not necessary for that antenna.
- When the SAR for all antennas tested using the thinnest battery is ≤ 4.0 W/kg (C4R31, C4R40, C4R42, C4R50), test additional batteries using the antenna and channel configuration that resulted in the highest SAR among all antennas (C2R50, C6R50, C8R50).
- The Noise Reduction Headset (Behind-the-Head) P/N: KHS-10-BH (Audio Accessory Category 1) was selected as the default audio accessory based on preliminary evaluations resulting in the most conservative SAR of all the disclosed audio accessories.
- When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 17 of 253

 Testing and Engineering Services Lab	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

SAR MEASUREMENT SUMMARY (CONT.)

BODY-WORN SAR EVALUATION RESULTS (with Remaining Default Audio Acc's by Category)


C	Test Date(s): Jan. 27, 2011			1		2		3		4		5		6	
R	Antenna Part No. & Test Freq. Range (MHz)	Test Freq. (MHz)	Cond. Power (W)	1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)	
				Li-ion Battery KNB-57L (a)				Li-ion Battery KNB-57L (a)				Li-ion Battery KNB-57L (a)			
				Belt-Clip KBH-12 (1)				Belt-Clip KBH-12 (1)				Belt-Clip KBH-12 (1)			
				AUDIO ACC. CATEGORY 2				AUDIO ACC. CATEGORY 3				AUDIO ACC. CATEGORY 4			
				Earpiece P/N: KHS-27				Palm-Mic Kit P/N: KHS-9BL				Speaker-Mic P/N: KMC-48GPS			
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f	
				SAR Drift dB		50%+droop		SAR Drift dB		50%+droop		SAR Drift dB		50%+droop	
1	ANT. A KRA-23M (450-490)	450.0	5.0	A2	8.96	4.48	N/A				N/A				
2					0.027	-									
3		463.3	4.9	A1	10.8	5.40	A4	10.4	5.20	A5	9.75	4.88			
4					-0.698	6.34		-0.503	5.85		-0.526	5.50			
5		476.7	4.9	A3	6.99	3.50	N/A				N/A				
6					-0.619	4.03									
7		490.0	4.9	N/A				N/A				N/A			
SAR LIMITS				BODY				SPATIAL PEAK				RF EXPOSURE CATEGORY			
FCC 47 CFR 2.1093				8.0 W/kg				1g averaging				Occupational / Controlled			


Notes



Test Mode = CW (Unmodulated Continuous Wave)		DUT Distance to Phantom		Antenna Distance to Phantom	
Phantom = Barski Planar Phantom		1.6 cm	Back of radio to phantom	2.7 cm	Antenna base to phantom
Audio accessories do not contain any built-in radiating element					
C = Column; R = Row	A1-A5 (A = Audio) denotes the corresponding Audio Accessory SAR Plot # as shown in Appendix A				

Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [6])

- Preliminary evaluations were performed in order to select the default audio accessory, per audio accessory category, expected to result in the highest SAR, with respect to changes in RF characteristics and exposure conditions, based on similar construction and operating requirements (see Appendix D for photographs of the manufacturer's disclosed accessory options).
- Based on the SAR previously measured in the body-worn test sequence with default audio accessory, if the SAR for the antenna, body-worn accessory and battery combination(s) applicable to an audio accessory was/were > 4.0 W/kg and ≤ 6.0 W/kg, test that audio accessory using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration previously identified that is applicable to the audio accessory (C2R4, C4R4, C6R4).
- When the SAR measured in #2 above is > 6.0 W/kg (C2R4), test that audio accessory on the required immediately adjacent channels (C2R1, C2R6); testing of the other required channels still needs consideration.
- When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 18 of 253

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 19 of 253

 Testing and Engineering Services Lab	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

SAR MEASUREMENT SUMMARY (CONT.)



BODY-WORN SAR EVALUATION RESULTS (with Remaining Default Audio Acc's by Category)															
C	Test Date(s): Jan. 27, 2011			1		2		3		4		5		6	
R	Antenna Part No. & Test Freq. Range (MHz)	Test Freq. (MHz)	Cond. Power (W)	1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)	
				Ni-MH Battery KNB-56N (c)				Ni-MH Battery KNB-56N (c)				Ni-MH Battery KNB-56N (c)			
				Belt-Clip KBH-12 (1)				Belt-Clip KBH-12 (1)				Belt-Clip KBH-12 (1)			
				AUDIO ACC. CATEGORY 2				AUDIO ACC. CATEGORY 3				AUDIO ACC. CATEGORY 4			
				Earpiece P/N: KHS-27				Palm-Mic Kit P/N: KHS-9BL				Speaker-Mic P/N: KMC-48GPS			
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f	
				SAR Drift dB		50%+droop		SAR Drift dB		50%+droop		SAR Drift dB		50%+droop	
18	ANT. D KRA-27M2 (470-512)	470.0	4.9	A15	11.8	5.90	A19	10.9	5.45	A23	12.5	6.25			
19					-0.050	5.97		0.100	-		0.040	-			
20		484.0	4.9	A14	12.6	6.30	A18	13.0	6.50	A22	13.6	6.80			
21					-0.649	7.32		-0.424	7.17		-0.333	7.34			
22		498.0	5.0	A13	12.6	6.30	A17	12.5	6.25	A21	12.7	6.35			
23					-0.650	7.32		-0.159	6.48		-0.430	7.01			
24		512.0	5.1	A12	11.8	5.90	A16	11.6	5.80	A20	12.1	6.05			
25					-0.189	6.16		-0.312	6.23		-0.254	6.41			
SAR LIMITS				BODY				SPATIAL PEAK				RF EXPOSURE CATEGORY			
FCC 47 CFR 2.1093				8.0 W/kg				1g averaging				Occupational / Controlled			
Notes															
Test Mode = CW (Unmodulated Continuous Wave)						DUT Distance to Phantom				Antenna Distance to Phantom					
Phantom = Barski Planar Phantom						1.7 cm	Back of radio to phantom			2.8 cm	Antenna base to phantom				
Audio accessories do not contain any built-in radiating element															
C = Column; R = Row			A12-A23 (A = Audio) denotes the corresponding Audio Accessory SAR Plot # as shown in Appendix A												
Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [6])															
1. Preliminary evaluations were performed in order to select the default audio accessory, per audio accessory category, expected to result in the highest SAR, with respect to changes in RF characteristics and exposure conditions, based on similar construction and operating requirements (see Appendix D for photographs of the manufacturer's disclosed accessory options).															
2. Based on the SAR previously measured in the body-worn test sequence with default audio accessory, if the SAR for the antenna, body-worn accessory and battery combination(s) applicable to an audio accessory was/were > 4.0 W/kg and ≤ 6.0 W/kg, test that audio accessory using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration previously identified that is applicable to the audio accessory (C2R25, C4R25, C6R25).															
3. When the SAR measured in #2 above is > 6.0 W/kg (C2R25, C4R25, C6R25), test that audio accessory on the required immediately adjacent channels (C2R23, C4R23, C6R23); testing of the other required channels still needs consideration (C2R21, C2R19, C4R21, C4R18, C6R21, C6R18).															
4. When the SAR for an audio accessory measured in #3 above is > 7.0 W/kg (C2R21, C2R23, C4R21, C6R21, C6R23), test that audio accessory on all required channels.															
5. If the SAR measured in #3/#4 above is > 7.0 W/kg and it is one of the accessories within a group of similar audio accessories, test all other audio accessories within that group of similar audio accessories using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration previously identified that is applicable to the audio accessory (see next pages).															
6. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).															

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 20 of 253

SAR MEASUREMENT SUMMARY (CONT.)

BODY-WORN SAR EVALUATION RESULTS - ADDITIONAL AUDIO ACC'S PER CATEGORY

C	Test Date(s): January 31, 2011					1		2			
R	Antenna P/N (Freq. Range)	Audio Accessory & Category	Audio Accessory Part No.	Test Frequency (MHz)	Conducted Power (W)	1g SAR (W/kg)					
						Ni-MH Battery 1400 mAh KNB-56N (c)					
						Plot #	100% ptt d/f SAR Drift dB	50% ptt d/f 50%+droop			
26	ANT. D KRA-27M2 (470-512 MHz)	Headset (Cat. 1)	KHS-10-OH	470.0	4.9	A24	12.1	6.05			
27							0.189	-			
28				484.0	4.9	A25	13.2	6.60			
29							-0.511	7.42			
30							12.1	6.05			
31				498.0	5.0	A26	-0.287	6.46			
32			11.4				5.70				
33			-0.121				5.86				
34			KHS-21	470.0	4.9	A28	11.3	5.65			
35							0.051	-			
36							484.0	4.9	A29	12.7	6.35
37										-0.576	7.25
38										12.7	6.35
39							498.0	5.0	A30	-0.325	6.84
40			12.1	6.05							
41			-0.208	6.35							
42			KHS-22	470.0	4.9	A32	12.0	6.00			
43							0.010	-			
44							484.0	4.9	A33	13.0	6.50
45										-0.607	7.48
46										12.5	6.25
47							498.0	5.0	A34	-0.196	6.54
48			12.1	6.05							
49			-0.175	6.30							
50			KHS-7	470.0	4.9	A36	11.8	5.90			
51							0.009	-			
52							484.0	4.9	A37	12.7	6.35
53										-0.517	7.15
54										12.7	6.35
55							498.0	5.0	A38	-0.316	6.83
56			11.2	5.60							
57			-0.275	5.97							
58			KHS-7A	470.0	4.9	A40	12.3	6.15			
59							-0.169	6.39			
60							484.0	4.9	A41	12.8	6.40
61										-0.428	7.06
62										12.8	6.40
63							498.0	5.0	A42	-0.276	6.82
64			11.8	5.90							
65			-0.154	6.11							
SAR LIMITS			BODY		SPATIAL PEAK		RF EXPOSURE CATEGORY				
FCC 47 CFR 2.1093			8.0 W/kg		1g average		Occupational / Controlled				

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

SAR MEASUREMENT SUMMARY (CONT.)



Notes

If the SAR previously measured with default audio accessory per category was > 7.0 W/kg and it is one of the accessories within a group of similar audio accessories, test all other audio accessories within that group of similar audio accessories using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration previously identified that is applicable to the audio accessory.

When the SAR for a similar audio accessory evaluated per above is > 7.0 W/kg (C2R29, C2R37, C2R45, C2R53, C2R61), test that audio accessory on all required channels using the same combination.

Test Mode = CW (Unmodulated Continuous Wave)	DUT Distance to Phantom		Antenna Distance to Phantom	
Phantom = Burski Planar Phantom	KRA-27M2 (Antenna D)	1.7 cm Belt-Clip	KRA-27M2 (Antenna D)	2.8 cm
C = Column; R = Row				
Body-worn Accessory = Belt-Clip (P/N: KBH-12)				
Audio accessories do not contain any built-in radiating element				

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 22 of 253



	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

SAR MEASUREMENT SUMMARY (CONT.)

BODY-WORN SAR EVALUATION RESULTS - ADDITIONAL AUDIO ACC'S PER CATEGORY

C	Test Date(s): January 28 & 31, 2011					1		2	
R	Antenna P/N (Freq. Range)	Audio Accessory & Category	Audio Accessory Part No.	Test Frequency (MHz)	Conducted Power (W)	1g SAR (W/kg)			
						Ni-MH Battery 1400 mAh KNB-56N (c)			
						Plot #	100% ptt d/f	50% ptt d/f	
							SAR Drift dB	50% + droop	
66	ANT. D KRA-27M2 (470-512 MHz)	Earpiece (Cat. 2)	KHS-23	470.0	4.9	A44	11.0	5.50	
67							-0.177	5.73	
68							13.6	6.80	
69							-0.430	7.51	
70							12.6	6.30	
71							-0.286	6.73	
72						11.2	5.60		
73						-0.027	5.63		
74						10.8	5.40		
75						0.268	-		
76						12.6	6.30		
77						-0.542	7.14		
78						12.5	6.25		
79						-0.403	6.86		
80						12.2	6.10		
81						-0.206	6.40		
82						11.5	5.75		
83						-0.338	6.22		
84						13.2	6.60		
85						-0.470	7.35		
86						13.2	6.60		
87						-0.363	7.18		
88						12.0	6.00		
89						-0.196	6.28		
90						10.7	5.35		
91						0.098	-		
92						13.5	6.75		
93						-0.485	7.55		
94						12.4	6.20		
95						-0.339	6.70		
96				12.1	6.05				
97				-0.060	6.13				
SAR LIMITS		BODY			SPATIAL PEAK		RF EXPOSURE CATEGORY		
FCC 47 CFR 2.1093		8.0 W/kg			1g average		Occupational / Controlled		

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

SAR MEASUREMENT SUMMARY (CONT.)



Notes

If the SAR previously measured with default audio accessory per category was > 7.0 W/kg and it is one of the accessories within a group of similar audio accessories, test all other audio accessories within that group of similar audio accessories using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration previously identified that is applicable to the audio accessory.

When the SAR for a similar audio accessory evaluated per above is > 7.0 W/kg (C2R69, C2R77, C2R85, C2R87, C2R93), test that audio accessory on all required channels using the same combination.

Test Mode = CW (Unmodulated Continuous Wave)	DUT Distance to Phantom		Antenna Distance to Phantom	
Phantom = Barski Planar Phantom	KRA-27M2 (Antenna D)	1.7 cm Belt-Clip	KRA-27M2 (Antenna D)	2.8 cm
C = Column; R = Row				
Body-worn Accessory = Belt-Clip (P/N: KBH-12)				
Audio accessories do not contain any built-in radiating element				

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 24 of 253

	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

Test Lab Certificate No. 2470.01



SAR MEASUREMENT SUMMARY (CONT.)

