


	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

DECLARATION OF COMPLIANCE - SAR RF EXPOSURE EVALUATION (FCC/IC)

Test Lab Information		CELLTECH LABS INC.		21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada	
Test Lab Accreditation(s)		ISO 17025 (A2LA Test Lab Certificate No. 2470.01)			
Applicant Information		VERTEX STANDARD CO., LTD.		4-8-8 Nakameguro, Meguro-ku, Tokyo 153-8664 Japan	
Application Type(s)		FCC		TCB Certification	
Standard(s) Applied		FCC		47 CFR §2.1093	
Procedure(s) Applied		FCC		OET Bulletin 65, Supplement C	
		FCC		KDB 643646 - SAR Test Reduction Considerations for Occ. PTT Radios D01v01	
		IC		RSS-102 Issue 4	
Device Classification(s)		IEEE		1528-2003	
		IEC		62209-1:2005	
Device Identifier(s)		FCC		Licensed Non-Broadcast Transmitter Held to Face (TNF) - FCC Part 90	
		IC		Land Mobile Radio Transmitter/Receiver (27.41-960 MHz) - RSS-119 Issue 10	
Device Model(s)		FCC ID:		K6610944620	
Device Model(s)		VX-459-G6-5 (16-Key LCD)		VX-454-G6-5 (4-Key LCD)	
Device Model(s)		VX-451-G6-5 (Non LCD)			
Test Sample S/N		VX-459-G6-5		0L000006 (Identical Prototype)	
		VX-454-G6-5		0L000011 (Identical Prototype)	
		VX-451-G6-5		0L000010 (Identical Prototype)	
Device Description		Portable FM UHF-L Push-To-Talk (PTT) Radio Transceiver			
Date of Sample Receipt		November 25, 2010 (VX-459-G6-5) & November 29, 2010 (VX-451-G6-5, VX-454-G6-5)			
Date(s) of SAR Evaluations		December 2, 10, 17-18, 2010			
Transmitter Frequency Range		406.1 - 470 MHz			
Manuf. Rated Output Power		5 Watts Conducted		Manuf. Tolerance Specification +/- 0.25 dB (5.3 W)	
Antenna Type(s) Tested		Detachable Whip (A)		P/N: ATU-16B 406 - 420 MHz Nc = 2 Length: 160 mm	
		Detachable Whip (B)		P/N: ATU-16C 420 - 450 MHz Nc = 4 Length: 155 mm	
		Detachable Whip (C)		P/N: ATU-16D 450 - 470 MHz Nc = 3 Length: 143 mm	
Battery Type(s) Tested		Li-Ion Standard (a)		7.4 V 1170 mAh P/N: FNB-V112LI	
		Li-Ion Extended (b)		7.4 V 2400 mAh P/N: FNB-V113LI	
Body-worn Accessories Tested		Belt-Clip (contains metal) P/N: CLIP-20			
Audio Accessories Tested		Over-the-Head Single-muff Headset P/N: VH-215S (Audio Accessory Category #1)			
		Earpiece Mic with Palm PTT P/N: VH-120S ((Audio Accessory Category #2)			
		Speaker-Microphone P/N: MH-45B4B (Audio Accessory Category #3)			
Max. SAR Level(s) Evaluated		Face-held		4.15 W/kg 1g 50% PTT duty cycle Occupational / Controlled Exp.	
		Body-worn		5.98 W/kg 1g 50% PTT duty cycle Occupational / Controlled Exp.	
FCC/IC Spatial Peak SAR Limit		Head/Body		8.0 W/kg 1g 50% PTT duty cycle Occupational / Controlled Exp.	
Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada Safety Code 6 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), IC RSS-102 Issue 4, 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:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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REVISION HISTORY			
REVISION NO.	DESCRIPTION	IMPLEMENTED BY	RELEASE DATE
1.0	Initial Release	Jon Hughes	December 23, 2010
1.1	Corrected typo - Section 9	Jon Hughes	January 04, 2011

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:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	 Vertex Standard
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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1.0 INTRODUCTION

This measurement report demonstrates that the Vertex Standard Co., Ltd. Portable FM UHF-L PTT Radio Transceiver (Models: VX-451-G6-5, VX-454-G6-5, VX-459-G6-5) complies with the SAR (Specific Absorption Rate) RF exposure requirements FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the Occupational / Controlled Exposure environment. The measurement procedures described in FCC OET Bulletin 65, Supplement C 01-01 (see reference [3]), IC RSS-102 Issue 4 (see reference [4]), IEEE Standard 1528-2003 (see reference [5]) and IEC Standard 62209-1:2005 (see reference [6]) 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.



Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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3.0 RF CONDUCTED OUTPUT POWER MEASUREMENTS

MEASURED RF CONDUCTED OUTPUT POWER LEVELS					
Radio Model	Test Frequency	Mode	dBm	Watts	Method
VX-459-G6-5 (16-Key LCD)	406.1 MHz	CW	37.08	5.10	Average Conducted
	420.0 MHz	CW	36.90	4.90	Average Conducted
	430.0 MHz	CW	37.08	5.10	Average Conducted
	440.0 MHz	CW	37.16	5.20	Average Conducted
	450.0 MHz	CW	37.08	5.10	Average Conducted
	460.0 MHz	CW	37.16	5.20	Average Conducted
	470.0 MHz	CW	37.24	5.30	Average Conducted
VX-454-G6-5 (4-Key LCD)	406.1 MHz	CW	37.16	5.20	Average Conducted
	420.0 MHz	CW	37.08	5.10	Average Conducted
	430.0 MHz	CW	37.08	5.10	Average Conducted
	440.0 MHz	CW	37.16	5.20	Average Conducted
	450.0 MHz	CW	37.08	5.10	Average Conducted
	460.0 MHz	CW	37.16	5.20	Average Conducted
	470.0 MHz	CW	37.24	5.30	Average Conducted
VX-451-G6-5 (Non LCD)	406.1 MHz	CW	36.99	5.00	Average Conducted
	420.0 MHz	CW	36.90	4.90	Average Conducted
	430.0 MHz	CW	36.99	5.00	Average Conducted
	440.0 MHz	CW	37.08	5.10	Average Conducted
	450.0 MHz	CW	36.99	5.00	Average Conducted
	460.0 MHz	CW	37.08	5.10	Average Conducted
	470.0 MHz	CW	37.16	5.20	Average Conducted
Notes					
1. The test channels were selected in accordance with the procedures specified in FCC KDB 447498 Section 6) c) (see reference [7]).					
2. 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 [14]) and IC RSS-Gen (see reference [15]).					

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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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	5 Watts	2.5 Watts
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 [7]).			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 D01 v01r01, SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz - see reference [9]).

Probe Calibration Frequency	Device Measurement Frequency	Frequency Interval	± 50 MHz (≥ 300 MHz)
450 MHz	406.1 MHz	43.9 MHz	< 50 MHz ¹
	420.0 MHz	30 MHz	< 50 MHz ¹
	430.0 MHz	20 MHz	< 50 MHz ¹
	440.0 MHz	10 MHz	< 50 MHz ¹
	450.0 MHz	0 MHz	< 50 MHz ¹
	460.0 MHz	10 MHz	< 50 MHz ¹
	470.0 MHz	20 MHz	< 50 MHz ¹

1. The probe calibration and measurement frequency interval is < 50 MHz; therefore the additional steps were not required.

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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6.0 NO. OF TEST CHANNELS (N_c)

Antenna Part No.	Antenna Freq. Range	Test Freq. Range	N_c	Test Frequencies
ATU-16B (Antenna A)	406.1 - 420 MHz	406.1 - 420.0 MHz	2	406.1, 420.0 MHz
ATU-16C (Antenna B)	420 - 450 MHz	420.0 - 450.0 MHz	4	420.0, 430.0, 440.0, 450.0 MHz
ATU-16D (Antenna C)	450 - 470 MHz	450.0 - 470.0 MHz	3	450.0, 460.0, 470.0 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 [7]).



7.0 MANUFACTURER'S DISCLOSED ACCESSORY LISTING

Part No.	Description	Accessory Type
ATU-16B	Whip Antenna (406.1-420 MHz)	Antenna
ATU-16C	Whip Antenna (420-450 MHz)	
ATU-16D	Whip Antenna (450-470 MHz)	
FNB-V112LI	Li-ion Battery Pack (1170 mAh)	Battery
FNB-V113LI	Li-ion Battery Pack (2400 mAh)	
CLIP-20	Belt-Clip (Contains Metal)	Body-worn
VH-115S	Behind-the-Head Headset w/ Boom-Mic	Headset (Audio Accessory Category 1)
VH-215S	Over-the-Head Single-muff Headset	
VC-25	Over-the-Head VOX Headset	
VH-120S	Earpiece Mic with Palm PTT	Earpiece (Audio Accessory Category 2)
VH-130S	Earpiece with Palm-Mic & PTT	
MH-37A4B	Earpiece Microphone	
MH-360S	Compact Speaker-Microphone	Speaker-Microphone (Audio Accessory Category 3)
MH-450S	Speaker-Microphone	
MH-45B4B	Noise-Canceling Speaker-Microphone	

Notes:

1. Manufacturer's disclosed accessory listing information was provided by Vertex Standard Co., Ltd.


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8.0 SAR MEASUREMENT SUMMARY

FACE-HELD SAR EVALUATION RESULTS – VX-459-G6-5 (16-Key LCD)


C	Test Date(s): December 2, 10, 18, 2010			1	2	3	4			
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted Power (W)	1g SAR (W/kg)		1g SAR (W/kg)				
				Std. Battery FNB-V112LI (a)		Ext. Battery FNB-V113LI (b ¹)				
				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			
1	ATU-16B (406-420 MHz) Antenna A	406.1	5.10	F2	7.36	3.68	F1	7.21	3.61	
-0.189					3.84			-0.296	3.86	
2				420.0	4.90	N/A		N/A		
3	ATU-16C (420-450 MHz) Antenna B	420.0	4.90	N/A		N/A				
4				430.0	5.10	N/A		N/A		
5				440.0	5.20	N/A		F3	6.74	3.37
6						-0.070	3.42			
7				450.0	5.10	N/A		N/A		
8	ATU-16D (450-470 MHz) Antenna C	450.0	5.10	N/A		F5	6.32	3.16		
9				-0.0898	3.23					
10				460.0	5.20	N/A		N/A		
11	470.0	5.30	F6	6.88	3.44	F4	7.49	3.75		
12				-0.369	3.75		-0.211	3.93		
13	SAR LIMITS			HEAD	SPATIAL PEAK	RF EXPOSURE CATEGORY				
	FCC 47 CFR 2.1093	HC Safety Code 6	8.0 W/kg	1g averaging	Occupational / Controlled					
Notes										
Test Mode = CW (Unmodulated Continuous Wave)					Phantom = Side Planar Phantom					
DUT Spacing to Phantom = 2.5 cm (see Appendix D)					Antenna Distance to Phantom = 4.0 cm (see Appendix D)					
F1-F6 denotes the corresponding Face SAR Plot # as shown in Appendix A										
Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])										
1. For face-held configuration, the battery with the highest capacity was selected as the default battery (battery "b").										
2. The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.										
3. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 4.0 W/kg, testing of the required immediately adjacent channel(s) is not necessary (C4R13). When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 3.5 W/kg (C4R2, C4R7), testing of all other required channels is not necessary.										
4. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≥ 4.0 W/kg, head SAR should be measured for that antenna on the required immediately adjacent channels. SAR evaluations for the remaining channels are not required if the highest SAR channel or adjacent channel is < 6.0 W/kg.										
5. When the SAR for all antennas tested using the default battery is ≤ 4.0 , test additional batteries using the antenna and channel configuration that resulted in the highest SAR (C2R2, C2R13).										
6. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).										



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SAR MEASUREMENT SUMMARY (CONT.)

FACE-HELD SAR EVALUATION RESULTS – VX-454-G6-5 (4-Key LCD)											
C	Test Date(s): December 2, 10, 18, 2010			1	2	3	4				
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted Power (W)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)				
				Std. Battery FNB-V112LI (a)			Ext. Battery FNB-V113LI (b ¹)				
				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				
14	ATU-16B (406-420 MHz) Antenna A	406.1	5.20	F8	7.40	3.70	F7	7.04	3.52		
15					-0.496	4.15		-0.426	3.88		
16				420.0	5.10	N/A		N/A			
17	ATU-16C (420-450 MHz) Antenna B	420.0	5.10	N/A		N/A					
18		430.0	5.10	N/A		N/A					
19		440.0	5.20	N/A		F9	6.46	3.23			
20				N/A			-0.104	3.31			
21		450.0	5.10	N/A		N/A					
22	ATU-16D (450-470 MHz) Antenna C	450.0	5.10	N/A		F11	6.15	3.08			
23				N/A			-0.121	3.16			
24		460.0	5.20	N/A		N/A					
25		470.0	5.30	N/A		F10	6.93	3.47			
26	N/A			-0.181	3.61						
SAR LIMITS			HEAD	SPATIAL PEAK	RF EXPOSURE CATEGORY						
FCC 47 CFR 2.1093			HC Safety Code 6	8.0 W/kg	1g averaging	Occupational / Controlled					
Notes											
Test Mode = CW (Unmodulated Continuous Wave)					Phantom = Side Planar Phantom						
DUT Spacing to Phantom = 2.5 cm (see Appendix D)					Antenna Distance to Phantom = 4.0 cm (see Appendix D)						
F7-F11 denotes the corresponding Face SAR Plot # as shown in Appendix A											
Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])											
1. For face-held configuration, the battery with the highest capacity was selected as the default battery (battery "b").											
2. The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.											
3. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 4.0 W/kg, testing of the required immediately adjacent channel(s) is not necessary (C4R15, C4R26). When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 3.5 W/kg (C4R20), testing of all other required channels is not necessary.											
4. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≥ 4.0 W/kg, head SAR should be measured for that antenna on the required immediately adjacent channels. SAR evaluations for the remaining channels are not required if the highest SAR channel or adjacent channel is < 6.0 W/kg.											
5. When the SAR for all antennas tested using the default battery is ≤ 4.0 , test additional batteries using the antenna and channel configuration that resulted in the highest SAR (C2R15).											
6. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).											

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

SAR MEASUREMENT SUMMARY (CONT.)

FACE-HELD SAR EVALUATION RESULTS – VX-451-G6-5 (No LCD)

C	Test Date(s): December 2, 10, 18, 2010			1	2	3	4		
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted Power (W)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
				Std. Battery FNB-V112LI (a)		Ext. Battery FNB-V113LI (b ¹)			
				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		
27	ATU-16B (406-420 MHz) Antenna A	406.1	5.00	F 14	7.45	3.73	F 12	7.61	3.81
28				-0.394	4.08	-0.330	4.11		
29	ATU-16C (420-450 MHz) Antenna B	420.0	4.90	N/A		F 13	6.45	3.23	
30				-0.278	3.44				
31	ATU-16D (450-470 MHz) Antenna C	420.0	4.90	N/A		N/A			
32		430.0	5.00	N/A		N/A			
33		440.0	5.10	N/A		F 15	6.40	3.20	
34				-0.134	3.30				
35	450.0	5.00	N/A		N/A				
36	ATU-16D (450-470 MHz) Antenna C	450.0	5.00	N/A		F 17	7.53	3.77	
37				-0.218	3.96				
38				460.0	5.10	N/A		N/A	
39				470.0	5.20	N/A		F 16	7.05
40	-0.191	3.68							

SAR LIMITS

HEAD

SPATIAL PEAK

RF EXPOSURE CATEGORY

FCC 47 CFR 2.1093

HC Safety Code 6

8.0 W/kg

1g averaging

Occupational / Controlled

Notes

Test Mode = CW (Unmodulated Continuous Wave)

Phantom = Side Planar Phantom

DUT Spacing to Phantom = 2.5 cm (see Appendix D)

Antenna Distance to Phantom = 4.0 cm (see Appendix D)

F12-F17 denotes the corresponding Face SAR Plot # as shown in Appendix A

Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])

1. For face-held configuration, the battery with the highest capacity was selected as the default battery (battery "b").


2. The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.



3. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 4.0 W/kg, testing of the required immediately adjacent channel(s) is not necessary (C4R40). When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 3.5 W/kg (C4R34), testing of all other required channels is not necessary.

4. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≥ 4.0 W/kg (C4R28), head SAR should be measured for that antenna on the required immediately adjacent channels (C4R30). SAR evaluations for the remaining channels are not required if the highest SAR channel or adjacent channel is < 6.0 W/kg.

5. When the SAR for all antennas tested using the default battery is ≥ 4.0 , test additional batteries using the antenna and channel configuration that resulted in the highest SAR amongst all antennas (C2R28).

6. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 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 (WITHOUT AUDIO ACC.) – VX-459-G6-5 (16-Key LCD)



C		Test Date(s): December 2, 10, 17, 2010		1	2	3	4	
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted Power (W)	1g SAR (W/kg)				
				DEFAULT BODY-WORN ACCESSORY = BELT-CLIP (P/N: CLIP-20)				
				Std. Battery FNB-V112LI (a ¹)		Ext. Battery FNB-V113LI (b)		
				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	
1	ATU-16B (406-420 MHz) Antenna A	406.1	5.10	B1	8.35	4.18	N/A	
2					-0.221	4.39		
3		420.0	4.90	B2	6.91	3.46	N/A	
4					-0.281	3.69		
5	ATU-16C (420-450 MHz) Antenna B	420.0	4.90	N/A				
6		430.0	5.10	B4	7.20	3.60	N/A	
7					-0.230	3.80		
8		440.0	5.20	B3	9.16	4.58	N/A	
9					-0.0638	4.65		
10		450.0	5.10	B5	7.29	3.65	N/A	
11	-0.114				3.74			
12	ATU-16D (450-470 MHz) Antenna C	450.0	5.10	N/A				
13		460.0	5.20	B7	9.07	4.54	N/A	
14					-0.163	4.71		
15		470.0	5.30	B6	9.25	4.63	B8	9.61
16	-0.378				5.05	-0.177	5.00	

SAR LIMITS		BODY	SPATIAL PEAK	RF EXPOSURE CATEGORY
FCC 47 CFR 2.1093	HC Safety Code 6	8.0 W/kg	1g averaging	Occupational / Controlled

Notes

- Test Mode = CW (Unmodulated Continuous Wave) Phantom = Side Planar Phantom
- B1-B8 denotes the corresponding Body SAR Plot # as shown in Appendix A
- | DUT Distance to Phantom (Battery & Belt-Clip spacing) | | | | Antenna Distance to Phantom | | | |
|---|--------------------|----------------------------|--------------------|-----------------------------|-----------------|----------------------------|-----------------|
| w/ Std. Battery FNB-V112LI | | w/ Ext. Battery FNB-V113LI | | w/ Std. Battery FNB-V112LI | | w/ Ext. Battery FNB-V113LI | |
| 2.0 cm | radio to phantom | 2.2 cm | radio to phantom | 2.5 cm | Base to phantom | 2.9 cm | Base to phantom |
| 1.8 cm | battery to phantom | 1.2 cm | battery to phantom | 2.8 cm | Tip to phantom | 3.1 cm | Tip to phantom |
- Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])**
- For body-worn configuration, the thinnest standard battery was selected as the default battery (battery "a").
 - The belt-clip accessory is the manufacturer's only disclosed body-worn accessory and is therefore the default accessory.
 - The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.
 - When the body SAR of an antenna tested on the highest output power channel using the default battery is ≥ 4.0 W/kg (C2R2, C2R9, C2R16), body SAR should be measured for that antenna on the required immediately adjacent channel (C2R4, C2R7, C2R11, C2R14). The same rule applies to each required immediately adjacent channel (C2R2) of the immediately adjacent channel.
 - When the body SAR of an antenna tested on the highest output power channel using the default battery is > 6.0 W/kg, all required channels should be measured for that antenna.
 - When the SAR for all antennas tested using the default battery is ≥ 4.0 , test additional batteries using the antenna and channel configuration that resulted in the highest SAR amongst all antennas (C4R16).
 - When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 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 (WITHOUT AUDIO ACC.) – VX-454-G6-5 (4-Key LCD)

C		Test Date(s): December 2, 10, 17, 18, 2010		1	2	3	4		
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted Power (W)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
				DEFAULT BODY-WORN ACCESSORY = BELT-CLIP (P/N: CLIP-20)					
				Std. Battery FNB-V112LI (a ¹)		Ext. Battery FNB-V113LI (b)			
				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		
17	ATU-16B (406-420 MHz) Antenna A	406.1	5.20	B9	9.24	4.62	B	9.56	4.78
18				-0.39	5.05	11	-0.175	4.98	
19		420.0	5.10	B	8.17	4.09	N/A		
20				10	-0.258	4.34			
21	ATU-16C (420-450 MHz) Antenna B	420.0	5.10	N/A		N/A			
22		430.0	5.10	B	8.06	4.03	N/A		
23				13	-0.132	4.15			
24		440.0	5.20	B	8.23	4.12	N/A		
25				12	-0.0613	4.17			
26		450.0	5.10	B	7.40	3.70	N/A		
27	14			-0.146	3.83				
28	ATU-16D (450-470 MHz) Antenna C	450.0	5.10	N/A		N/A			
29		460.0	5.20	B	7.68	3.84	N/A		
30				16	-0.166	3.99			
31		470.0	5.30	B	8.46	4.23	N/A		
32	15			-0.268	4.50				