BODY-WORN SAR EVALUATION RESULTS - ADDITIONAL AUDIO ACC'S PER CATEGORY

C	Test Date(s): January 28, 31, 2011					1	2
R	Antenna P/N (Freq. Range)	Audio Accessory & Category	Audio Accessory Part No.	Test Frequency (MHz)	Conducted Power (W)	1g SAR (W/kg)	
						Ni-MH Battery 1400 mAh KNB-56N (c)	
						Plot #	50% ptt d/f SAR Drift dB
98	ANT. D KRA-27M2 (470-512 MHz)	Speaker- Mic (Cat. 4)	KMC-21	470.0	4.9	A60	11.0
99							5.50
100				484.0	4.9	A61	0.054
101							-
102				498.0	5.0	A62	13.1
103							6.55
104			KMC-45	470.0	4.9	A64	-0.505
105				484.0	4.9	A65	7.36
106				498.0	5.0	A66	13.2
107				512.0	5.1	A67	6.60
108							-0.347
109				470.0	4.9	A68	7.15
110				484.0	4.9	A69	12.1
111				498.0	5.0	A70	6.05
112				512.0	5.1	A71	-0.268
113			KMC-45 with KEP-2 Earphone Kit	470.0	4.9		6.44
114				484.0	4.9		12.5
115				498.0	5.0		6.25
116				512.0	5.1		-0.223
117							6.58
118			KMC-45 with KEP-2 Earphone Kit	470.0	4.9		13.3
119				484.0	4.9		6.65
120				498.0	5.0		-0.461
121				512.0	5.1		7.39
							6.40

Notes				
If the SAR previously measured with default audio accessory per category was > 7.0 W/kg and it is one of the accessories within a group of similar audio accessories, test all other audio accessories within that group of similar audio accessories using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration previously identified that is applicable to the audio accessory.				
When the SAR for a similar audio accessory evaluated per above is > 7.0 W/kg (C2R101, C2R103, C2R109, C2R111, C2R117), test that audio accessory on all required channels using the same combination.				
Test Mode = CW (Unmodulated Continuous Wave)	DUT Distance to Phantom		Antenna Distance to Phantom	
Phantom = Barski Planar Phantom	KRA-27M2 (Antenna D)	1.7 cm Belt-Clip	KRA-27M2 (Antenna D)	2.8 cm
C = Column; R = Row				
Body-worn Accessory = Belt-Clip (P/N: KBH-12)				
Audio accessories do not contain any built-in radiating element				

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 25 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01


10.0 SAR SCALING (TUNE-UP TOLERANCE)



SAR LEVELS SCALED TO KENWOOD MAXIMUM TOLERANCE SPECIFICATION

Test Config.	Freq. (MHz)	Antenna Part No.	Battery Part No.	Conducted Power (W)	SAR Level (inc. droop) 1g (W/kg)		Scale to 5.0 W (5 W + 0 dB)	Scaled SAR 1g (W/kg)
Body-worn	463.3	KRA-23M (A)	KNB-55L (b)	4.9	4.96	B2	+0.088 dB	5.06
Body-worn	476.7	KRA-23M (A)	KNB-55L (b)	4.9	4.53	B3	+0.088 dB	4.62
Body-worn	490.0	KRA-23M (A)	KNB-55L (b)	4.9	2.91	B4	+0.088 dB	2.97
Body-worn	463.3	KRA-23M (A)	KNB-57L (a)	4.9	5.15	B5	+0.088 dB	5.26
Body-worn	463.3	KRA-23M (A)	KNB-56N (c)	4.9	4.81	B6	+0.088 dB	4.91
Body-worn	463.3	KRA-23M (A)	KBP-5 (d)	4.9	5.04	B7	+0.088 dB	5.14
Body-worn	463.3	KRA-27M (C)	KNB-55L (b)	4.9	5.13	B14	+0.088 dB	5.24
Body-worn	476.7	KRA-27M (C)	KNB-55L (b)	4.9	5.22	B15	+0.088 dB	5.33
Body-worn	490.0	KRA-27M (C)	KNB-55L (b)	4.9	4.25	B16	+0.088 dB	4.34
Body-worn	476.7	KRA-27M (C)	KNB-57L (a)	4.9	4.80	B17	+0.088 dB	4.90
Body-worn	476.7	KRA-27M (C)	KNB-56N (c)	4.9	5.20	B18	+0.088 dB	5.31
Body-worn	476.7	KRA-27M (C)	KBP-5 (d)	4.9	4.96	B19	+0.088 dB	5.06
Body-worn	484.0	KRA-27M2 (D)	KNB-55L (b)	4.9	6.00	B22	+0.088 dB	6.12
Body-worn	470.0	KRA-27M2 (D)	KNB-55L (b)	4.9	5.27	B23	+0.088 dB	5.38
Body-worn	484.0	KRA-27M2 (D)	KNB-57L (a)	4.9	6.45	B26	+0.088 dB	6.58
Body-worn	470.0	KRA-27M2 (D)	KNB-57L (a)	4.9	5.35	B27	+0.088 dB	5.46
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.47	B30	+0.088 dB	6.60
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.22	B31	+0.088 dB	6.35
Body-worn	484.0	KRA-27M2 (D)	KBP-5 (d)	4.9	6.12	B34	+0.088 dB	6.25
Body-worn	470.0	KRA-27M2 (D)	KBP-5 (d)	4.9	5.55	B35	+0.088 dB	5.66
Body-worn	463.3	KRA-23M (A)	KNB-57L (a)	4.9	6.34	A1	+0.088 dB	6.47
Body-worn	476.7	KRA-23M (A)	KNB-57L (a)	4.9	4.03	A3	+0.088 dB	4.11
Body-worn	463.3	KRA-23M (A)	KNB-57L (a)	4.9	5.85	A4	+0.088 dB	5.97
Body-worn	463.3	KRA-23M (A)	KNB-57L (a)	4.9	5.50	A5	+0.088 dB	5.61
Body-worn	476.7	KRA-27M (C)	KNB-55L (b)	4.9	5.04	A9	+0.088 dB	5.14
Body-worn	476.7	KRA-27M (C)	KNB-55L (b)	4.9	5.18	A10	+0.088 dB	5.29
Body-worn	476.7	KRA-27M (C)	KNB-55L (b)	4.9	4.75	A11	+0.088 dB	4.85
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.32	A14	+0.088 dB	7.47
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	5.97	A15	+0.088 dB	6.09
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.17	A18	+0.088 dB	7.32
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	5.45	A19	+0.088 dB	5.56
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.34	A22	+0.088 dB	7.49

Notes:

1. The SAR levels reported are based on 50% PTT duty factor including SAR droop.
2. The right-side column of split SAR Level column denotes the corresponding SAR Plot # (see Appendix A).
3. The scaled SAR levels are below the FCC Occupational SAR Limit of 8.0 W/kg.

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 26 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

SAR SCALING (TUNE-UP TOLERANCE) (CONT.)



SAR LEVELS SCALED TO KENWOOD MAXIMUM TOLERANCE SPECIFICATION

Test Config.	Freq. (MHz)	Antenna Part No.	Battery Part No.	Conducted Power (W)	SAR Level (inc. droop) 1g (W/kg)		Scale to 5.0 W (5 W + 0 dB)	Scaled SAR 1g (W/kg)
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.25	A23	+0.088 dB	6.38
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.05	A24	+0.088 dB	6.17
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.42	A25	+0.088 dB	7.57
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	5.65	A28	+0.088 dB	5.77
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.25	A29	+0.088 dB	7.40
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.00	A32	+0.088 dB	6.12
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.48	A33	+0.088 dB	7.63
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	5.90	A36	+0.088 dB	6.02
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.15	A37	+0.088 dB	7.30
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.39	A40	+0.088 dB	6.52
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.06	A41	+0.088 dB	7.20
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	5.73	A44	+0.088 dB	5.85
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.51	A45	+0.088 dB	7.66
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	5.40	A48	+0.088 dB	5.51
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.14	A49	+0.088 dB	7.29
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.22	A52	+0.088 dB	6.35
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.35	A53	+0.088 dB	7.50
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	5.35	A56	+0.088 dB	5.46
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.55	A57	+0.088 dB	7.70
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	5.50	A60	+0.088 dB	5.61
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.36	A61	+0.088 dB	7.51
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.58	A64	+0.088 dB	6.71
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.39	A65	+0.088 dB	7.54
Body-worn	470.0	KRA-27M2 (D)	KNB-56N (c)	4.9	6.78	A68	+0.088 dB	6.92
Body-worn	484.0	KRA-27M2 (D)	KNB-56N (c)	4.9	7.33	A69	+0.088 dB	7.48

Notes:

1. The SAR levels reported are based on 50% PTT duty factor including SAR droop.
2. The right-side column of split SAR Level column denotes the corresponding SAR Plot # (see Appendix A).
3. The scaled SAR levels are below the FCC Occupational SAR Limit of 8.0 W/kg.


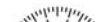

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 27 of 253

 Celltech Testing and Engineering Services Lab	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

11.0 RATIONALE FOR PROCEDURES APPLIED (FCC KDB 643646)

- a. Face-held Configuration - Default Battery Selection - page 14, footnote 1 - per FCC KDB 643646, Page 2, Section 1) A): *"When multiple standard batteries are supplied with a radio, the battery with the highest capacity is considered the default battery for making head SAR measurements."*
- b. Body-worn Configuration - Default Battery Selection - pages 15 and 17, footnote 1 - per FCC KDB 643646, Page 5, Section 1) A): *"Start by testing a PTT radio with the thinnest battery and a standard (default) body-worn accessory that are both supplied with the radio and, if applicable, a default audio accessory....."*
- c. Body-worn Configuration - Default Body-worn Accessory Selection - the belt-clip was selected as the default body-worn accessory based on the smaller separation distance it provides between the radio and the user in comparison to the belt-loop accessory. Please refer to the body-worn accessory spacing listed in the notes section on pages 15 and 17. Per FCC KDB 643646, Page 5, Section 1) A): *"When multiple default body-worn accessories are supplied with a radio, the standard body-worn accessory expected to result in the highest SAR based on its construction and exposure conditions is considered the default body-worn accessory for making body-worn measurements."*
- d. Body-worn Configuration - Additional Body-worn Accessory (page 17) - the belt-loop body-worn accessory was evaluated based on the *"additional body-worn accessory"* guidance provided in FCC KDB 643646, Page 7, Section 4).
- e. Body-worn Configuration - Default Audio Accessory Selection - the Default Audio Accessory (pages 15 and 17) was selected based on the guidance provided in FCC KDB 643646, Page 4, Section "Body SAR Test Considerations for Body-worn Accessories", footnote 8: *"The applicable audio accessory that is expected to result in the most conservative SAR must be used."* Please refer to note (i) below for the assessment method utilized to establish the default audio accessory.
- f. Body-worn Configuration - Selection of Remaining Default Audio Accessories by Category - the Remaining Default Audio Accessories by Category (pages 18-20) were selected based on the guidance provided in FCC KDB 643646, Section "Body SAR Test Considerations for Audio Accessories without Built-in Antenna", Page 10: *"For audio accessories with similar construction and operating requirements, test only the audio accessory within the group that is expected to result in the highest SAR, with respect to changes in RF characteristics and exposure conditions for the combination. If it is unclear which audio accessory within a group of similar accessories is expected to result in the highest SAR, good engineering judgment and preliminary testing should be applied to select the accessory that is expected to result in the highest SAR."* See note (?) below. The Remaining Default Audio Accessories by Category were evaluated on the highest SAR channel (per antenna) from the KHS-10-BH headset evaluations based on the guidance provided in FCC KDB 643646, Page 10, Section 1) A) thru D).
- g. Body-worn Configuration - Selection of Additional Audio Accessories by Category - the Additional Audio Accessories by Category (pages 21-25) were selected based on the guidance provided in FCC KDB 643646, Section "Body SAR Test Considerations for Audio Accessories without Built-in Antenna", Page 10, 1): *"For the audio accessories that have not been tested in the body-worn accessories test sequences in the previous section, the highest SAR for an antenna, body-worn accessory and battery combination tested in the body-worn accessories sequences applicable to an audio accessory is used to determine SAR test requirements....."*
- h. According to the manufacturer, the radio is not supplied to the end user with an audio accessory; therefore a "standard" default audio accessory (as referenced in FCC KDB 643646, Page 4, Section "Body SAR Test Considerations for Body-worn Accessories") does not apply.
- i. According to the manufacturer, all the optional audio accessories can be used with any accessory combination (antenna, battery & body-worn accessory). Therefore, in order to determine the default audio accessory (in accordance with FCC KDB 643646, Page 4, footnote 8), preliminary SAR evaluations (area scans with belt-clip and thinnest battery) were performed by Celltech with all of the optional audio accessories connected to the radio consecutively in order to select the audio accessory expected to result in the highest SAR level for the final compliance evaluations. The headset audio accessory part no. KHS-10-BH yielded the highest SAR level from the preliminary evaluations and therefore was selected as the default audio accessory.

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 28 of 253


	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				



12.0 DETAILS OF SAR EVALUATION

- The number of test frequencies and the test channels evaluated for SAR were selected in accordance with the procedures described in FCC KDB 447498 Section 6) c) (see reference [5]).
- The DUT was evaluated for SAR in accordance with the procedures described in FCC KDB 643646 D01v01 (see reference [6]).
- 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 SAR droop of the DUT was measured by the DASY4 system for the duration of the SAR evaluations. The measured SAR droop was added to the measured SAR levels to report scaled SAR levels as shown in the SAR test data tables. A SAR-versus-Time power droop evaluation was performed (see SAR Plot #A25 - Appendix A).
- The fluid temperature was measured prior to and after the SAR evaluations. The fluid temperature remained within $\pm 2^{\circ}\text{C}$ during the SAR evaluations.
- The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).
- The DUT was tested at the maximum conducted output power level preset by the manufacturer 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.

13.0 SAR EVALUATION PROCEDURES

- 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.
 - 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.

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 29 of 253

 Testing and Engineering Services Lab	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

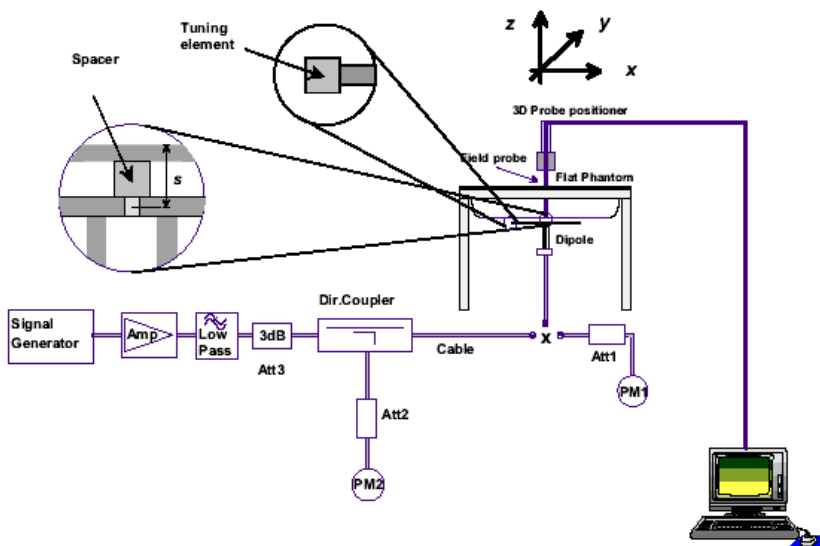
14.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations, daily system checks were performed with a planar phantom and SPEAG 450 MHz dipole (see Appendix B) in accordance with the procedures described in IEEE Standard 1528-2003 (see reference [3]). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C for measured fluid dielectric parameters). A forward power of 398 mW was applied to the dipole and the system was verified to a tolerance of $\pm 10\%$ from the SAR system manufacturer's dipole calibration target SAR value (see Appendix E for system manufacturer's dipole calibration procedures).