SAR LIMITS		BODY		SPATIAL PEAK		RF EXPOSURE CATEGORY	
FCC 47 CFR 2.1093	HC Safety Code 6	8.0 W/kg		1g averaging		Occupational / Controlled	

Notes


Test Mode = CW (Unmodulated Continuous Wave) Phantom = Side Planar Phantom



B9-B16 denotes the corresponding Body SAR Plot # as shown in Appendix A

DUT Distance to Phantom (Battery & Belt-Clip spacing)				Antenna Distance to Phantom			
w/ Std. Battery FNB-V112LI		w/ Ext. Battery FNB-V113LI		w/ Std. Battery FNB-V112LI		w/ Ext. Battery FNB-V113LI	
2.0 cm	radio to phantom	2.2 cm	radio to phantom	2.5 cm	Base to phantom	2.9 cm	Base to phantom
1.8 cm	battery to phantom	1.2 cm	battery to phantom	2.8 cm	Tip to phantom	3.1 cm	Tip to phantom

Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])

1. For body-worn configuration, the thinnest standard battery was selected as the default battery (battery "a").
2. The belt-clip accessory is the manufacturer's only disclosed body-worn accessory and is therefore the default accessory.
3. The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.
4. When the body SAR of an antenna tested on the highest output power channel using the default battery is ≥ 4.0 W/kg (C2R18, C2R25, C2R32), body SAR should be measured for that antenna on the required immediately adjacent channel (C2R20, C2R23, C2R27, C2R30). The same rule applies to each required immediately adjacent channel of the immediately adjacent channel.
5. When the body SAR of an antenna tested on the highest output power channel using the default battery is > 6.0 W/kg, all required channels should be measured for that antenna.
6. When the SAR for all antennas tested using the default battery is ≥ 4.0 , test additional batteries using the antenna and channel configuration that resulted in the highest SAR amongst all antennas (C4R18).
7. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 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 (WITHOUT AUDIO ACC.) – VX-451-G6-5 (No LCD)



C		Test Date(s): December 2, 10, 17, 2010				1		2		3		4	
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted Power (W)	1g SAR (W/kg)									
				DEFAULT BODY-WORN ACCESSORY = BELT-CLIP (P/N: CLIP-20)									
				Std. Battery FNB-V112LI (a ¹)				Ext. Battery FNB-V113LI (b)					
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f			
				SAR Drift dB		50% + droop		SAR Drift		50% + droop			
33	ATU-16B (406-420 MHz) Antenna A	406.1	5.00	B	10.1	5.05	B	10.1	5.05				
34				17	-0.506	5.67	19	-0.139	5.52				
35		420.0	4.90	B	7.18	3.59	N/A						
36				18	-0.295	3.84							
37	ATU-16C (420-450 MHz) Antenna B	420.0	4.90	N/A				N/A					
38		430.0	5.00	B	7.52	3.76	N/A						
39				21	-0.222	3.96							
40		440.0	5.10	B	7.91	3.96	N/A						
41				20	-0.226	4.17							
42		450.0	5.00	B	6.33	3.17	N/A						
43	22			-0.242	3.35								
44	ATU-16D (450-470 MHz) Antenna C	450.0	5.00	N/A				N/A					
45		460.0	5.10	B	6.94	3.47	N/A						
46				24	-0.237	3.66							
47		470.0	5.20	B	8.61	4.31	N/A						
48	23			-0.175	4.48								

SAR LIMITS				BODY		SPATIAL PEAK		RF EXPOSURE CATEGORY	
FCC 47 CFR 2.1093		HC Safety Code 6		8.0 W/kg		1g averaging		Occupational / Controlled	

Notes							
Test Mode = CW (Unmodulated Continuous Wave)				Phantom = Side Planar Phantom			
B17-B24 denotes the corresponding Body SAR Plot # as shown in Appendix A							
DUT Distance to Phantom (Battery & Belt-Clip spacing)				Antenna Distance to Phantom			
w/ Std. Battery FNB-V112LI		w/ Ext. Battery FNB-V113LI		w/ Std. Battery FNB-V112LI		w/ Ext. Battery FNB-V113LI	
2.0 cm	radio to phantom	2.2 cm	radio to phantom	2.5 cm	Base to phantom	2.9 cm	Base to phantom
1.8 cm	battery to phantom	1.2 cm	battery to phantom	2.8 cm	Tip to phantom	3.1 cm	Tip to phantom

- Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])**
- For body-worn configuration, the thinnest standard battery was selected as the default battery (battery "a").
 - The belt-clip accessory is the manufacturer's only disclosed body-worn accessory and is therefore the default accessory.
 - The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.
 - When the body SAR of an antenna tested on the highest output power channel using the default battery is ≥ 4.0 W/kg (C2R34, C2R41, C2R48), body SAR should be measured for that antenna on the required immediately adjacent channel (C2R36, C2R39, C2R43, C2R46). The same rule applies to each required immediately adjacent channel of the immediately adjacent channel.
 - When the body SAR of an antenna tested on the highest output power channel using the default battery is > 6.0 W/kg, all required channels should be measured for that antenna.
 - When the SAR for all antennas tested using the default battery is ≥ 4.0 , test additional batteries using the antenna and channel configuration that resulted in the highest SAR amongst all antennas (C4R34).
 - When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 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 (with DEFAULT AUDIO ACC.) – VX-459-G6-5 (16-Key LCD)


C		Test Date(s): December 18, 2010		1	2	3	4	5	6		
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted 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)		
				AUDIO ACC. CATEGORY 1		AUDIO ACC. CATEGORY 2		AUDIO ACC. CATEGORY 3			
				Headset P/N: VH-215S		Earpiece P/N: VH-120S		Speaker-Mic P/N: MH-45B4B			
				Std. Battery FNB-V112LI (a)		Std. Battery FNB-V112LI (a)		Std. Battery FNB-V112LI (a)			
				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	ATU-16B (406-420 MHz) Antenna A	406.1	5.10	N/A		N/A		N/A			
2		420.0	4.90	N/A		N/A		N/A			
3		420.0	4.90	N/A		N/A		N/A			
4	ATU-16C (420-450 MHz) Antenna B	430.0	5.10	N/A		N/A		N/A			
5		440.0	5.20	N/A		N/A		N/A			
6		450.0	5.10	N/A		N/A		N/A			
7	ATU-16D (450-470 MHz) Antenna C	450.0	5.10	N/A		N/A		N/A			
8		460.0	5.20	N/A		N/A		N/A			
9		470.0	5.30	A1	9.83	4.92	A2	11	5.50	A3	9.33
10				-0.222	5.17		-0.365	5.98		-0.177	4.86
SAR LIMITS				BODY		SPATIAL PEAK		RF EXPOSURE CATEGORY			
FCC 47 CFR 2.1093		HC Safety Code 6		8.0 W/kg		1g averaging		Occupational / Controlled			



Notes

Test Mode = CW (Unmodulated Continuous Wave)	DUT Distance to Phantom	Antenna Distance to Phantom
Phantom = Side Planar Phantom	2.0 cm	radio to phantom
Audio accessories do not contain any built-in radiating element	1.8 cm	battery to phantom
Body-worn Accessory = Belt-Clip (P/N: CLIP-20)	A1-A3 denotes the corresponding Audio Accessory SAR Plot # as shown in Appendix A	

Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])

1. The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.
2. Preliminary evaluations were performed in order to select the default accessory, per audio accessory category (see manufacturer's disclosed accessory listing, Section 7.0), 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).
3. Based on the SAR measured in the body-worn test sequence (without audio accessory) if the SAR for the antenna, body-worn accessory and battery combination(s) applicable to an audio accessory is/are > 4.0 W/kg, test that audio accessory using the highest body-worn SAR combination and channel configuration applicable to the audio accessory (C2R10, C4R10, C6R10). *Note: The VX-459-G6-5 was evaluated for audio accessories with the ATU-16D antenna only (highest SAR antenna configuration) - the VX-451-G6-5 is the radio with the highest SAR level measured overall; therefore the VX-451-G6-5 was selected as the radio for evaluation with all three (3) antenna options.*
4. If the SAR measured for an audio accessory combination is > 6.0 W/kg, test that audio accessory on the required immediately adjacent channels.
5. Remaining required channels were not evaluated based on the highest SAR channel(s) and/or adjacent channel(s) were < 7.0 W/kg.
6. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 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 (with DEFAULT AUDIO ACC.) – VX-454-G6-5 (4-Key LCD)


C		Test Date(s): December 18, 2010		1	2	3	4	5	6						
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted Power (W)	1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)					
				AUDIO ACC. CATEGORY 1				AUDIO ACC. CATEGORY 2				AUDIO ACC. CATEGORY 3			
				Headset P/N: VH-215S				Earpiece P/N: VH-120S				Speaker-Mic P/N: MH-45B4B			
				Std. Battery FNB-V112LI (a)				Std. Battery FNB-V112LI (a)				Std. Battery FNB-V112LI (a)			
				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	
11	ATU-16B (406-420 MHz) Antenna A	406.1	5.20	A4	9.22	4.61	A5	9.68	4.84	A6	8.72	4.36			
12					-0.287	4.92		-0.357	5.25		-0.053	4.41			
13	ATU-16C (420-450 MHz) Antenna B	420.0	5.10	N/A		N/A		N/A							
14		420.0	5.10	N/A		N/A		N/A							
15		430.0	5.10	N/A		N/A		N/A							
16		440.0	5.20	N/A		N/A		N/A							
17		450.0	5.10	N/A		N/A		N/A							
18		450.0	5.10	N/A		N/A		N/A							
19	ATU-16D (450-470 MHz) Antenna C	460.0	5.20	N/A		N/A		N/A							
20		470.0	5.30	N/A		N/A		N/A							
SAR LIMITS				BODY		SPATIAL PEAK		RF EXPOSURE CATEGORY							
FCC 47 CFR 2.1093		HC Safety Code 6		8.0 W/kg		1g averaging		Occupational / Controlled							



Notes

Test Mode = CW (Unmodulated Continuous Wave)		DUT Distance to Phantom		Antenna Distance to Phantom	
Phantom = Side Planar Phantom		2.0 cm	radio to phantom	2.5 cm	Base to phantom
Audio accessories do not contain any built-in radiating element		1.8 cm	battery to phantom	2.8 cm	Tip to phantom
Body-worn Accessory = Belt-Clip (P/N: CLIP-20)	A4-A6 denotes the corresponding Audio Accessory SAR Plot # as shown in Appendix A				

Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])

- The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.
- Preliminary evaluations were performed in order to select the default accessory, per audio accessory category (see manufacturer's disclosed accessory listing, Section 7.0), 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 measured in the body-worn test sequence (without audio accessory) if the SAR for the antenna, body-worn accessory and battery combination(s) applicable to an audio accessory is/are > 4.0 W/kg, test that audio accessory using the highest body-worn SAR combination and channel configuration applicable to the audio accessory (C2R12, C4R12, C6R12). *Note: The VX-454-G6-5 was evaluated for audio accessories with the ATU-16D antenna only (highest SAR antenna configuration) - the VX-451-G6-5 is the radio with the highest SAR level measured overall; therefore the VX-451-G6-5 was selected as the radio for evaluation with all three (3) antenna options.*
- If the SAR measured for an audio accessory combination is > 6.0 W/kg, test that audio accessory on the required immediately adjacent channels.
- Remaining required channels were not evaluated based on the highest SAR channel(s) and/or adjacent channel(s) were < 7.0 W/kg.
- When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).


Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 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 (with DEFAULT AUDIO ACC.) – VX-451-G6-5 (No LCD)

C		Test Date(s): December 18, 2010		1	2	3	4	5	6										
R	Antenna P/N (Freq. Range)	Test Freq. (MHz)	Conducted Power (W)	1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)		1g SAR (W/kg)									
				AUDIO ACC. CATEGORY 1				AUDIO ACC. CATEGORY 2				AUDIO ACC. CATEGORY 3							
				Headset P/N: VH-215S				Earpiece P/N: VH-120S				Speaker-Mic P/N: MH-45B4B							
				Std. Battery FNB-V112LI (a)				Std. Battery FNB-V112LI (a)				Std. Battery FNB-V112LI (a)							
				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					
21	ATU-16B (406-420 MHz) Antenna A	406.1	5.00	A7	9.17	4.59	A8	9.19	4.60	A9	9.16	4.58							
22		420.0	4.90		-0.296	4.91		-0.454	5.10		-0.442	5.07							
23		420.0	4.90		N/A		N/A		N/A		N/A								
24	ATU-16C (420-450 MHz) Antenna B	420.0	4.90		N/A		N/A		N/A		N/A								
25		430.0	5.00		N/A		N/A		N/A		N/A								
26		440.0	5.10	A 10	8.23	4.12	A 11	7.14	3.57	A 12	7.11	3.56							
27		440.0	5.10		-0.037	4.15		-0.107	3.66		-0.193	3.72							
28	450.0	5.00		N/A		N/A		N/A		N/A									
29	ATU-16D (450-470 MHz) Antenna C	450.0	5.00		N/A		N/A		N/A		N/A								
30		460.0	5.10		N/A		N/A		N/A		N/A								
31		470.0	5.20	A 13	8.3	4.15	A 14	9.62	4.81	A 15	9.71	4.86							
32		470.0	5.20		-0.302	4.45		-0.264	5.11		-0.233	5.12							
SAR LIMITS				BODY				SPATIAL PEAK				RF EXPOSURE CATEGORY							
FCC 47 CFR 2.1093				HC Safety Code 6				8.0 W/kg				1g averaging				Occupational / Controlled			
Notes																			
Test Mode = CW (Unmodulated Continuous Wave)						DUT Distance to Phantom			Antenna Distance to Phantom										
Phantom = Side Planar Phantom						2.0 cm radio to phantom			2.5 cm Base to phantom										
Audio accessories do not contain any built-in radiating element						1.8 cm battery to phantom			2.8 cm Tip to phantom										
Body-worn Accessory = Belt-Clip (P/N: CLIP-20)				A7-A15 denotes the corresponding Audio Accessory SAR Plot # as shown in Appendix A															
Test Procedures applied in accordance with FCC KDB 643646 D01v01 (see reference [8])																			
1. The SAR evaluations commenced at the highest output power channel (highlighted in yellow) per antenna band.																			
2. Preliminary evaluations were performed in order to select the default accessory, per audio accessory category (see manufacturer's disclosed accessory listing, Section 7.0), 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).																			
3. Based on the SAR measured in the body-worn test sequence (without audio accessory) if the SAR for the antenna, body-worn accessory and battery combination(s) applicable to an audio accessory is/are > 4.0 W/kg, test that audio accessory using the highest body-worn SAR combination and channel configuration applicable to the audio accessory (C2R22, C4R22, C6R22 & C2R27, C4R27, C6R27 & C2R32, C4R32, C6R32). <i>Note: The VX-451-G6-5 is the radio with the highest SAR level measured overall; therefore the VX-451-G6-5 was selected as the radio for evaluation with all three (3) antenna options.</i>																			
4. If the SAR measured for an audio accessory combination is > 6.0 W/kg, test that audio accessory on the required immediately adjacent channels.																			
5. Remaining required channels were not evaluated based on the highest SAR channel(s) and/or adjacent channel(s) were < 7.0 W/kg.																			
6. When test reduction applies, the slots for such configurations are denoted with N/A (Not Applicable).																			

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5	Vertex Standard		
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	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


9.0 SAR SCALING (TUNE-UP TOLERANCE)



SAR LEVELS SCALED TO VERTEX STANDARD MAX. TOLERANCE SPECIFICATION

Test Config.	Freq. (MHz)	Antenna Part No.	Battery Part No.	Conducted Power (W)	SAR Level (inc. droop) 1g (W/kg)	Scale to 5.3 W (5 W + 0.25 dB)	Scaled SAR 1g (W/kg)	
Face-held	406.1	ATU-16B (a)	FNB-V113LI (b)	5.10	3.86	+0.167 dB	4.01	F1
Face-held	406.1	ATU-16B (a)	FNB-V112LI (a)	5.10	3.84	+0.167 dB	3.99	F2
Face-held	440	ATU-16C (b)	FNB-V113LI (b)	5.20	3.42	+0.083 dB	3.49	F3
Face-held	450	ATU-16D (c)	FNB-V113LI (b)	5.10	3.23	+0.167 dB	3.36	F5
Face-held	406.1	ATU-16B (a)	FNB-V113LI (b)	5.20	4.15	+0.083 dB	4.23	F7
Face-held	406.1	ATU-16B (a)	FNB-V112LI (a)	5.20	3.88	+0.083 dB	3.95	F8
Face-held	440	ATU-16C (b)	FNB-V113LI (b)	5.20	3.31	+0.083 dB	3.37	F9
Face-held	450	ATU-16D (c)	FNB-V113LI (b)	5.10	3.16	+0.167 dB	3.28	F11
Face-held	406.1	ATU-16B (a)	FNB-V113LI (b)	5.00	4.11	+0.253 dB	4.36	F12
Face-held	420	ATU-16B (a)	FNB-V113LI (b)	4.90	3.44	+0.341 dB	3.72	F13
Face-held	406.1	ATU-16B (a)	FNB-V112LI (a)	5.00	4.08	+0.253 dB	4.32	F14
Face-held	440	ATU-16C (b)	FNB-V113LI (b)	5.10	3.30	+0.167 dB	3.43	F15
Face-held	470	ATU-16D (c)	FNB-V113LI (b)	5.20	3.68	+0.083 dB	3.75	F16
Face-held	450	ATU-16D (c)	FNB-V113LI (b)	5.00	3.96	+0.253 dB	4.20	F17
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.10	4.39	+0.167 dB	4.56	B1
Body-worn	420	ATU-16B (a)	FNB-V112LI (a)	4.90	3.69	+0.341 dB	3.99	B2
Body-worn	440	ATU-16C (b)	FNB-V112LI (a)	5.20	4.65	+0.083 dB	4.74	B3
Body-worn	430	ATU-16C (b)	FNB-V112LI (a)	5.10	3.80	+0.167 dB	3.95	B4
Body-worn	450	ATU-16C (b)	FNB-V112LI (a)	5.10	3.74	+0.167 dB	3.89	B5
Body-worn	460	ATU-16D (c)	FNB-V112LI (a)	5.20	4.71	+0.083 dB	4.80	B7
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.20	5.05	+0.083 dB	5.15	B9
Body-worn	420	ATU-16B (a)	FNB-V112LI (a)	5.10	4.34	+0.167 dB	4.51	B10
Body-worn	406.1	ATU-16B (a)	FNB-V113LI (b)	5.20	4.98	+0.083 dB	5.08	B11
Body-worn	440	ATU-16C (b)	FNB-V112LI (a)	5.20	4.17	+0.083 dB	4.25	B12
Body-worn	430	ATU-16C (b)	FNB-V112LI (a)	5.10	4.15	+0.167 dB	4.31	B13
Body-worn	450	ATU-16C (b)	FNB-V112LI (a)	5.10	3.83	+0.167 dB	3.98	B14
Body-worn	460	ATU-16D (c)	FNB-V112LI (a)	5.20	3.99	+0.083 dB	4.07	B16
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.00	5.67	+0.253 dB	6.01	B17
Body-worn	420	ATU-16B (a)	FNB-V112LI (a)	4.90	3.84	+0.341 dB	4.15	B18

Notes:

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

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


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



SAR LEVELS SCALED TO VERTEX STANDARD MAX. TOLERANCE SPECIFICATION

Test Config.	Freq. (MHz)	Antenna Part No.	Battery Part No.	Conducted Power (W)	SAR Level (inc. droop) 1g (W/kg)	Scale to 5.3 W (5 W + 0.25 dB)	Scaled SAR 1g (W/kg)	
Body-worn	406.1	ATU-16B (a)	FNB-V113LI (b)	5.00	5.52	+0.253 dB	5.85	B19
Body-worn	440	ATU-16C (b)	FNB-V112LI (a)	5.10	4.17	+0.167 dB	4.33	B20
Body-worn	430	ATU-16C (b)	FNB-V112LI (a)	5.00	3.96	+0.253 dB	4.20	B21
Body-worn	450	ATU-16C (b)	FNB-V112LI (a)	5.00	3.35	+0.253 dB	3.55	B22
Body-worn	470	ATU-16D (c)	FNB-V112LI (a)	5.20	4.48	+0.083 dB	4.57	B23
Body-worn	460	ATU-16D (c)	FNB-V112LI (a)	5.10	3.66	+0.167 dB	3.80	B24
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.20	4.92	+0.083 dB	5.01	A4
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.20	5.25	+0.083 dB	5.35	A5
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.20	4.41	+0.083 dB	4.50	A6
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.00	4.91	+0.253 dB	5.20	A7
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.00	5.10	+0.253 dB	5.41	A8
Body-worn	406.1	ATU-16B (a)	FNB-V112LI (a)	5.00	5.07	+0.253 dB	5.37	A9
Body-worn	440	ATU-16C (b)	FNB-V112LI (a)	5.10	4.15	+0.167 dB	4.31	A10
Body-worn	440	ATU-16C (b)	FNB-V112LI (a)	5.10	3.66	+0.167 dB	3.80	A11
Body-worn	440	ATU-16C (b)	FNB-V112LI (a)	5.10	3.72	+0.167 dB	3.87	A12
Body-worn	470	ATU-16D (c)	FNB-V112LI (a)	5.20	4.45	+0.083 dB	4.54	A13
Body-worn	470	ATU-16D (c)	FNB-V112LI (a)	5.20	5.11	+0.083 dB	5.21	A14
Body-worn	470	ATU-16D (c)	FNB-V112LI (a)	5.20	5.12	+0.083 dB	5.22	A15