SYSTEM PERFORMANCE CHECK EVALUATIONS

Test Date	Equiv. Tissue Freq. (MHz)	SAR 1g (W/kg)			Dielectric Constant ϵ_r			Conductivity σ (mho/m)			ρ (Kg/m ³)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		SPEAG Target	Meas.	Dev.	SPEAG Target	Meas.	Dev.	SPEAG Target	Meas.	Dev.						
Jan 04	Body 450	1.78 $\pm 10\%$	1.92	+7.9%	56.7 $\pm 5\%$	58.8	+3.7%	0.94 $\pm 5\%$	0.93	-1.1%	1000	23.0	22.4	≥ 15	35	101.1
Jan 06	Head 450	1.87 $\pm 10\%$	1.93	+3.2%	43.5 $\pm 5\%$	45.6	+4.8%	0.87 $\pm 5\%$	0.88	+1.1%	1000	23.5	22.5	≥ 15	40	101.1
Jan 26	Body 450	1.78 $\pm 10\%$	1.85	+3.9%	56.7 $\pm 5\%$	57.7	+1.8%	0.94 $\pm 5\%$	0.91	-3.2%	1000	23.3	22.7	≥ 15	35	101.1
Jan 27	Body 450	1.78 $\pm 10\%$	1.84	+3.4%	56.7 $\pm 5\%$	58.2	+2.6%	0.94 $\pm 5\%$	0.91	-3.2%	1000	23.1	22.4	≥ 15	35	101.1
Jan 28	Body 450	1.78 $\pm 10\%$	1.89	+6.2%	56.7 $\pm 5\%$	58.9	+3.9%	0.94 $\pm 5\%$	0.93	-1.1%	1000	24.0	23.1	≥ 15	40	101.1
Jan 31	Body 450	1.78 $\pm 10\%$	1.90	+6.7%	56.7 $\pm 5\%$	59.3	+4.6%	0.94 $\pm 5\%$	0.93	-1.1%	1000	24.1	23.2	≥ 15	40	101.1

- | | | |
|-------|----|--|
| Notes | 1. | The target SAR values are the measured values from the SAR system manufacturer's dipole calibration (see Appendix E). |
| | 2. | The target dielectric parameters are the nominal values from the SAR system manufacturer's dipole calibration (see Appendix E). |
| | 3. | The fluid temperature was measured prior to and after the system performance check evaluations. The fluid temperature remained within $\pm 2^\circ\text{C}$ during the system performance check evaluations. |
| | 4. | The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C). |



System Performance Check Measurement Setup (IEEE Standard 1528-2003)



SPEAG 450 MHz Validation Dipole Setup

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 30 of 253



15.0 SIMULATED EQUIVALENT TISSUES

The simulated equivalent tissue recipes in the table below are derived from the SAR system manufacturer's suggested recipes in the DASY4 manual (see references [8] and [9]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2003 (see reference [3]). The ingredient percentage may have been adjusted minimally in order to achieve the appropriate target dielectric parameters within the specified tolerance.

SIMULATED TISSUE MIXTURES		
INGREDIENT	450 MHz HEAD	450 MHz BODY
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 %

16.0 SAR LIMITS

SAR RF EXPOSURE LIMITS		
FCC 47 CFR 2.1093	General Population	Occupational
Spatial Average (averaged over the whole body)	0.08 W/kg	0.4 W/kg
Spatial Peak (averaged over any 1 g of tissue)	1.6 W/kg	8.0 W/kg
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0 W/kg	20.0 W/kg
The Spatial Average value of the SAR averaged over the whole body.		
The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.		
The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.		
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.		



	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01


17.0 ROBOT SYSTEM SPECIFICATIONS

<u>Specifications</u>	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
<u>Data Converter</u>	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<u>E-Field Probe</u>	
Model	ET3DV6
Serial No.	1590
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
<u>Evaluation Phantom</u>	
Type	Barski Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters
<u>Validation Phantom</u>	
Type	Barski Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters


Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 32 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


18.0 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 head simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)	
Frequency:	10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)	
Directivity:	± 0.2 dB in head tissue (rotation around probe axis) ± 0.4 dB in head tissue (rotation normal to probe axis)	
Dynamic Range:	5 μ W/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



19.0 BARSKI PLANAR PHANTOM

<p>The Barski Planar Phantom is a fiberglass shell phantom with a 2.0 mm (+/-0.2mm) thick device measurement area at the center of the phantom for SAR evaluations of devices with a larger surface area than the planar section of the SAM phantom. The planar phantom is integrated in a wooden table. The planar phantom was used for the DUT SAR evaluations and the system performance check evaluations. See Appendix G for dimensions and specifications of the Barski Planar Phantom.</p>	
	Barski Planar Phantom

20.0 DEVICE HOLDER

<p>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. For evaluations of larger devices a Plexiglas platform is attached to the device holder.</p>	
	Device Holder

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 33 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

21.0 TEST EQUIPMENT LIST




TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION INTERVAL
USED	DESCRIPTION				
x	Schmid & Partner DASY4 System	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	CNR	CNR
x	-Robot	00046	599396-01	CNR	CNR
x	-DAE4	00019	353	27Apr10	Annual
x	-ET3DV6 E-Field Probe	00017	1590	15Jul10	Annual
x	-SPEAG D450V3 Validation Dipole	00217	1068	18Jan10	Biennial
x	-Side Planar Phantom	00156	161	CNR	CNR
x	-Barski Planar Phantom	00155	03-01	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
x	Gigatronics 8652A Power Meter	00007	1835272	04May10	Biennial
x	Gigatronics 80701A Power Sensor	00014	1833699	04May10	Biennial
x	HP 8753ET Network Analyzer	00134	US39170292	04May10	Biennial
x	Rohde & Schwarz SMR20 Signal Generator	00006	100104	CNR	CNR
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Abbr.	CNR = Calibration Not Required				

22.0 JUSTIFICATION FOR EXTENDED SAR DIPOLE CALIBRATION

SAR dipoles calibrated less than two years ago but more than one year ago were confirmed by maintaining return loss (< -20 dB, within 20% of prior calibration) and impedance (within 5 Ω from prior calibration) requirements per extended calibrations in FCC KDB 450824 (see reference [7]).

SPEAG VALIDATION DIPOLE D450V3 - SN: 1068						
Measurement Date	Freq.	TSL	Return Loss (dB)	Δ %	Impedance (Ω)	Δ Ω
January 18, 2010	450 MHz	Head	-21.0		57.5	
February 7, 2011			-21.3	1.5%	53.8	3.7
January 18, 2010	450 MHz	Body	-20.0		54.8	
February 7, 2011			-20.5	2.5%	50.4	4.4

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 34 of 253

	Date(s) of Evaluation Jan. 4,6,26-28,31, 2011	Test Report Serial No. 121510ALH-T1070-S90U	Test Report Revision No. Rev. 1.2 (3rd Release)	 
	Test Report Issue Date March 24, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

Test Lab Certificate No. 2470.01



23.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION									
Uncertainty Component	IEEE 1528 Section	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value $\pm\%$ (1g)	Uncertainty Value $\pm\%$ (10g)	V_i or V_{eff}
Measurement System									
Probe Calibration (450 MHz)	E.2.1	6.65	Normal	1	1	1	6.65	6.65	∞
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	Rectangular	1.732050808	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	E.4.1	3.6	Normal	1	1	1	3.6	3.6	8
SAR Drift Measurement	6.6.2	5	Rectangular	1.732050808	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measured)	E.3.3	4.6	Normal	1	0.64	0.43	2.9	2.0	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	4.9	Normal	1	0.6	0.49	3.0	2.4	∞
Combined Standard Uncertainty			RSS				11.77	11.31	
Expanded Uncertainty (95% Confidence Interval)			k=2				23.54	22.63	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2



Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 35 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

24.0 REFERENCES



- [1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093.
- [2] 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.
- [3] 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.
- [4] IEC International Standard 62209-1:2005 - "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures."
- [5] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01v04: November 2009.
- [6] Federal Communications Commission, Office of Engineering and Technology - "SAR Test Reduction Considerations for Occupational PTT Radios", KDB 643646 D01v01: December 2010.
- [7] Federal Communications Commission, Office of Engineering and Technology - "Application Note: SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz"; KDB 450824 D01v01r01: January 2007.
- [8] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 16 Application Note, Head Tissue Recipe: Sept. 2005.
- [9] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 17 Application Note, Body Tissue Recipe: Sept. 2005.
- [10] ISO/IEC 17025 - "General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)."
- [11] Federal Communications Commission - "Measurements Required: RF Power Output"; Rule Part 47 CFR §2.1046.
- [12] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 21 Application Note, SAR Sensitivities: Sept. 2005.

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 36 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX B - SYSTEM PERFORMANCE CHECK PLOTS

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 165 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 01/04/2011

System Performance Check - 450 MHz Dipole - Body

DUT: Dipole D450V3; Asset: 00217; Serial: 1068; Calibration: 01/18/2010

Ambient Temp: 23.0°C; Fluid Temp: 22.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: M450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.93 \text{ mho/m}$; $\epsilon_r = 58.8$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.73, 7.73, 7.73); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 450 MHz Dipole

Body d=15mm Pin=398mW 2/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.03 mW/g

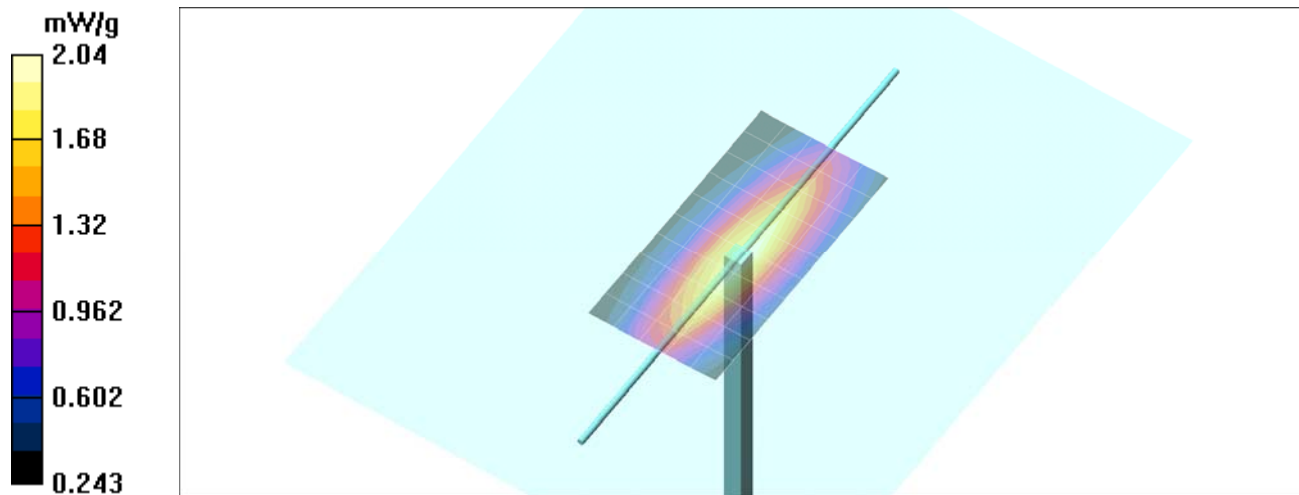
Body d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 45.7 V/m; Power Drift = 0.003 dB



Peak SAR (extrapolated) = 3.06 W/kg

SAR(1 g) = 1.92 mW/g; SAR(10 g) = 1.28 mW/g

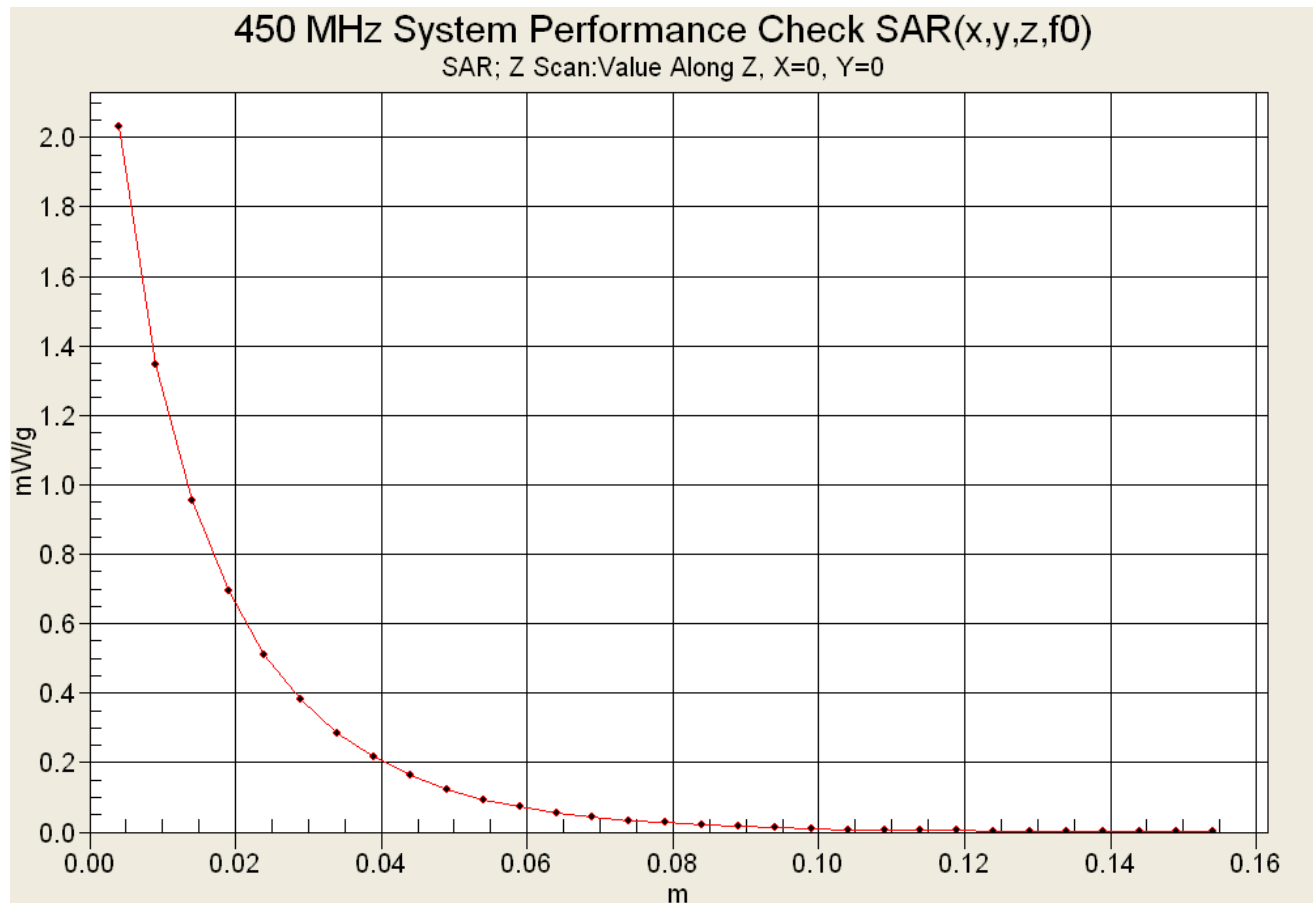
Maximum value of SAR (measured) = 2.04 mW/g





Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 166 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 167 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 01/06/2011

System Performance Check - 450 MHz Dipole - Head

DUT: Dipole D450V3; Asset: 00217; Serial: 1068; Calibration: 01/18/2010

Ambient Temp: 23.5°C; Fluid Temp: 22.5°C; Barometric Pressure: 101.1 kPa; Humidity: 40%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: HSL450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.88 \text{ mho/m}$; $\epsilon_r = 45.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.25, 7.25, 7.25); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 450 MHz Dipole

Head d=15mm Pin=398mW 2/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.02 mW/g

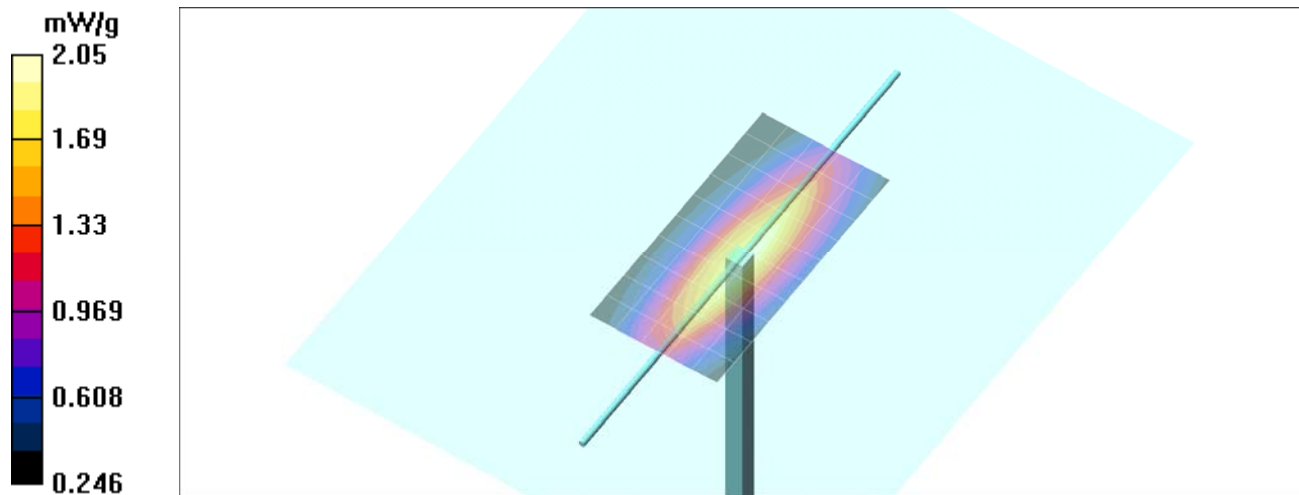
Head d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 47.2 V/m; Power Drift = -0.002 dB



Peak SAR (extrapolated) = 2.99 W/kg

SAR(1 g) = 1.93 mW/g; SAR(10 g) = 1.29 mW/g

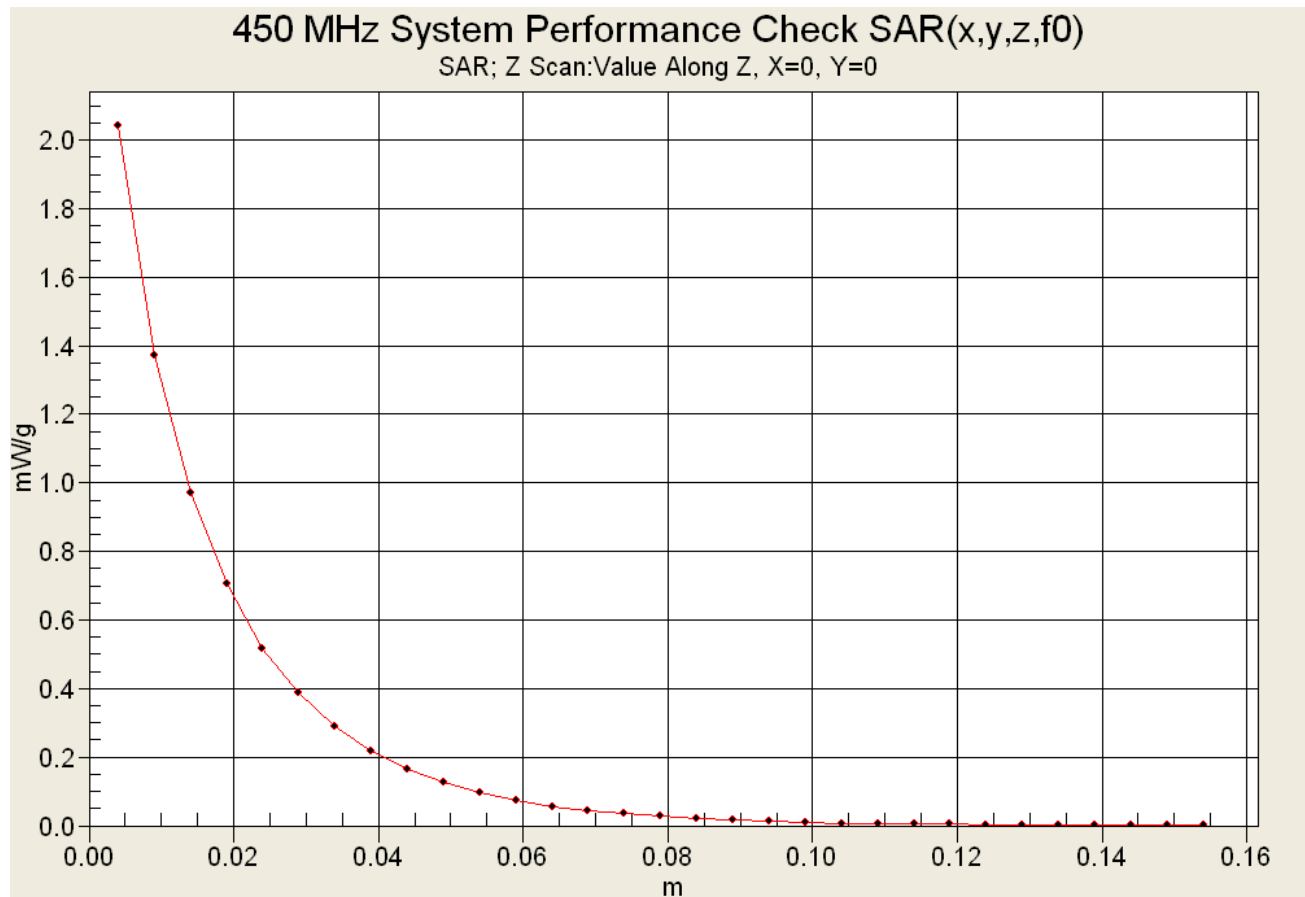
Maximum value of SAR (measured) = 2.05 mW/g





Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 168 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 169 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 01/26/2011

System Performance Check - 450 MHz Dipole - Body

DUT: Dipole D450V3; Asset: 00217; Serial: 1068; Calibration: 01/18/2010

Ambient Temp: 23.3°C; Fluid Temp: 22.7°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: M450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 57.7$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.73, 7.73, 7.73); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 450 MHz Dipole

Body d=15mm Pin=398mW 2/Area Scan (6x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.92 mW/g

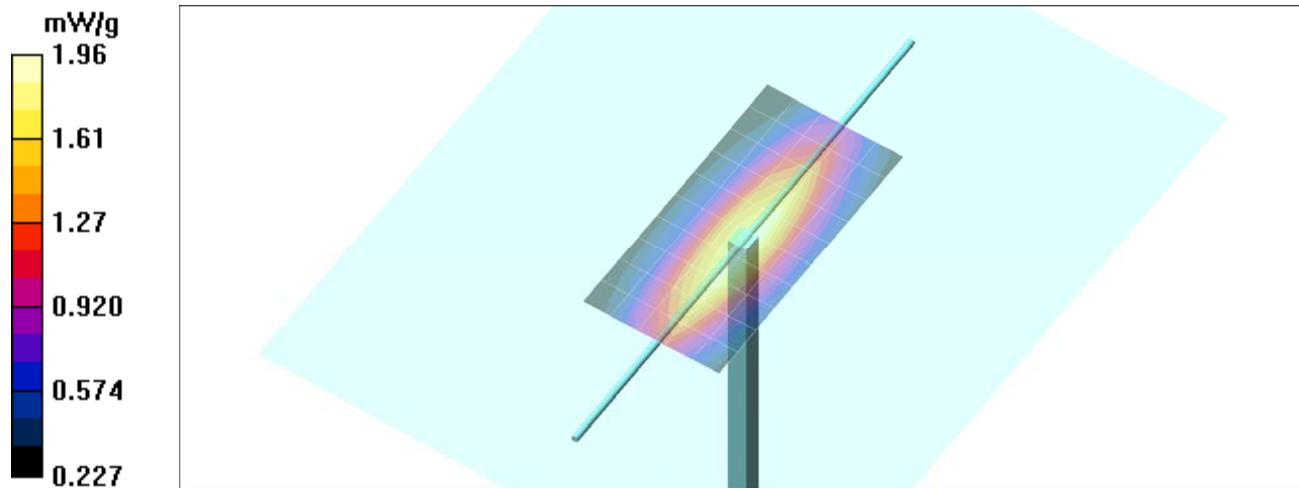
Body d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 45.6 V/m; Power Drift = 0.061 dB



Peak SAR (extrapolated) = 2.92 W/kg

SAR(1 g) = 1.85 mW/g; SAR(10 g) = 1.24 mW/g

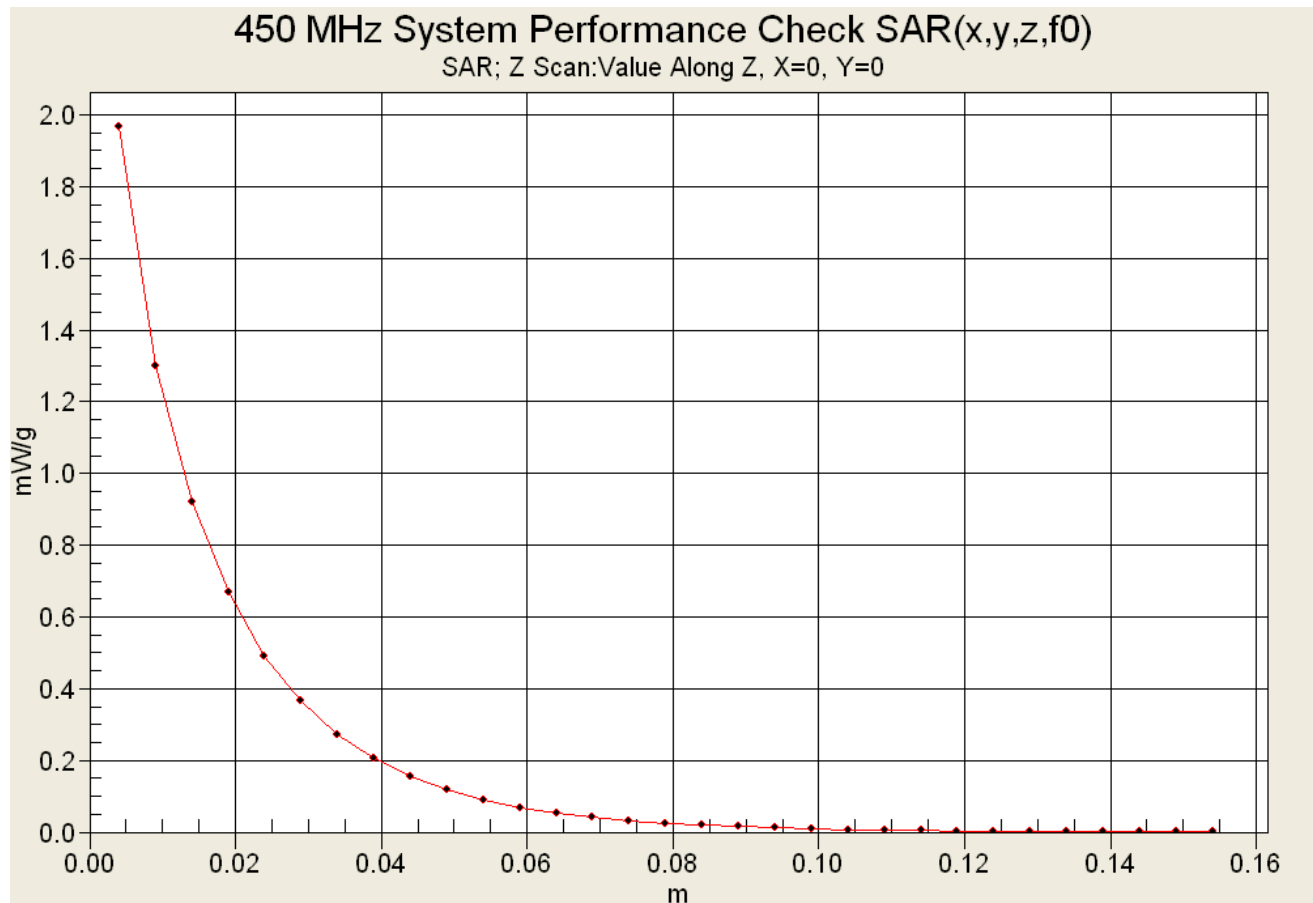
Maximum value of SAR (measured) = 1.96 mW/g





Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 170 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 171 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 01/27/2011

System Performance Check - 450 MHz Dipole - Body

DUT: Dipole D450V3; Asset: 00217; Serial: 1068; Calibration: 01/18/2010

Ambient Temp: 23.1°C; Fluid Temp: 22.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: M450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 58.2$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.73, 7.73, 7.73); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 450 MHz Dipole

Body d=15mm Pin=398mW 2/Area Scan (6x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.94 mW/g