Notes:


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



Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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10.0 FLUID DIELECTRIC PARAMETERS


FLUID DIELECTRIC PARAMETERS						
Date: 12/02/2010		Frequency: 450 MHz			Tissue: Body	
Freq (GHz)	Test_e	Test_s	450MHz Target_e	450MHz Target_s	Deviation Permittivity	Deviation Conductivity
0.35	59.06	0.84	56.7	0.94	4.16%	-10.64%
0.36	59.12	0.84	56.7	0.94	4.27%	-10.64%
0.37	59.35	0.84	56.7	0.94	4.67%	-10.64%
0.38	58.98	0.85	56.7	0.94	4.02%	-9.57%
0.39	58.80	0.86	56.7	0.94	3.70%	-8.51%
0.40	58.20	0.90	56.7	0.94	2.65%	-4.26%
0.41	58.98	0.90	56.7	0.94	4.02%	-4.26%
0.42	58.19	0.90	56.7	0.94	2.63%	-4.26%
0.43	57.47	0.91	56.7	0.94	1.36%	-3.19%
0.44	58.35	0.91	56.7	0.94	2.91%	-3.19%
0.45	58.39	0.91	56.7	0.94	2.98%	-3.19%
0.46	58.08	0.93	56.7	0.94	2.43%	-1.06%
0.47	57.60	0.92	56.7	0.94	1.59%	-2.13%
0.48	57.64	0.93	56.7	0.94	1.66%	-1.06%
0.49	57.66	0.94	56.7	0.94	1.69%	0.00%
0.50	57.08	0.95	56.7	0.94	0.67%	1.06%
0.51	57.66	0.94	56.7	0.94	1.69%	0.00%
0.52	57.46	0.94	56.7	0.94	1.34%	0.00%
0.53	57.05	0.97	56.7	0.94	0.62%	3.19%
0.54	57.25	0.99	56.7	0.94	0.97%	5.32%
0.55	56.83	1.00	56.7	0.94	0.23%	6.38%




Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 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: 12/02/2010		Frequency: 450 MHz			Tissue: Head	
Freq (GHz)	Test_e	Test_s	450MHz Target_e	450MHz Target_s	Deviation Permittivity	Deviation Conductivity
0.35	46.87	0.74	43.5	0.87	7.75%	-14.76%
0.36	46.82	0.74	43.5	0.87	7.63%	-14.76%
0.37	46.58	0.76	43.5	0.87	7.08%	-12.39%
0.38	46.89	0.77	43.5	0.87	7.79%	-11.21%
0.39	46.33	0.80	43.5	0.87	6.51%	-8.05%
0.40	45.63	0.83	43.5	0.87	4.90%	-4.60%
0.41	45.94	0.83	43.5	0.87	5.61%	-4.60%
0.42	45.42	0.83	43.5	0.87	4.41%	-4.60%
0.43	45.04	0.84	43.5	0.87	3.54%	-3.45%
0.44	44.87	0.84	43.5	0.87	3.15%	-2.92%
0.45	45.32	0.85	43.5	0.87	4.18%	-1.74%
0.46	44.61	0.85	43.5	0.87	2.55%	-1.74%
0.47	44.40	0.85	43.5	0.87	2.07%	-1.74%
0.48	44.70	0.88	43.5	0.87	2.76%	0.63%
0.49	44.40	0.89	43.5	0.87	2.07%	1.82%
0.50	44.34	0.87	43.5	0.87	1.93%	-0.55%
0.51	43.59	0.89	43.5	0.87	0.21%	1.82%
0.52	43.49	0.89	43.5	0.87	-0.02%	1.82%
0.53	43.18	0.90	43.5	0.87	-0.74%	3.00%
0.54	43.18	0.91	43.5	0.87	-0.74%	4.18%
0.55	42.68	0.93	43.5	0.87	-1.89%	6.55%


Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 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: 12/10/2010		Frequency: 450 MHz			Tissue: Body	
Freq (GHz)	Test_e	Test_s	450MHz Target_e	450MHz Target_s	Deviation Permittivity	Deviation Conductivity
0.35	59.18	0.82	56.7	0.94	4.37%	-12.77%
0.36	59.70	0.84	56.7	0.94	5.29%	-10.64%
0.37	58.46	0.85	56.7	0.94	3.10%	-9.57%
0.38	58.29	0.85	56.7	0.94	2.80%	-9.57%
0.39	59.05	0.86	56.7	0.94	4.14%	-8.51%
0.40	58.67	0.90	56.7	0.94	3.47%	-4.26%
0.4061*	58.50	0.90	56.7	0.94	3.17%	-4.26%
0.41	58.33	0.90	56.7	0.94	2.87%	-4.26%
0.42	57.77	0.91	56.7	0.94	1.89%	-3.19%
0.43	57.80	0.92	56.7	0.94	1.94%	-2.13%
0.44	58.11	0.93	56.7	0.94	2.49%	-1.06%
0.45	57.73	0.94	56.7	0.94	1.82%	0.00%
0.46	57.33	0.94	56.7	0.94	1.11%	0.00%
0.47	57.02	0.95	56.7	0.94	0.56%	1.06%
0.48	57.56	0.95	56.7	0.94	1.52%	1.06%
0.49	57.07	0.95	56.7	0.94	0.65%	1.06%
0.50	56.88	0.96	56.7	0.94	0.32%	2.13%
0.51	56.73	0.97	56.7	0.94	0.05%	3.19%
0.52	56.87	0.97	56.7	0.94	0.30%	3.19%
0.53	56.95	0.98	56.7	0.94	0.44%	4.26%
0.54	56.79	1.01	56.7	0.94	0.16%	7.45%
0.55	56.44	1.02	56.7	0.94	-0.46%	8.51%

*interpolated using DASY4 Software


Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 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: 12/10/2010		Frequency: 450 MHz			Tissue: Head	
Freq (GHz)	Test_e	Test_s	450MHz Target_e	450MHz Target_s	Deviation Permittivity	Deviation Conductivity
0.35	46.84	0.79	43.5	0.87	7.68%	-9.20%
0.36	45.59	0.79	43.5	0.87	4.80%	-9.20%
0.37	46.29	0.80	43.5	0.87	6.41%	-8.05%
0.38	45.57	0.80	43.5	0.87	4.76%	-8.05%
0.39	45.24	0.82	43.5	0.87	4.00%	-5.75%
0.40	45.14	0.83	43.5	0.87	3.77%	-4.60%
0.4061*	45.00	0.83	43.5	0.87	3.45%	-4.60%
0.41	45.01	0.83	43.5	0.87	3.47%	-4.60%
0.42	44.91	0.84	43.5	0.87	3.24%	-3.45%
0.43	44.07	0.84	43.5	0.87	1.31%	-3.45%
0.44	44.78	0.85	43.5	0.87	2.94%	-2.30%
0.45	44.21	0.86	43.5	0.87	1.63%	-1.15%
0.46	43.20	0.87	43.5	0.87	-0.69%	0.00%
0.47	43.30	0.88	43.5	0.87	-0.46%	1.15%
0.48	43.49	0.89	43.5	0.87	-0.02%	2.30%
0.49	43.71	0.89	43.5	0.87	0.48%	2.30%
0.50	43.25	0.90	43.5	0.87	-0.57%	3.45%
0.51	42.77	0.91	43.5	0.87	-1.68%	4.60%
0.52	42.97	0.91	43.5	0.87	-1.22%	4.60%
0.53	42.15	0.93	43.5	0.87	-3.10%	6.90%
0.54	42.67	0.92	43.5	0.87	-1.91%	5.75%
0.55	42.17	0.94	43.5	0.87	-3.06%	8.05%



*interpolated using DASY4 Software

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 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: 12/17/2010		Frequency: 450 MHz			Tissue: Body	
Freq (GHz)	Test_e	Test_s	450MHz Target_e	450MHz Target_s	Deviation Permittivity	Deviation Conductivity
0.35	58.42	0.86	56.7	0.94	3.03%	-8.51%
0.36	57.96	0.84	56.7	0.94	2.22%	-10.64%
0.37	58.41	0.86	56.7	0.94	3.02%	-8.51%
0.38	58.08	0.87	56.7	0.94	2.43%	-7.45%
0.39	58.07	0.88	56.7	0.94	2.42%	-6.38%
0.40	57.82	0.90	56.7	0.94	1.98%	-4.26%
0.41	57.91	0.90	56.7	0.94	2.13%	-4.26%
0.42	57.63	0.91	56.7	0.94	1.64%	-3.19%
0.43	57.91	0.92	56.7	0.94	2.13%	-2.13%
0.44	56.97	0.90	56.7	0.94	0.48%	-4.26%
0.45	57.17	0.91	56.7	0.94	0.83%	-3.19%
0.46	56.88	0.92	56.7	0.94	0.32%	-2.13%
0.47	57.40	0.94	56.7	0.94	1.23%	0.00%
0.48	57.25	0.95	56.7	0.94	0.97%	1.06%
0.49	56.99	0.95	56.7	0.94	0.51%	1.06%
0.50	57.08	0.95	56.7	0.94	0.67%	1.06%
0.51	57.27	0.97	56.7	0.94	1.01%	3.19%
0.52	56.49	0.98	56.7	0.94	-0.37%	4.26%
0.53	56.53	0.98	56.7	0.94	-0.30%	4.26%
0.54	56.32	0.99	56.7	0.94	-0.67%	5.32%
0.55	56.06	1.01	56.7	0.94	-1.13%	7.45%



	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 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: 12/18/2010		Frequency: 450 MHz			Tissue: Body	
Freq (GHz)	Test_e	Test_s	450MHz Target_e	450MHz Target_s	Deviation Permittivity	Deviation Conductivity
0.35	58.19	0.86	56.7	0.94	2.63%	-8.51%
0.36	58.17	0.85	56.7	0.94	2.59%	-9.57%
0.37	58.45	0.87	56.7	0.94	3.09%	-7.45%
0.38	58.51	0.88	56.7	0.94	3.19%	-6.38%
0.39	57.92	0.87	56.7	0.94	2.15%	-7.45%
0.40	58.01	0.90	56.7	0.94	2.31%	-4.26%
0.4061*	57.90	0.91	56.7	0.94	2.12%	-3.19%
0.41	57.94	0.91	56.7	0.94	2.19%	-3.19%
0.42	57.61	0.92	56.7	0.94	1.60%	-2.13%
0.43	57.66	0.92	56.7	0.94	1.69%	-2.13%
0.44	57.57	0.91	56.7	0.94	1.53%	-3.19%
0.45	57.57	0.91	56.7	0.94	1.53%	-3.19%
0.46	56.73	0.93	56.7	0.94	0.05%	-1.06%
0.47	57.06	0.95	56.7	0.94	0.63%	1.06%
0.48	57.27	0.95	56.7	0.94	1.01%	1.06%
0.49	57.25	0.96	56.7	0.94	0.97%	2.13%
0.50	57.01	0.96	56.7	0.94	0.55%	2.13%
0.51	56.94	0.97	56.7	0.94	0.42%	3.19%
0.52	56.60	0.98	56.7	0.94	-0.18%	4.26%
0.53	56.92	0.99	56.7	0.94	0.39%	5.32%
0.54	56.27	1.00	56.7	0.94	-0.76%	6.38%
0.55	56.47	1.01	56.7	0.94	-0.41%	7.45%