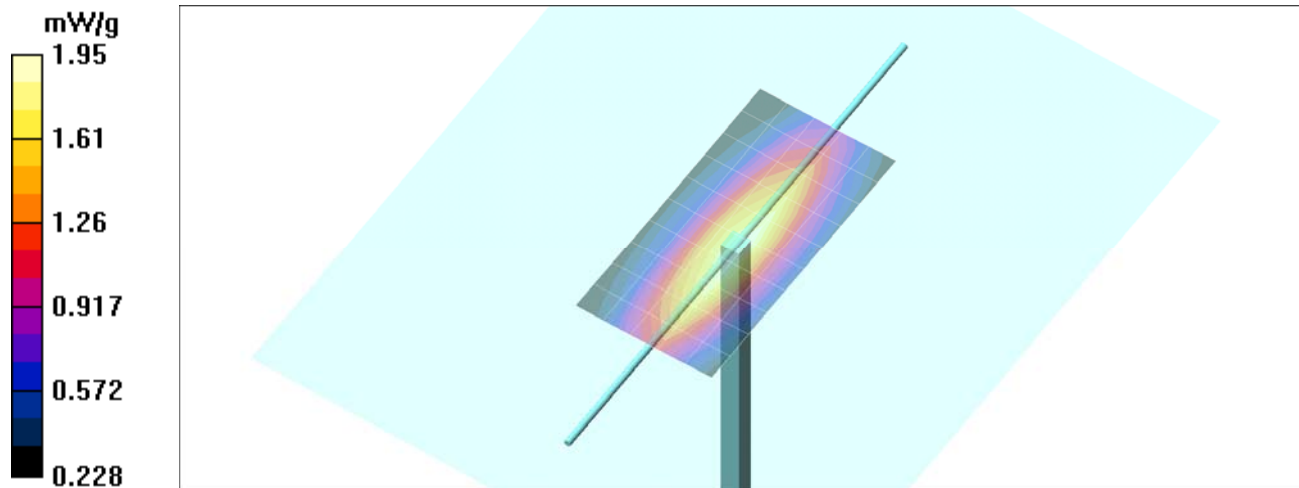
Body d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 45.7 V/m; Power Drift = 0.034 dB



Peak SAR (extrapolated) = 2.91 W/kg

SAR(1 g) = 1.84 mW/g; SAR(10 g) = 1.23 mW/g

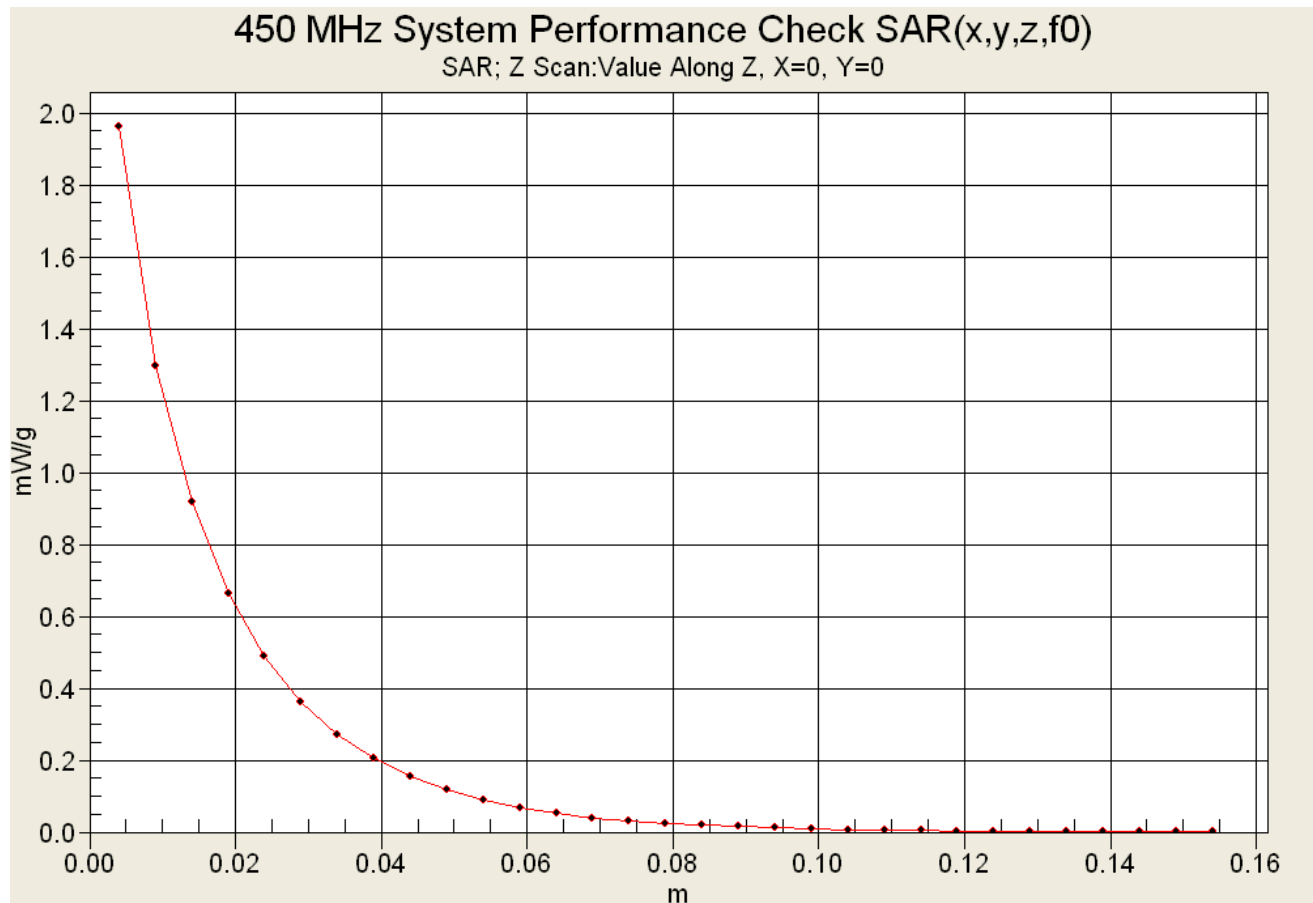
Maximum value of SAR (measured) = 1.95 mW/g





Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 172 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 173 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 01/28/2011

System Performance Check - 450 MHz Dipole - Body

DUT: Dipole D450V3; Asset: 00217; Serial: 1068; Calibration: 01/18/2010

Ambient Temp: 24.0°C; Fluid Temp: 23.1°C; Barometric Pressure: 101.1 kPa; Humidity: 40%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: M450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.93 \text{ mho/m}$; $\epsilon_r = 58.9$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.73, 7.73, 7.73); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 450 MHz Dipole

Body d=15mm Pin=398mW 2/Area Scan (6x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.95 mW/g

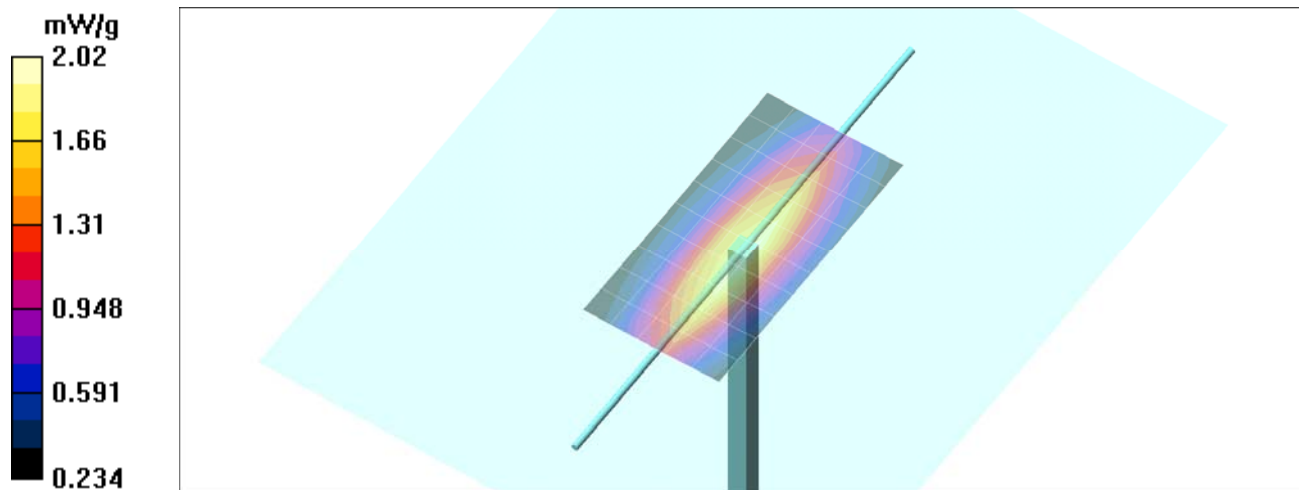
Body d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 45.5 V/m; Power Drift = 0.064 dB



Peak SAR (extrapolated) = 3.01 W/kg

SAR(1 g) = 1.89 mW/g; SAR(10 g) = 1.26 mW/g

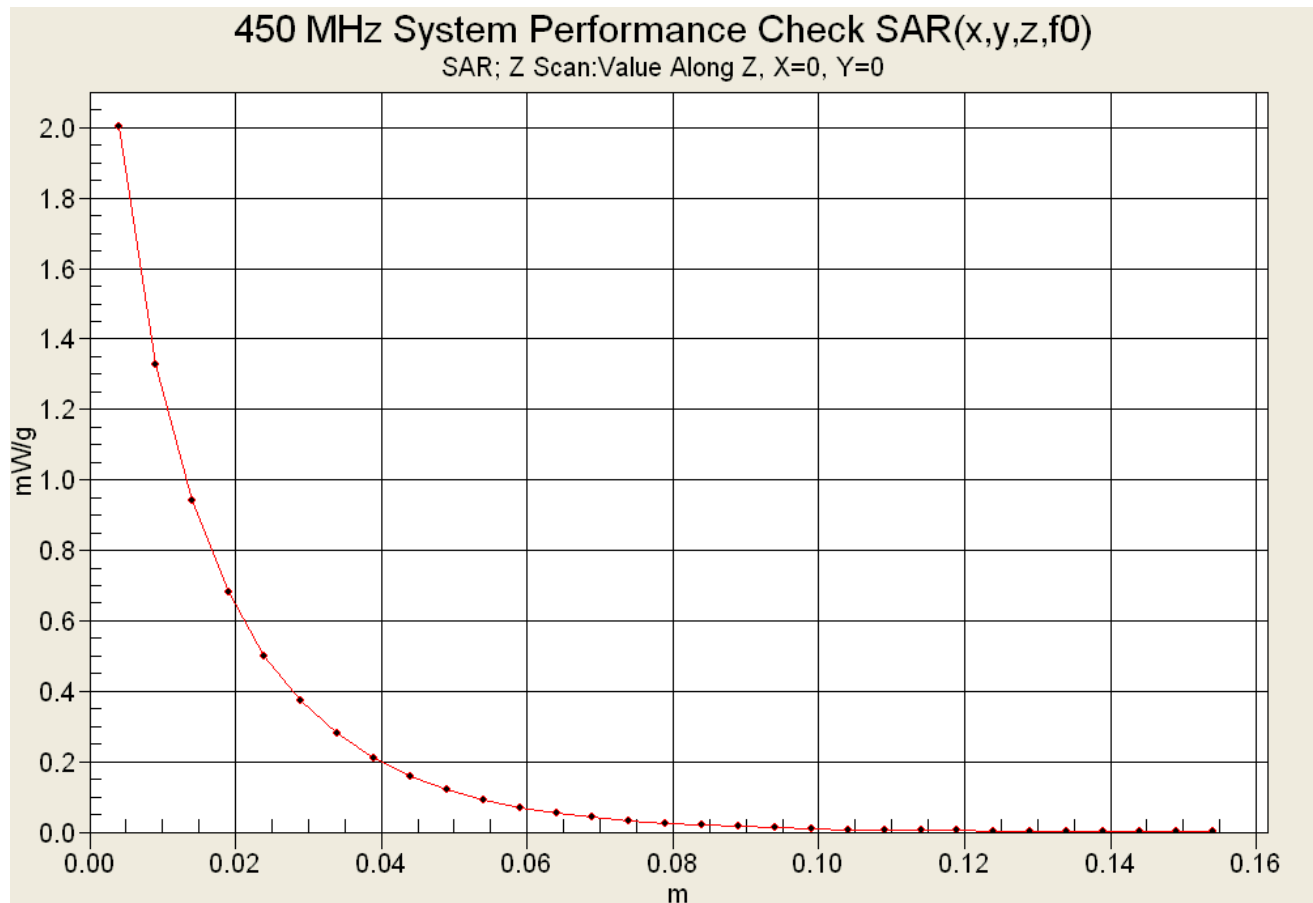
Maximum value of SAR (measured) = 2.02 mW/g





Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 174 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 175 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 01/31/2011

System Performance Check - 450 MHz Dipole - Body

DUT: Dipole D450V3; Asset: 00217; Serial: 1068; Calibration: 01/18/2010

Ambient Temp: 24.1°C; Fluid Temp: 23.2°C; Barometric Pressure: 101.1 kPa; Humidity: 40%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: M450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.93 \text{ mho/m}$; $\epsilon_r = 59.3$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.73, 7.73, 7.73); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 450 MHz Dipole

Body d=15mm Pin=398mW 2/Area Scan (6x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.95 mW/g

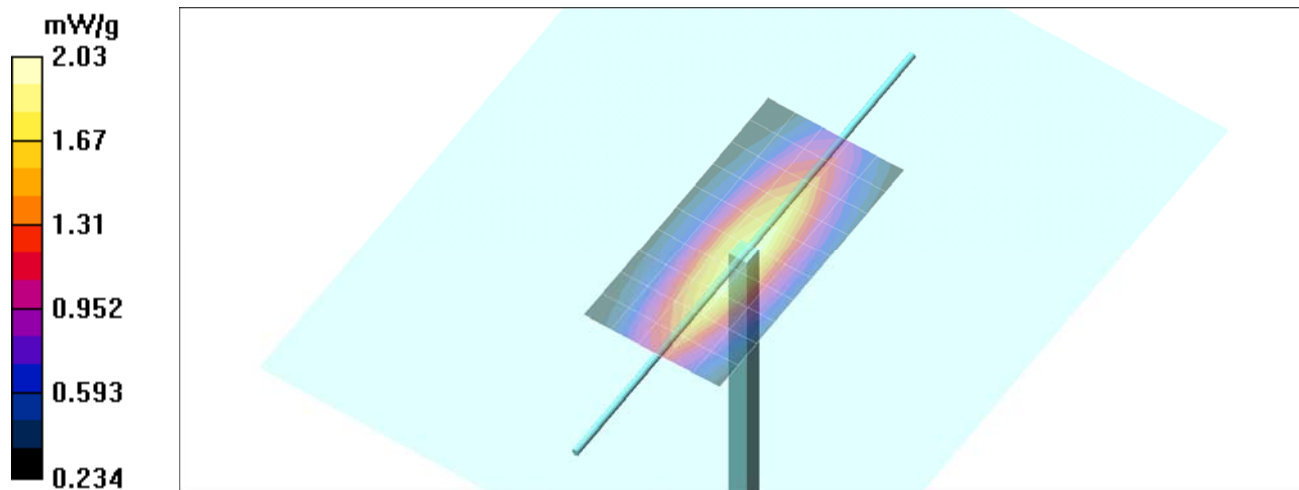
Body d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 45.6 V/m; Power Drift = 0.060 dB