*interpolated using DASY4 Software



Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 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: 12/18/2010		Frequency: 450 MHz			Tissue: Head	
Freq (GHz)	Test_e	Test_s	450MHz Target_e	450MHz Target_s	Deviation Permittivity	Deviation Conductivity
0.35	50.43	0.83	43.5	0.87	15.93%	-4.60%
0.36	46.31	0.78	43.5	0.87	6.46%	-10.34%
0.37	44.86	0.79	43.5	0.87	3.13%	-9.20%
0.38	42.66	0.73	43.5	0.87	-1.93%	-16.09%
0.39	45.39	0.80	43.5	0.87	4.34%	-8.05%
0.40	44.80	0.83	43.5	0.87	2.99%	-4.60%
0.41	44.15	0.83	43.5	0.87	1.49%	-4.60%
0.42	44.87	0.84	43.5	0.87	3.15%	-3.45%
0.43	44.02	0.84	43.5	0.87	1.20%	-3.45%
0.44	43.54	0.84	43.5	0.87	0.09%	-3.45%
0.45	43.97	0.85	43.5	0.87	1.08%	-2.30%
0.46	43.48	0.84	43.5	0.87	-0.05%	-3.45%
0.47	43.25	0.86	43.5	0.87	-0.57%	-1.15%
0.48	42.82	0.87	43.5	0.87	-1.56%	0.00%
0.49	43.22	0.88	43.5	0.87	-0.64%	1.15%
0.50	42.50	0.87	43.5	0.87	-2.30%	0.00%
0.51	42.58	0.89	43.5	0.87	-2.11%	2.30%
0.52	41.97	0.89	43.5	0.87	-3.52%	2.30%
0.53	41.93	0.92	43.5	0.87	-3.61%	5.75%
0.54	41.83	0.91	43.5	0.87	-3.84%	4.60%
0.55	42.00	0.93	43.5	0.87	-3.45%	6.90%



Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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FLUID DIELECTRIC PARAMETERS (CONT.)

Test Date	Fluid Type	Ambient Temp.	Fluid Temp.	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
Dec 02	450 Body	22.8	22.2	≥ 15 cm	101.1 kPa	40%	1000
	450 Head	22.8	22.4	≥ 15 cm	101.1 kPa	40%	1000
Dec 10	450 Body	23.4	22.5	≥ 15 cm	101.1 kPa	40%	1000
	450 Head	23.4	22.8	≥ 15 cm	101.1 kPa	40%	1000
Dec 17	450 Body	23.0	22.5	≥ 15 cm	101.1 kPa	35%	1000
Dec 18	450 Body	23.5	23.0	≥ 15 cm	101.1 kPa	35%	1000
	450 Head	23.5	22.8	≥ 15 cm	101.1 kPa	35%	1000

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
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11.0 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 [7]).
- The DUT was evaluated for SAR in accordance with the procedures described in FCC KDB 643646 D01v01 (see reference [8]).
- 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 in the test configuration that reported the maximum measured SAR level. See Appendix A (SAR Test Plots) for SAR-versus-Time power droop evaluation plot.
- The fluid temperature was measured prior to and after the SAR evaluations. The fluid temperature remained within +/-2°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.

12.0 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:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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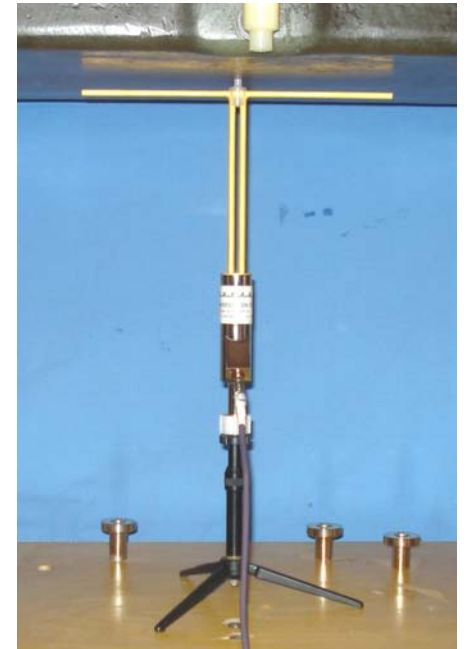
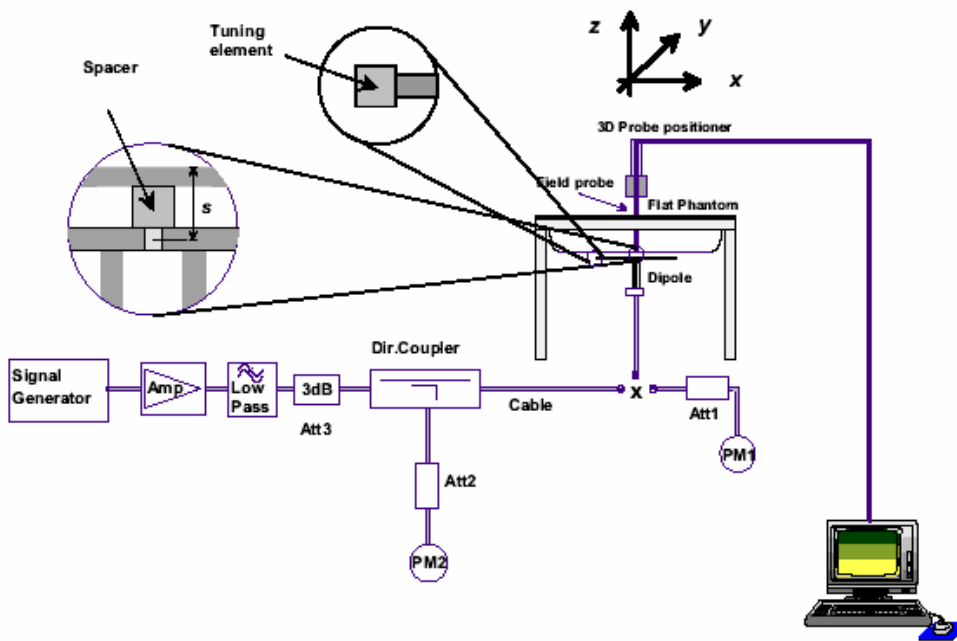
13.0 SYSTEM PERFORMANCE CHECK

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 [5]). 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	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.						
Dec 02	Body 450	1.78 $\pm 10\%$	1.82	+2.2%	56.7 $\pm 5\%$	58.4	+3.0%	0.94 $\pm 5\%$	0.91	-3.2%	1000	22.8	22.2	≥ 15	40	101.1
Dec 10	Body 450	1.78 $\pm 10\%$	1.88	+5.6%	56.7 $\pm 5\%$	57.7	+1.8%	0.94 $\pm 5\%$	0.94	0.0%	1000	23.4	22.5	≥ 15	40	101.1
Dec 17	Body 450	1.78 $\pm 10\%$	1.86	+4.5%	56.7 $\pm 5\%$	57.2	+0.9%	0.94 $\pm 5\%$	0.91	-3.2%	1000	23.0	22.5	≥ 15	35	101.1
Dec 18	Body 450	1.78 $\pm 10\%$	1.88	+5.6%	56.7 $\pm 5\%$	57.6	+1.6%	0.94 $\pm 5\%$	0.91	-3.2%	1000	23.5	23.0	≥ 15	35	101.1



- Notes**
- The target SAR values are the measured values from the SAR system manufacturer's dipole calibration (see Appendix E).
 - The target dielectric parameters are the nominal values from the SAR system manufacturer's dipole calibration (see Appendix E).
 - 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.
 - 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:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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14.0 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 [11] and [12]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2003 (see reference [5]). 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 %

15.0 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.		




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16.0 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	Side Planar Phantom
Shell Material	Plexiglas
Thickness	2.0 mm ± 0.1 mm
Volume	72.6 cm (L) x 20.3 cm (W) x 20.3 cm (H)
<u>Validation Phantom</u>	
Type	Barski Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters


Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
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17.0 PROBE SPECIFICATION (ET3DV6)


<p>Construction: Symmetrical design with triangular core; Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)</p> <p>Calibration: In air from 10 MHz to 2.5 GHz In head simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)</p> <p>Frequency: 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)</p> <p>Directivity: ± 0.2 dB in head tissue (rotation around probe axis) ± 0.4 dB in head tissue (rotation normal to probe axis)</p> <p>Dynamic Range: $5 \mu\text{W/g}$ to $> 100 \text{ mW/g}$; Linearity: ± 0.2 dB</p> <p>Surface Detect: ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces</p> <p>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</p> <p>Application: General dosimetry up to 3 GHz; Compliance tests of mobile phone</p>	
ET3DV6 E-Field Probe	



18.0 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	

19.0 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	




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20.0 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	-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				

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
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21.0 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	3.45	Normal	1	0.6	0.49	2.1	1.7	∞
Combined Standard Uncertainty			RSS				11.58	11.18	
Expanded Uncertainty (95% Confidence Interval)			k=2				23.16	22.36	

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



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22.0 REFERENCES



- [1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093.
- [2] Health Canada - "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6: 1999.
- [3] Federal Communications Commission - "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- [4] Industry Canada - "Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 4: March 2010.
- [5] IEEE Standard 1528-2003 - "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": December 2003.
- [6] 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."
- [7] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01 v04: November 2009.
- [8] Federal Communications Commission, Office of Engineering and Technology - "SAR Test Reduction Considerations for Occupational PTT Radios", KDB 643646 D01v01: December 2010.
- [9] 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 D01 v01r01: January 2007.
- [10] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 21 Application Note, SAR Sensitivities: Sept. 2005.
- [11] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 16 Application Note, Head Tissue Recipe: Sept. 2005.
- [12] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 17 Application Note, Body Tissue Recipe: Sept. 2005.
- [13] ISO/IEC 17025 - "General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)."
- [14] Federal Communications Commission - "Measurements Required: RF Power Output"; Rule Part 47 CFR §2.1046.
- [15] Industry Canada - "General Requirements and Information for the Certification of Radiocommunication Equipment", Radio Standards Specification RSS-Gen Issue 2: June 2007.