Peak SAR (extrapolated) = 3.03 W/kg

SAR(1 g) = 1.9 mW/g; SAR(10 g) = 1.27 mW/g

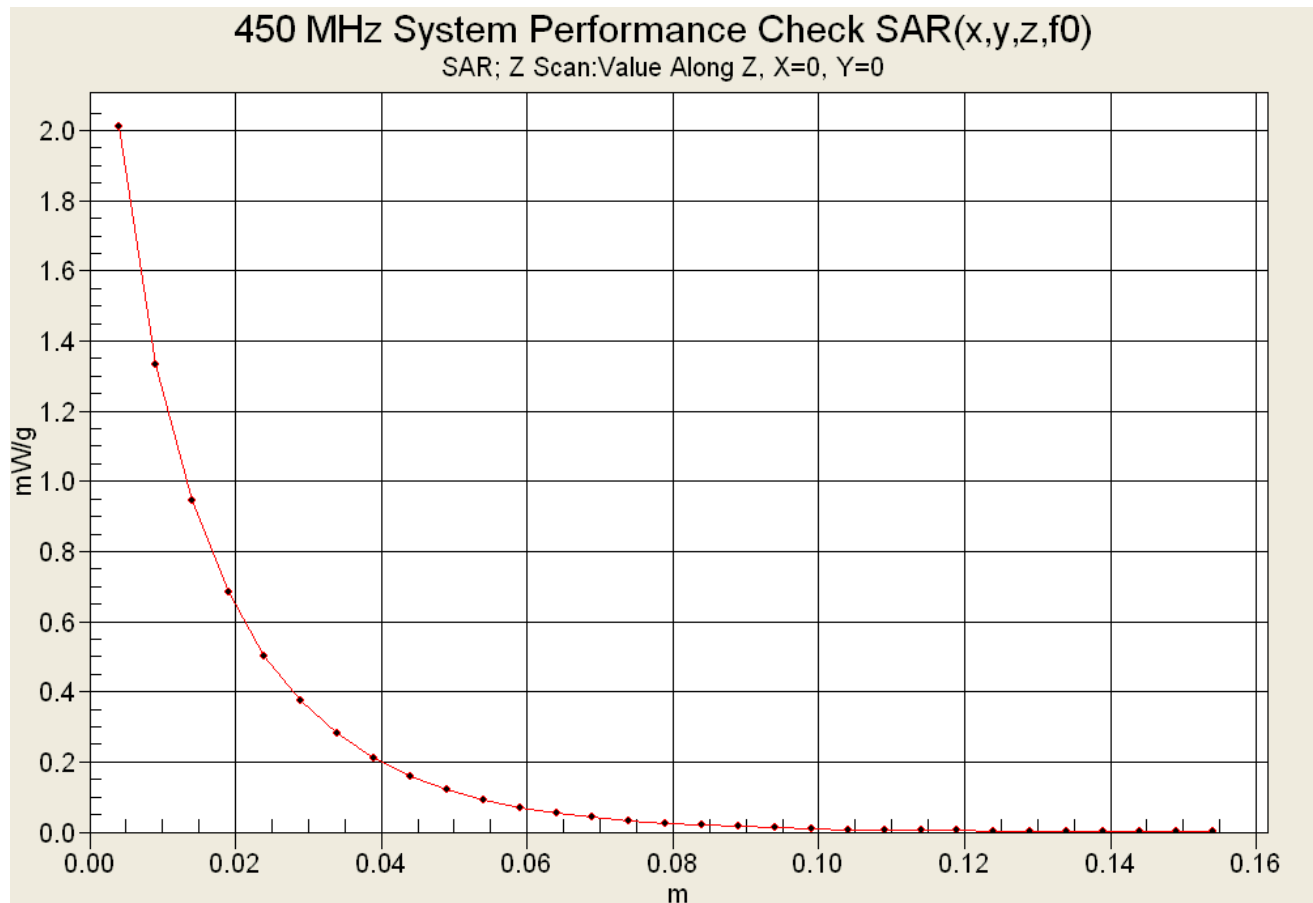
Maximum value of SAR (measured) = 2.03 mW/g





Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 176 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


Z-Axis Scan





Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 177 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 178 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

450 MHz Head

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

06/Jan/2011

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_eHF	FCC_sH	Test_e	Test_s
0.3500	44.70	0.87	48.20	0.81
0.3600	44.58	0.87	48.37	0.82
0.3700	44.46	0.87	47.65	0.82
0.3800	44.34	0.87	47.19	0.84
0.3900	44.22	0.87	47.20	0.84
0.4000	44.10	0.87	47.25	0.86
0.4100	43.98	0.87	46.40	0.86
0.4200	43.86	0.87	45.95	0.86
0.4300	43.74	0.87	45.60	0.87
0.4400	43.62	0.87	45.47	0.87
0.4500	43.50	0.87	45.61	0.88
0.4600	43.45	0.87	45.56	0.88
0.4700	43.40	0.87	45.31	0.88
0.4800	43.34	0.87	44.72	0.89
0.4900	43.29	0.87	44.84	0.90
0.5000	43.24	0.87	44.86	0.90
0.5100	43.19	0.87	44.68	0.91
0.5200	43.14	0.88	44.37	0.91
0.5300	43.08	0.88	44.00	0.93
0.5400	43.03	0.88	44.05	0.95
0.5500	42.98	0.88	43.95	0.96

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 179 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



Test Lab Certificate No. 2470.01

450 MHz Body

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
04/Jan/2011
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_eHFCC	sHFCC	Test_e	Test_s
0.3500	57.70	0.93	60.17	0.85
0.3600	57.60	0.93	60.61	0.86
0.3700	57.50	0.93	60.23	0.85
0.3800	57.40	0.93	59.86	0.87
0.3900	57.30	0.93	59.86	0.87
0.4000	57.20	0.93	59.60	0.88
0.4100	57.10	0.93	59.25	0.88
0.4200	57.00	0.94	59.06	0.90
0.4300	56.90	0.94	59.51	0.91
0.4400	56.80	0.94	59.84	0.91
0.4500	56.70	0.94	58.76	0.93
0.4600	56.66	0.94	59.45	0.91
0.4700	56.62	0.94	58.45	0.94
0.4800	56.58	0.94	58.49	0.94
0.4900	56.54	0.94	58.38	0.96
0.5000	56.51	0.94	58.46	0.96
0.5100	56.47	0.94	58.58	0.97
0.5200	56.43	0.95	57.95	0.98
0.5300	56.39	0.95	57.96	0.98
0.5400	56.35	0.95	57.90	0.99
0.5500	56.31	0.95	57.48	1.00

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 180 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

450 MHz Body

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

26/Jan/2011

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_eHFCC_sH	Test_e	Test_s
0.3500	57.70	0.93	59.28
0.3600	57.60	0.93	58.27
0.3700	57.50	0.93	57.79
0.3800	57.40	0.93	58.74
0.3900	57.30	0.93	57.80
0.4000	57.20	0.93	58.39
0.4100	57.10	0.93	57.87
0.4200	57.00	0.94	57.69
0.4300	56.90	0.94	57.68
0.4400	56.80	0.94	58.15
0.4500	56.70	0.94	57.69
0.4600	56.66	0.94	57.99
0.4700	56.62	0.94	56.94
0.4800	56.58	0.94	56.89
0.4900	56.54	0.94	56.86
0.5000	56.51	0.94	57.20
0.5100	56.47	0.94	57.36
0.5200	56.43	0.95	56.80
0.5300	56.39	0.95	56.78
0.5400	56.35	0.95	56.88
0.5500	56.31	0.95	56.31

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 181 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

450 MHz Body

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

27/Jan/2011

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_eHFCC	sHFCC	Test_e	Test_s
0.3500	57.70	0.93	58.93	0.83
0.3600	57.60	0.93	58.83	0.83
0.3700	57.50	0.93	58.61	0.84
0.3800	57.40	0.93	59.35	0.85
0.3900	57.30	0.93	58.68	0.87
0.4000	57.20	0.93	58.73	0.87
0.4100	57.10	0.93	58.48	0.88
0.4200	57.00	0.94	58.29	0.89
0.4300	56.90	0.94	58.31	0.90
0.4400	56.80	0.94	58.46	0.90
0.4500	56.70	0.94	58.19	0.91
0.4600	56.66	0.94	58.23	0.92
0.4700	56.62	0.94	57.48	0.93
0.4800	56.58	0.94	57.00	0.93
0.4900	56.54	0.94	57.22	0.94
0.5000	56.51	0.94	57.62	0.95
0.5100	56.47	0.94	57.26	0.97
0.5200	56.43	0.95	56.70	0.96
0.5300	56.39	0.95	57.11	0.98
0.5400	56.35	0.95	57.01	0.98
0.5500	56.31	0.95	56.68	1.00

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 182 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

450 MHz Body

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

28/Jan/2011

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_eHFCC	sHFCC	Test_e	Test_s
0.3500	57.70	0.93	60.24	0.86
0.3600	57.60	0.93	60.20	0.86
0.3700	57.50	0.93	59.64	0.87
0.3800	57.40	0.93	59.70	0.87
0.3900	57.30	0.93	59.43	0.89
0.4000	57.20	0.93	59.78	0.89
0.4100	57.10	0.93	59.31	0.90
0.4200	57.00	0.94	58.71	0.91
0.4300	56.90	0.94	59.07	0.91
0.4400	56.80	0.94	58.74	0.92
0.4500	56.70	0.94	58.85	0.93
0.4600	56.66	0.94	58.99	0.93
0.4700	56.62	0.94	58.77	0.93
0.4800	56.58	0.94	58.64	0.95
0.4900	56.54	0.94	58.26	0.96
0.5000	56.51	0.94	58.02	0.97
0.5100	56.47	0.94	57.87	0.98
0.5200	56.43	0.95	57.92	0.98
0.5300	56.39	0.95	57.86	1.00
0.5400	56.35	0.95	57.54	1.00
0.5500	56.31	0.95	57.59	1.00

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver		Transmitter Frequency Range:		450.0 - 512.0 MHz	
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 183 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

450 MHz Body

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

31/Jan/2011

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_eHFCC	sHFCC	Test_e	Test_s
0.3500	57.70	0.93	60.18	0.85
0.3600	57.60	0.93	60.19	0.85
0.3700	57.50	0.93	59.70	0.86
0.3800	57.40	0.93	60.14	0.87
0.3900	57.30	0.93	59.41	0.89
0.4000	57.20	0.93	59.38	0.88
0.4100	57.10	0.93	59.96	0.91
0.4200	57.00	0.94	59.49	0.92
0.4300	56.90	0.94	59.91	0.92
0.4400	56.80	0.94	59.17	0.93
0.4500	56.70	0.94	59.31	0.93
0.4600	56.66	0.94	58.91	0.94
0.4700	56.62	0.94	58.58	0.95
0.4800	56.58	0.94	59.45	0.96
0.4900	56.54	0.94	59.35	0.97
0.5000	56.51	0.94	59.50	0.98
0.5100	56.47	0.94	58.00	0.98
0.5200	56.43	0.95	58.76	0.98
0.5300	56.39	0.95	58.84	1.00
0.5400	56.35	0.95	58.90	1.01
0.5500	56.31	0.95	58.74	1.02

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 184 of 253

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX E - DIPOLE CALIBRATION

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 251 of 253



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Client **Celltech**

Certificate No: **D450V3-1068_Jan10**

CALIBRATION CERTIFICATE

Object **D450V3 - SN: 1068**

Calibration procedure(s) **QA CAL-15.v5**
Calibration Procedure for dipole validation kits below 800 MHz

Calibration date: **January 18, 2010**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ET3DV6 (LF)	SN: 1507	03-Jul-09 (No. ET3-1507_Jul09)	Jul-10
DAE4	SN: 654	04-May-09 (No. DAE4-654_May09)	May-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

Calibrated by: **Jeton Kastrati** Name **Laboratory Technician** Function **i.v. [Signature]** Signature

Approved by: **Katja Pokovic** Technical Manager **[Signature]**

Issued: January 20, 2010

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
ConF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	ELI4 Flat Phantom	Shell thickness: 2 ± 0.2 mm
Distance Dipole Center - TSL	15 mm	with Spacer
Area Scan Resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	450 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	43.5	0.87 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	44.2 \pm 6 %	0.86 mho/m \pm 6 %
Head TSL temperature during test	(22.0 \pm 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	398 mW input power	1.87 mW / g
SAR normalized	normalized to 1W	4.70 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	4.76 mW / g \pm 18.1 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	398 mW input power	1.25 mW / g
SAR normalized	normalized to 1W	3.14 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	3.17 mW / g \pm 17.6 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	56.7	0.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.1 ± 6 %	0.90 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	398 mW input power	1.78 mW / g
SAR normalized	normalized to 1W	4.47 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	4.58 mW / g ± 18.1 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	398 mW input power	1.19 mW / g
SAR normalized	normalized to 1W	2.99 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	3.06 mW / g ± 17.6 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	57.5 Ω - 5.9 j Ω
Return Loss	- 21.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	54.8 Ω - 9.3 j Ω
Return Loss	- 20.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.350 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 16, 2009

DASY5 Validation Report for Head TSL

Date/Time: 1/18/2010 10:59:37 AM

DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1068

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1

Medium: HSL450

Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.86 \text{ mho/m}$; $\epsilon_r = 44.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ET3DV6 - SN1507 (LF); ConvF(6.66, 6.66, 6.66); Calibrated: 7/3/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 5/4/2009
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

Head/d=15mm, Pin=398mW/Area Scan (41x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.99 mW/g