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APPENDIX B - SYSTEM PERFORMANCE CHECK PLOTS

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Date Tested: 12/02/2010

System Performance Check - 450 MHz Dipole - Body

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

Ambient Temp: 22.8°C; Fluid Temp: 22.2°C; Barometric Pressure: 101.1 kPa; Humidity: 40%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: MSL450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 58.4$; $\rho = 1000 \text{ kg/m}^3$

- 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

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

Maximum value of SAR (measured) = 1.88 mW/g

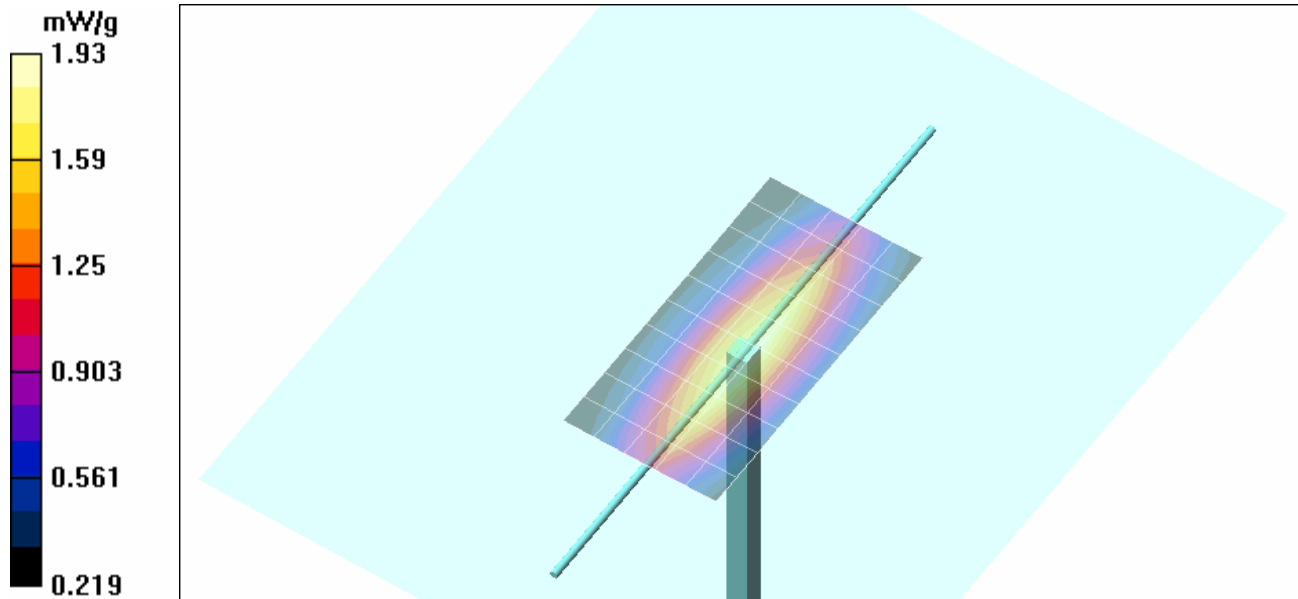
Head d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm


Reference Value = 44.9 V/m; Power Drift = 0.087 dB



Peak SAR (extrapolated) = 2.92 W/kg

SAR(1 g) = 1.82 mW/g; SAR(10 g) = 1.21 mW/g

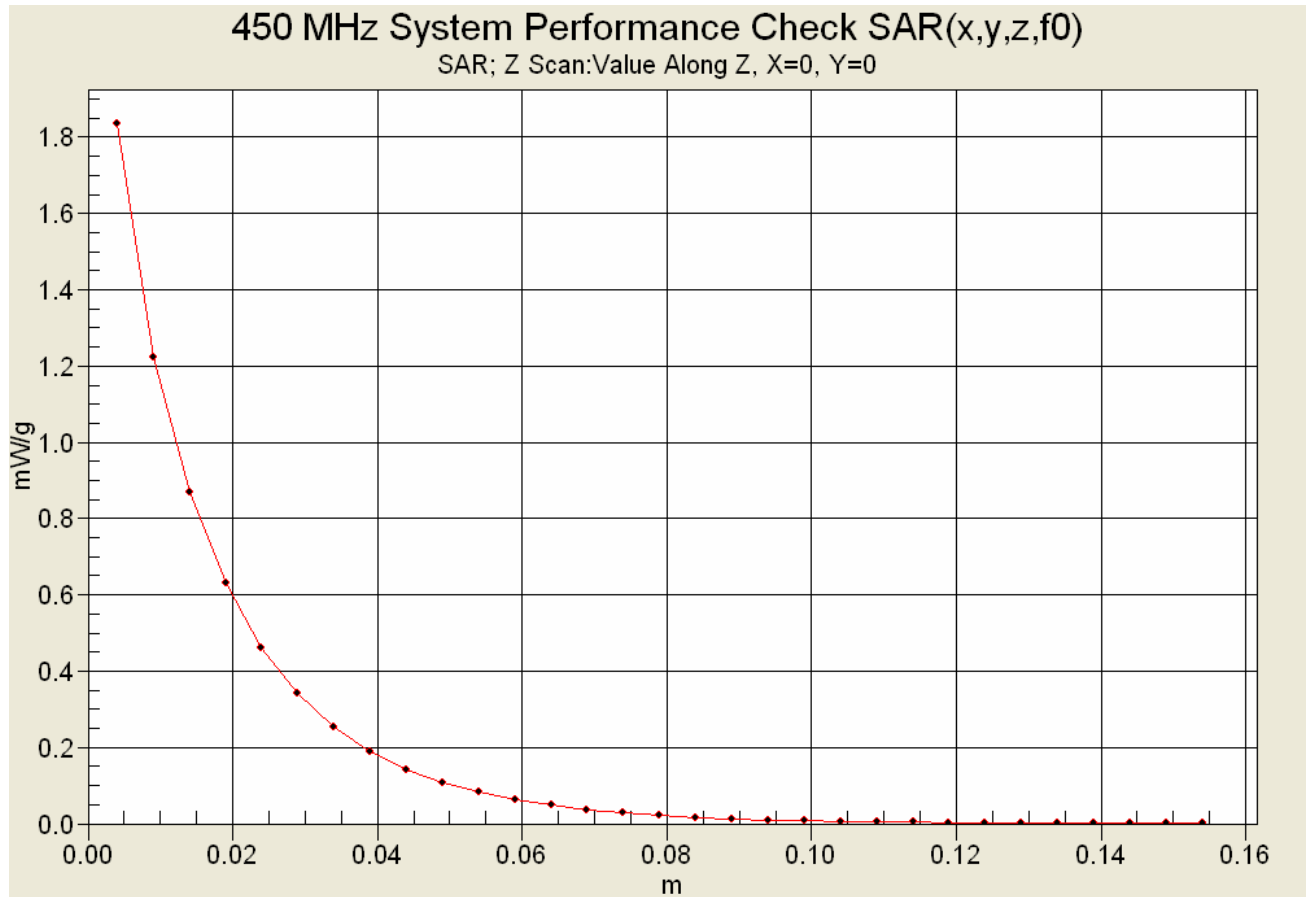
Maximum value of SAR (measured) = 1.93 mW/g






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Z-Axis Scan



Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	 Vertex Standard
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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Date Tested: 12/10/2010

System Performance Check - 450 MHz Dipole - Body

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

Ambient Temp: 23.4°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: MSL450 Medium parameters used: $f = 450$ MHz; $\sigma = 0.94$ mho/m; $\epsilon_r = 57.7$; $\rho = 1000$ kg/m³

- 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

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

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

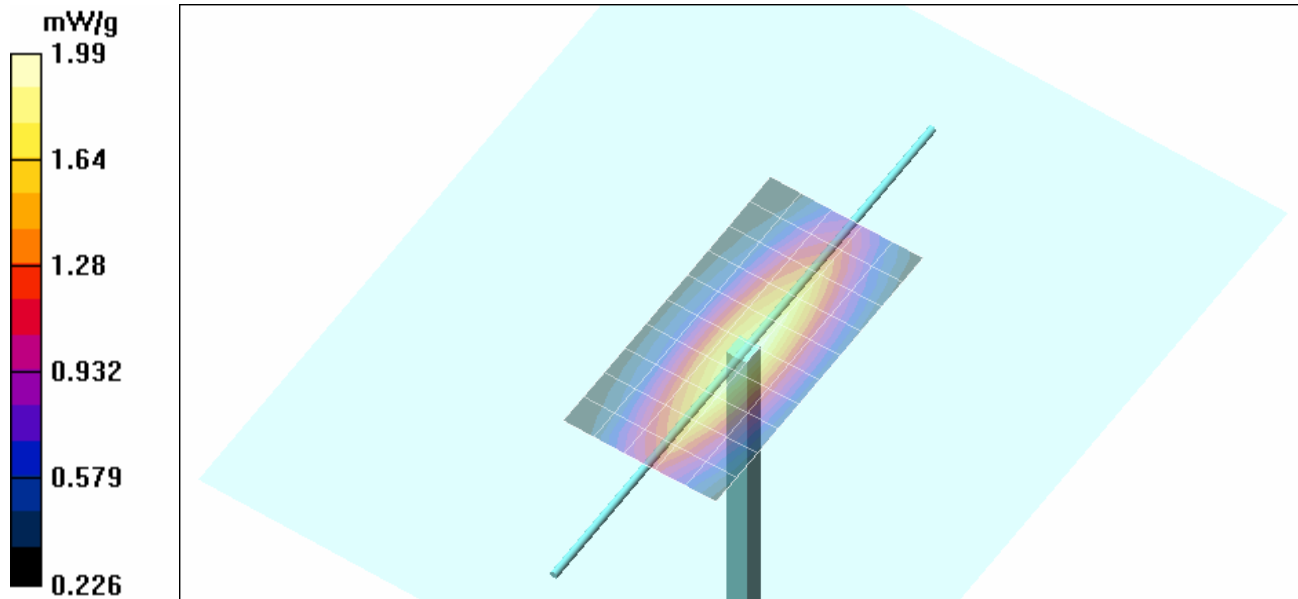
Head d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm