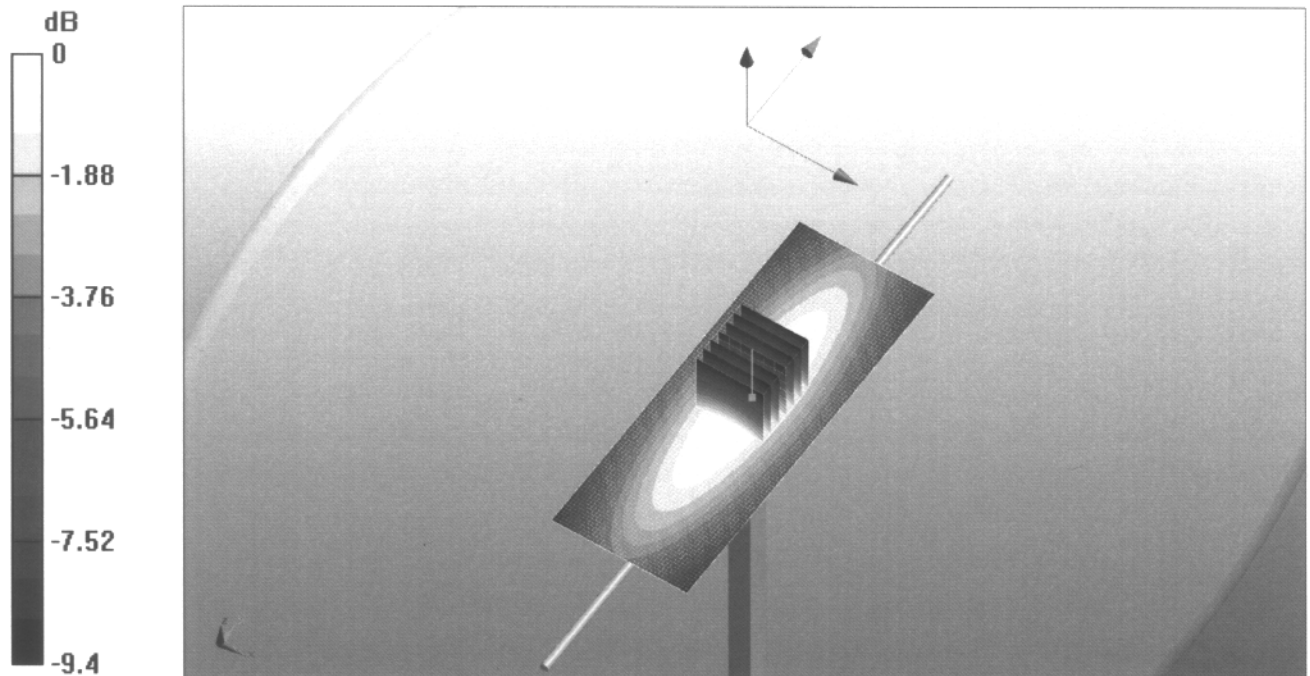
Head/d=15mm, Pin=398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 50.2 V/m; Power Drift = -0.020 dB

Peak SAR (extrapolated) = 2.78 W/kg

SAR(1 g) = 1.87 mW/g; SAR(10 g) = 1.25 mW/g

Maximum value of SAR (measured) = 2 mW/g

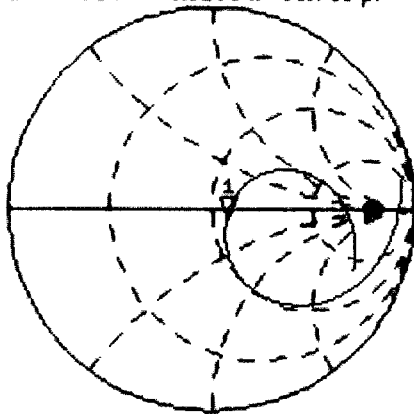


0 dB = 2mW/g

Impedance Measurement Plot for Head TSL

18 Jan 2010 10:25:40
CH1 S11 1 U FS 1: 57.502 Ω -5.9180 Ω 59.763 pF 450.000 000 MHz

*
De1
Cor



Avg
16

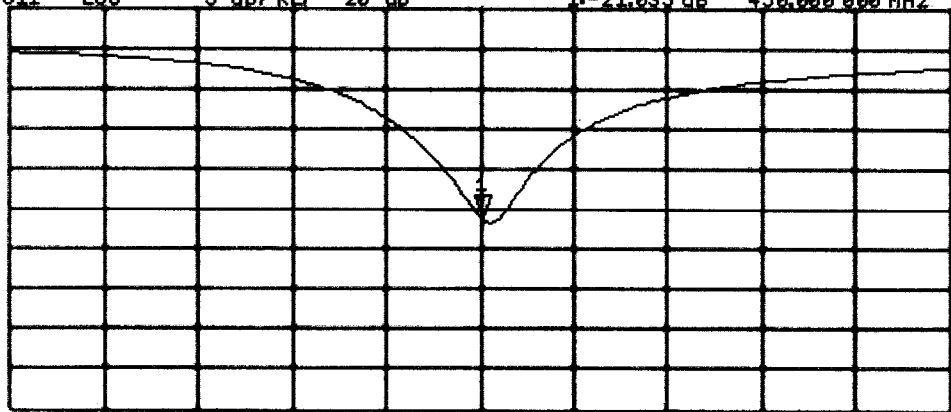
↑

CH2 S11 LOG 5 dB/ REF -20 dB 1:-21.035 dB 450.000 000 MHz

Cor

Avg
16

↑



START 250.000 000 MHz

STOP 650.000 000 MHz

DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1068

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1

Medium: MSL450

Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ET3DV6 - SN1507 (LF); ConvF(7.11, 7.11, 7.11); Calibrated: 7/3/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 5/4/2009
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

Body/d=15mm, Pin=398mW/Area Scan (61x201x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.9 mW/g

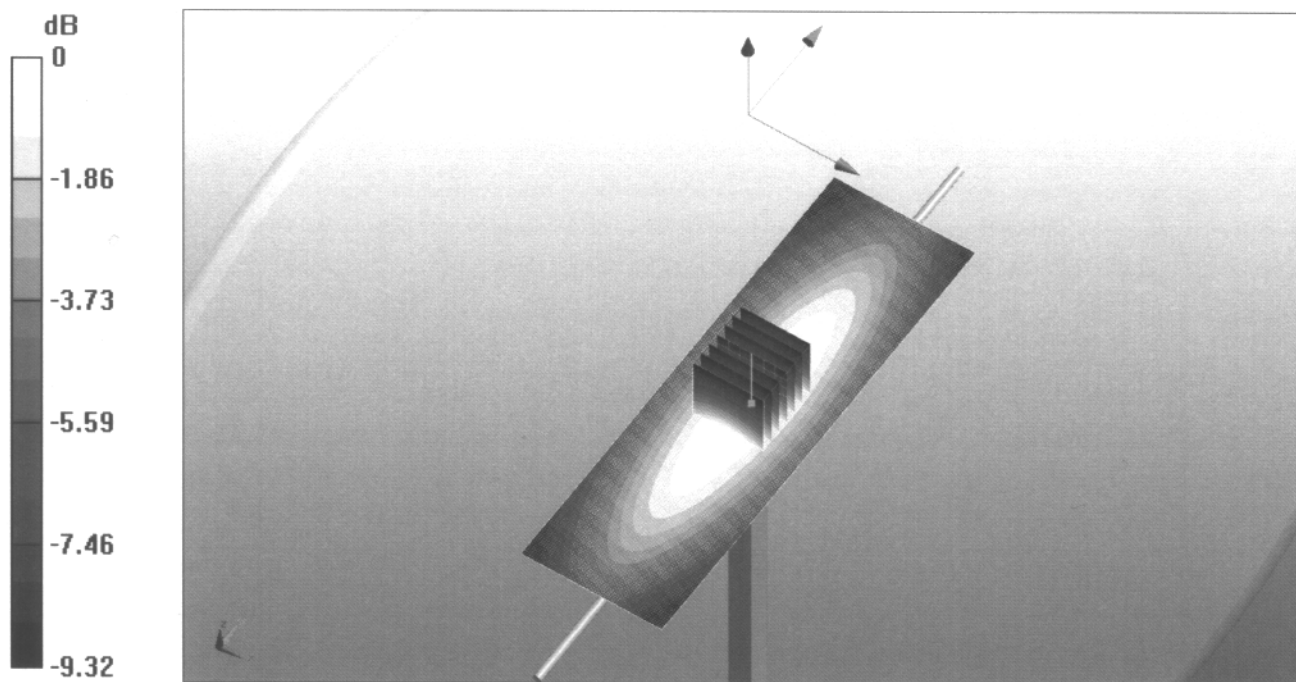
Body/d=15mm, Pin=398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 47.4 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 2.71 W/kg

SAR(1 g) = 1.78 mW/g; SAR(10 g) = 1.19 mW/g

Maximum value of SAR (measured) = 1.9 mW/g

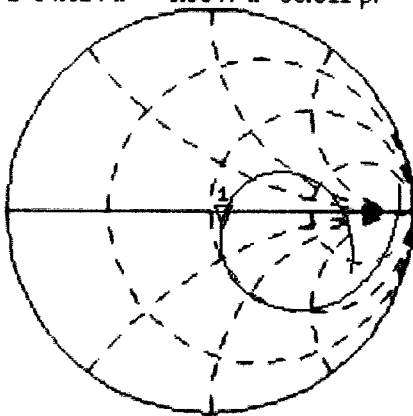


0 dB = 1.9mW/g

Impedance Measurement Plot for Body TSL

CH1 S11 1 U FS 18 Jan 2010 12:18:41
1: 54.824 Ω -9.3047 Ω 38.011 pF 450.000 000 MHz

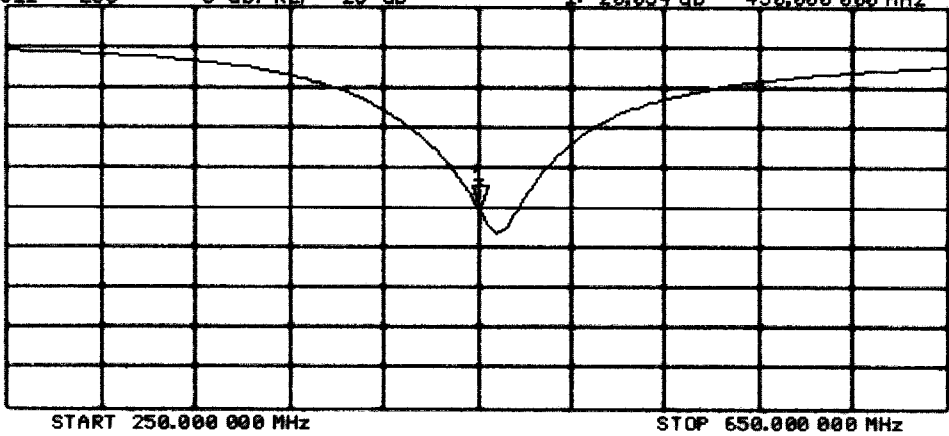
*
De1
Cor





Avg
16
↑

CH2 S11 LOG 5 dB/REF -20 dB 1:-20.034 dB 450.000 000 MHz

Cor
Avg
16
↑



	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX F - PROBE CALIBRATION

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 252 of 253



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Calltech**

Certificate No: **ET3-1590_Jul10**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1590**

Calibration procedure(s) **QA CAL-01.v6, QA CAL-12.v6, QA CAL-23.v3 and QA CAL-25.v2**
Calibration procedure for dosimetric E-field probes

Calibration date: **July 15, 2010**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

Calibrated by **Jeton Kastrati** **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Signature

Issued: July 15, 2010

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 -field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,y,z}; A, B, C** are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN:1590

Manufactured:	March 19, 2001
Last calibrated:	July 16, 2009
Recalibrated:	July 15, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ET3DV6 SN:1590**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	1.86	2.06	1.77	$\pm 10.1\%$
DCP (mV) ^B	91.4	92.4	83.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	$\pm 1.5\%$
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6)

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the maximum deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 SN:1590

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz] ^c	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
450	± 50 / ± 100	43.5 ± 5%	0.87 ± 5%	7.25	7.25	7.25	0.20	2.19 ± 13.3%
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	6.27	6.27	6.27	0.32	2.49 ± 11.0%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	6.12	6.12	6.12	0.27	2.86 ± 11.0%

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

DASY/EASY - Parameters of Probe: ET3DV6 SN:1590

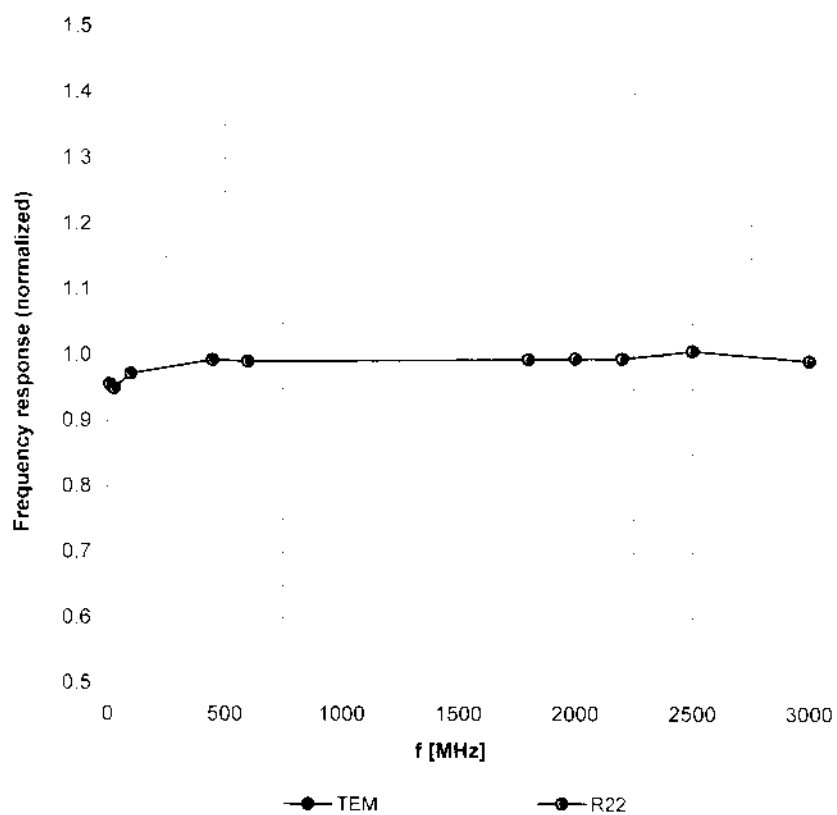
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz] ^c	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
450	± 50 / ± 100	56.7 ± 5%	0.94 ± 5%	7.73	7.73	7.73	0.13	2.06 ± 13.3%
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	6.33	6.33	6.33	0.22	3.60 ± 11.0%
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	6.15	6.15	6.15	0.28	2.94 ± 11.0%

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

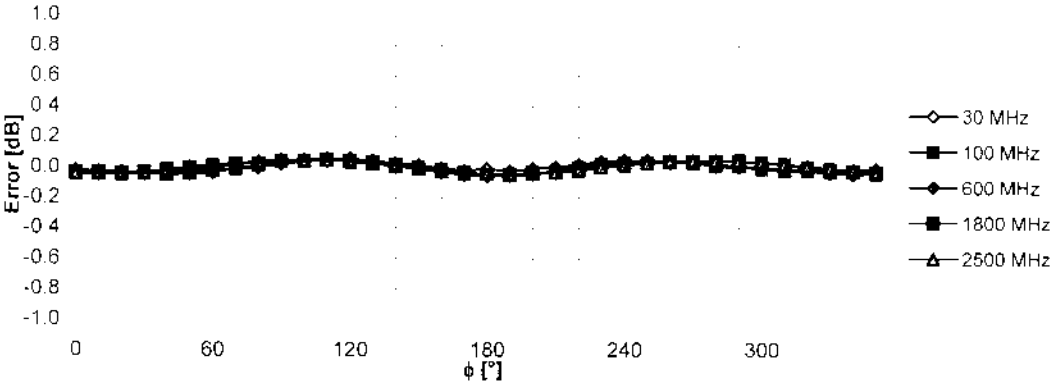
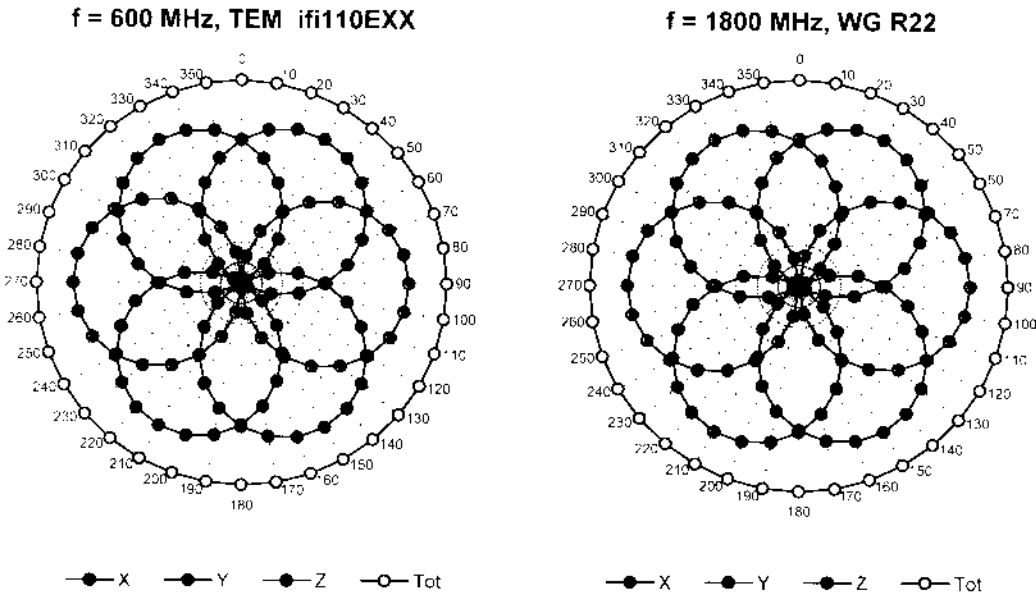
Frequency Response of E-Field

(TEM-Cell: ifi110 EXX, Waveguide: R22)



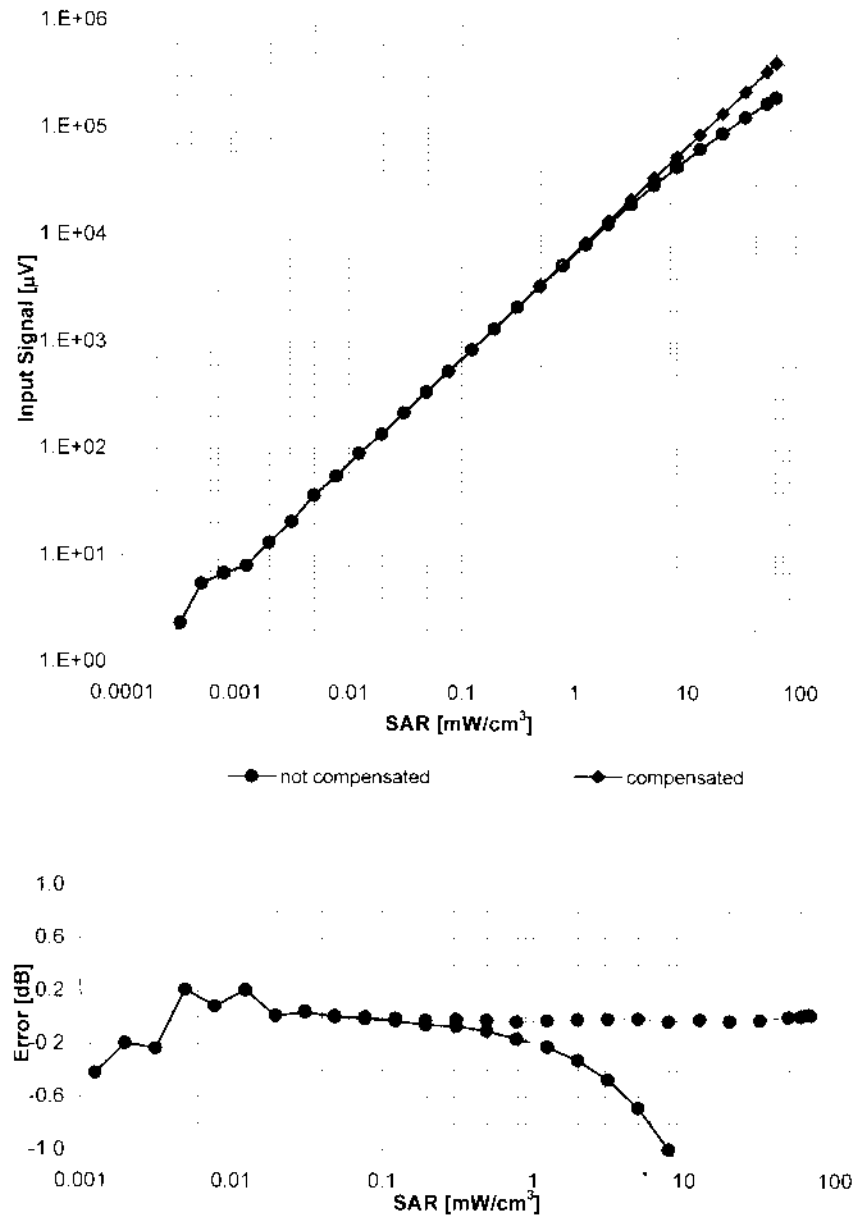
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$



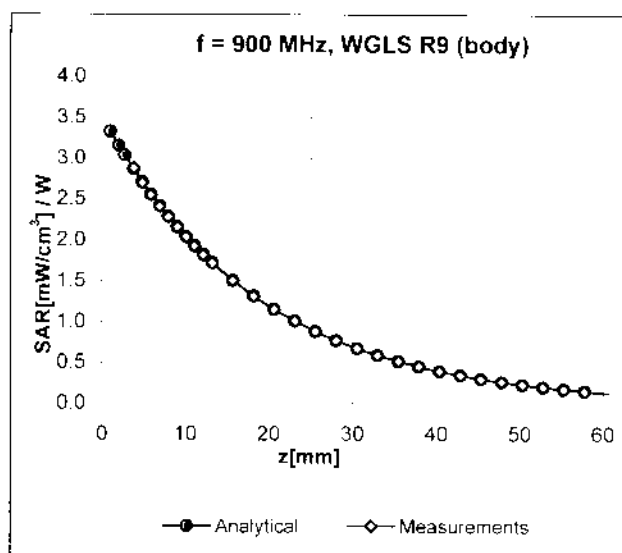
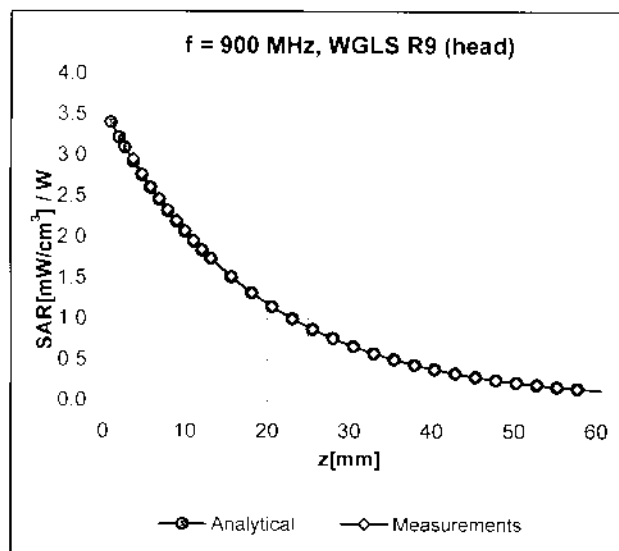
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head})
(Waveguide R22, f = 1800 MHz)



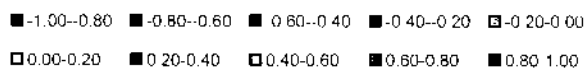
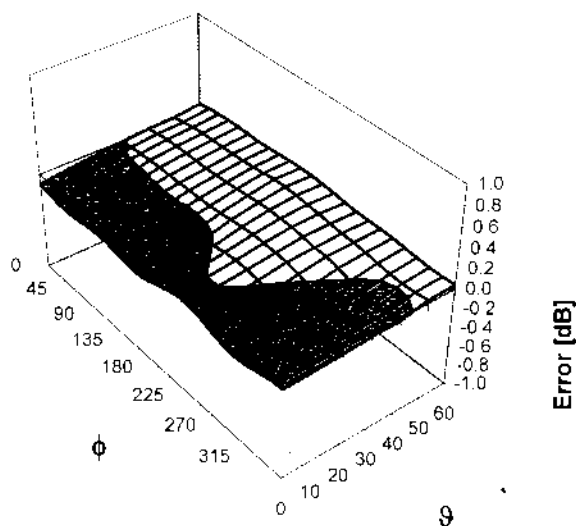
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in HSL



Error (ϕ , θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ (k=2)

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

	<u>Date(s) of Evaluation</u> Jan. 4,6,26-28,31, 2011	<u>Test Report Serial No.</u> 121510ALH-T1070-S90U	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> March 24, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX G - BARSKI PLANAR PHANTOM CERTIFICATE OF CONFORMITY

Applicant:	Kenwood USA Corporation	FCC ID:	ALH431000	DUT Model:	NX-320-K3	KENWOOD
DUT Type:	Portable UHF-H PTT Radio Transceiver	Transmitter Frequency Range:		450.0 - 512.0 MHz		
2011 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 253 of 253

2378 Westlake Road
Kelowna, B.C. Canada
V1Z-2V2



Ph. # 250-769-6848
Fax # 250-769-6334
E-mail: barskiind@shaw.ca
Web: www.bcfiberglass.com

FIBERGLASS FABRICATORS

Certificate of Conformity

Item : Flat Planar Phantom Unit # 03-01
Date: June 16, 2003
Manufacturer: Barski Industries (1985 Ltd)

Test	Requirement	Details
Shape	Compliance to geometry according to drawing	Supplied CAD drawing
Material Thickness	Compliant with the requirements	2mm +/- 0.2mm in measurement area
Material Parameters	Dielectric parameters for required frequencies Based on Dow Chemical technical data	100 MHz-5 GHz Relative permittivity<5 Loss Tangent<0.05

Conformity

Based on the above information, we certify this product to be compliant to the requirements specified.

Signature: _____

A handwritten signature in black ink, appearing to read 'Daniel Chailier', is written over a horizontal line.

Daniel Chailier



Fiberglass Planar Phantom - Top View



Fiberglass Planar Phantom - Front View



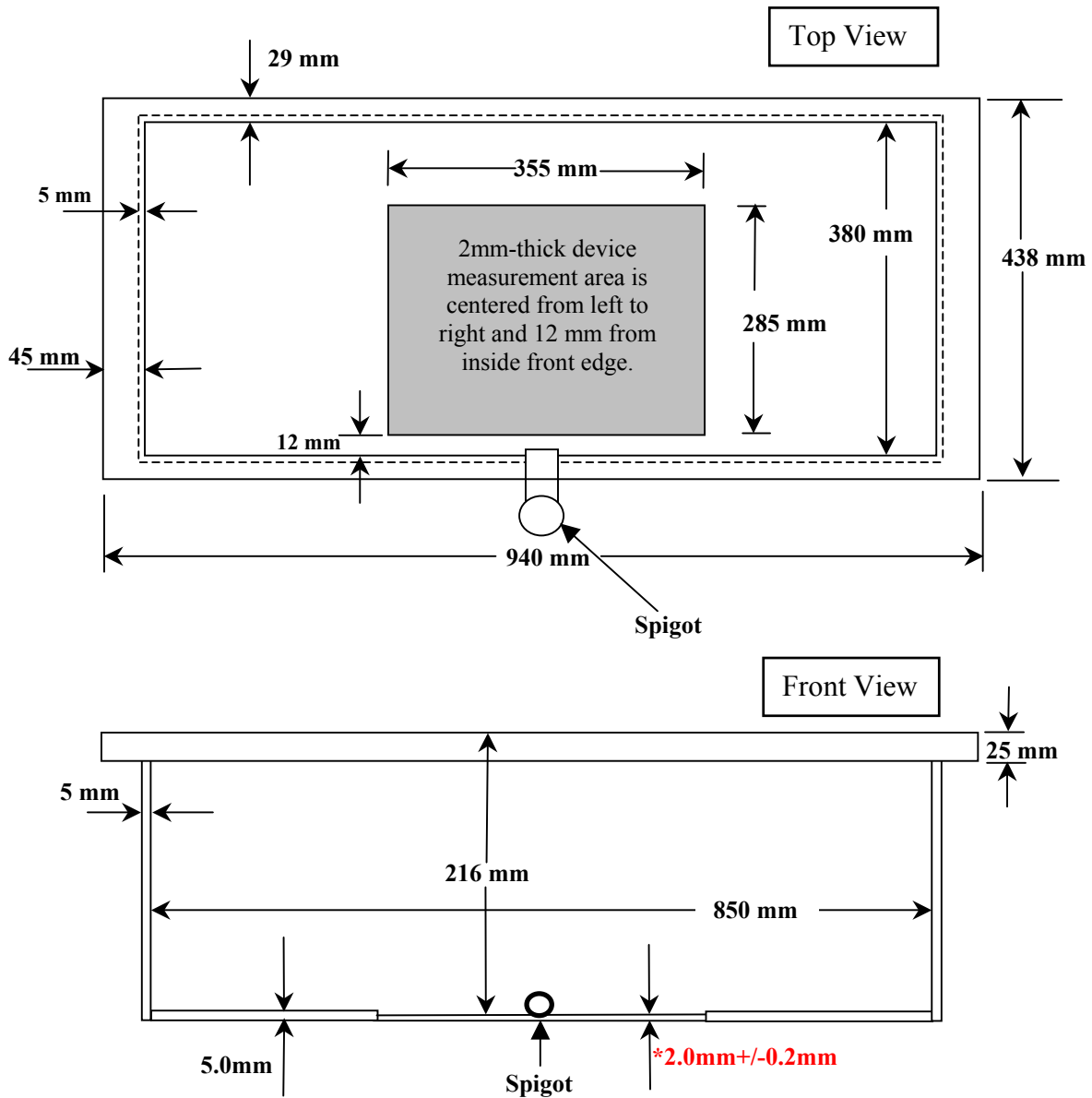
Fiberglass Planar Phantom - Back View



Fiberglass Planar Phantom - Bottom View

Dimensions of Fiberglass Planar Phantom

(Manufactured by Barski Industries Ltd. - Unit# 03-01)



**Note: Measurements that aren't repeated for the opposite sides are the same as the side measured.
This drawing is not to scale.**