Reference Value = 44.9 V/m; Power Drift = 0.080 dB



Peak SAR (extrapolated) = 3.02 W/kg

SAR(1 g) = 1.88 mW/g; SAR(10 g) = 1.25 mW/g

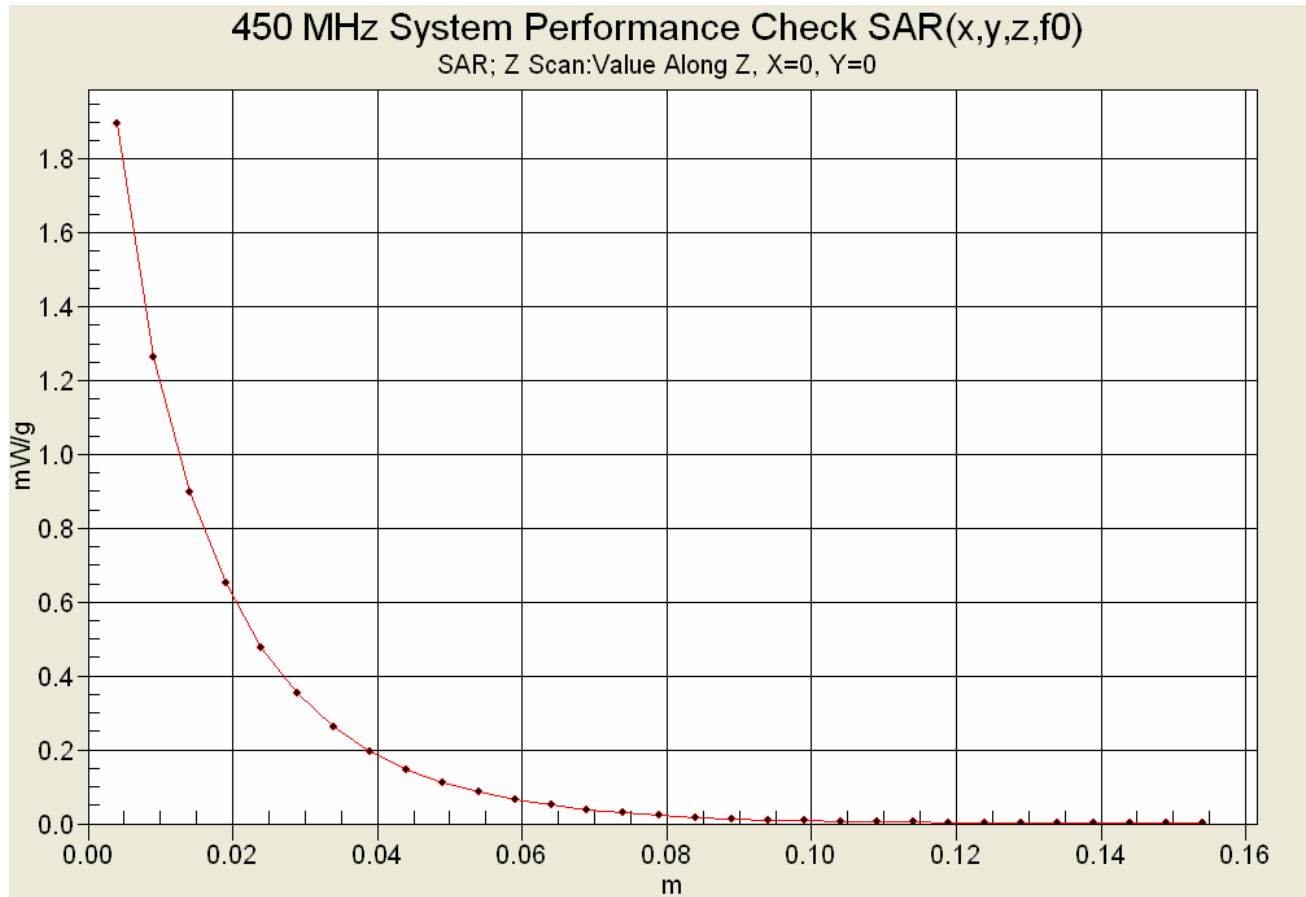
Maximum value of SAR (measured) = 1.99 mW/g






Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	 Vertex Standard
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 12/17/2010

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: 22.5°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: MSL450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 57.2$; $\rho = 1000 \text{ kg/m}^3$

- 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

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

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

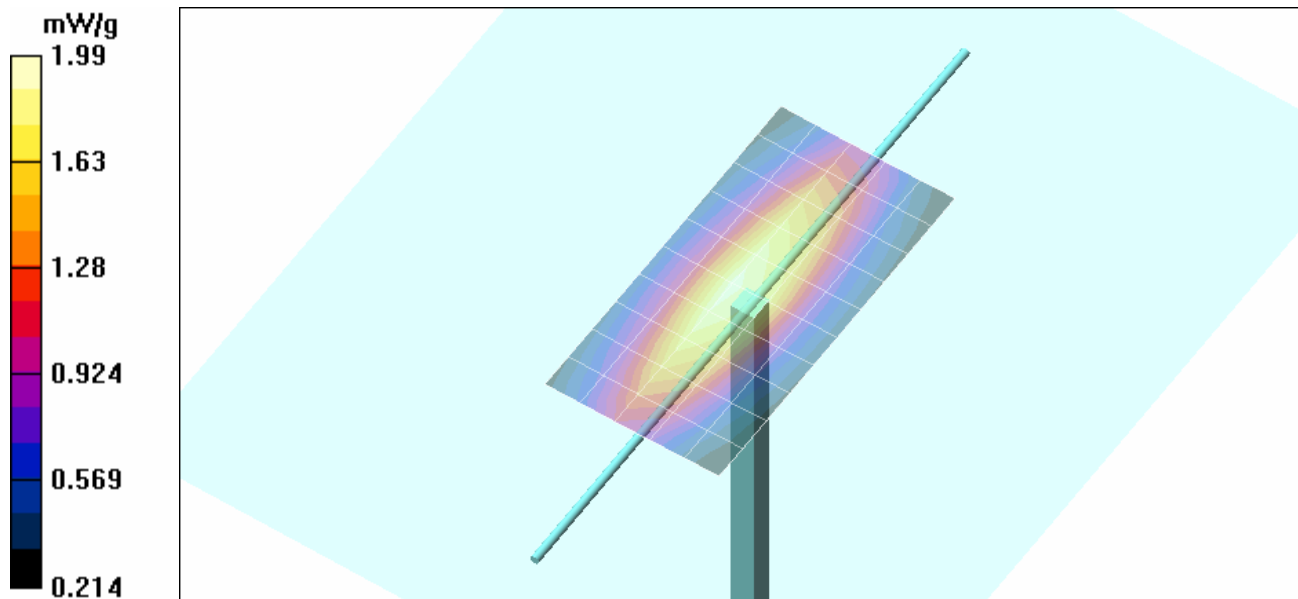
Head d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm


Reference Value = 45.2 V/m; Power Drift = 0.024 dB



Peak SAR (extrapolated) = 3.00 W/kg

SAR(1 g) = 1.86 mW/g; SAR(10 g) = 1.25 mW/g

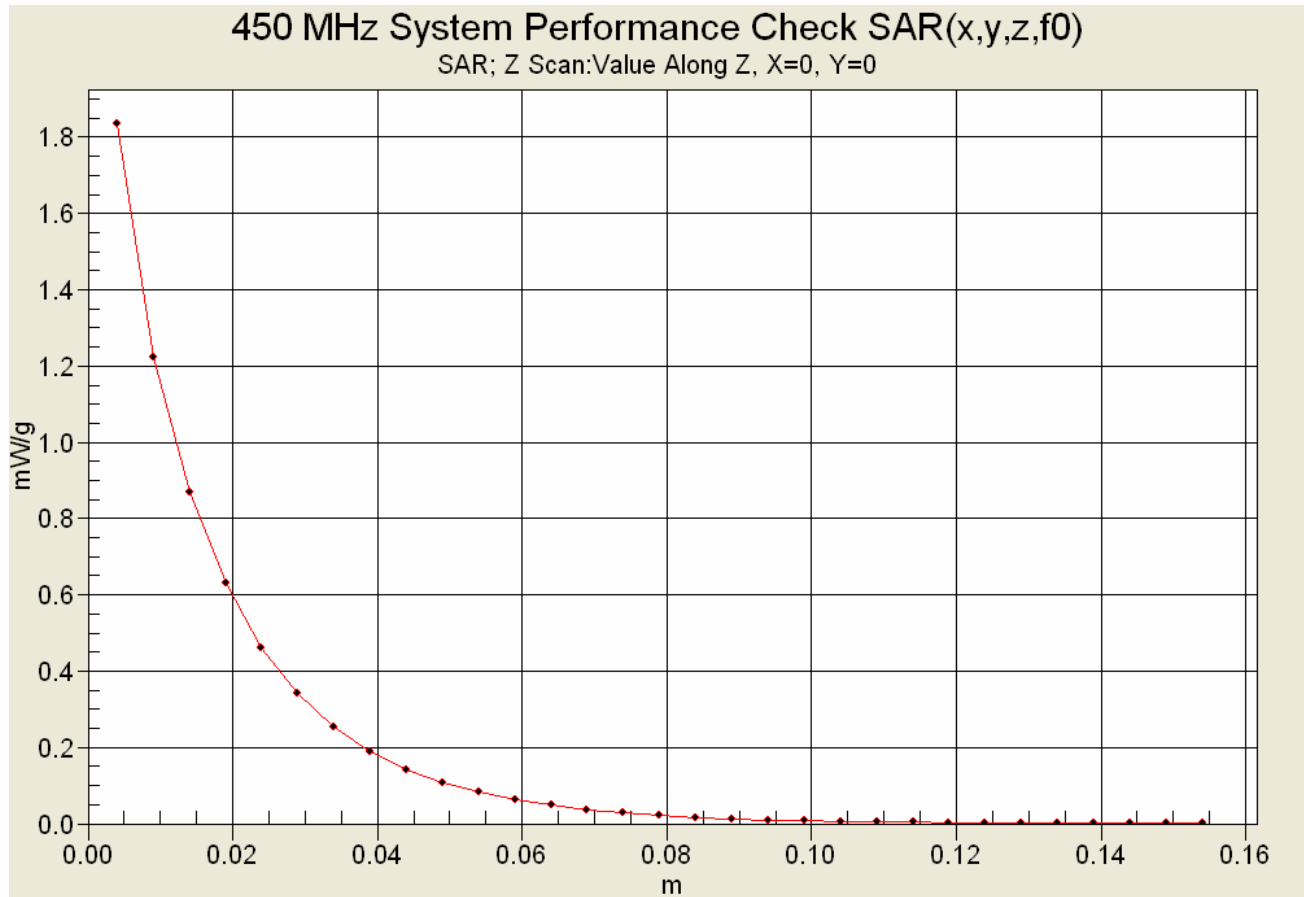
Maximum value of SAR (measured) = 1.99 mW/g






Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	 Vertex Standard
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 12/18/2010

System Performance Check - 450 MHz Dipole - Body

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

Ambient Temp: 23.5°C; Fluid Temp: 23.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: MSL450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 57.6$; $\rho = 1000 \text{ kg/m}^3$

- 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

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

Maximum value of SAR (measured) = 1.83 mW/g

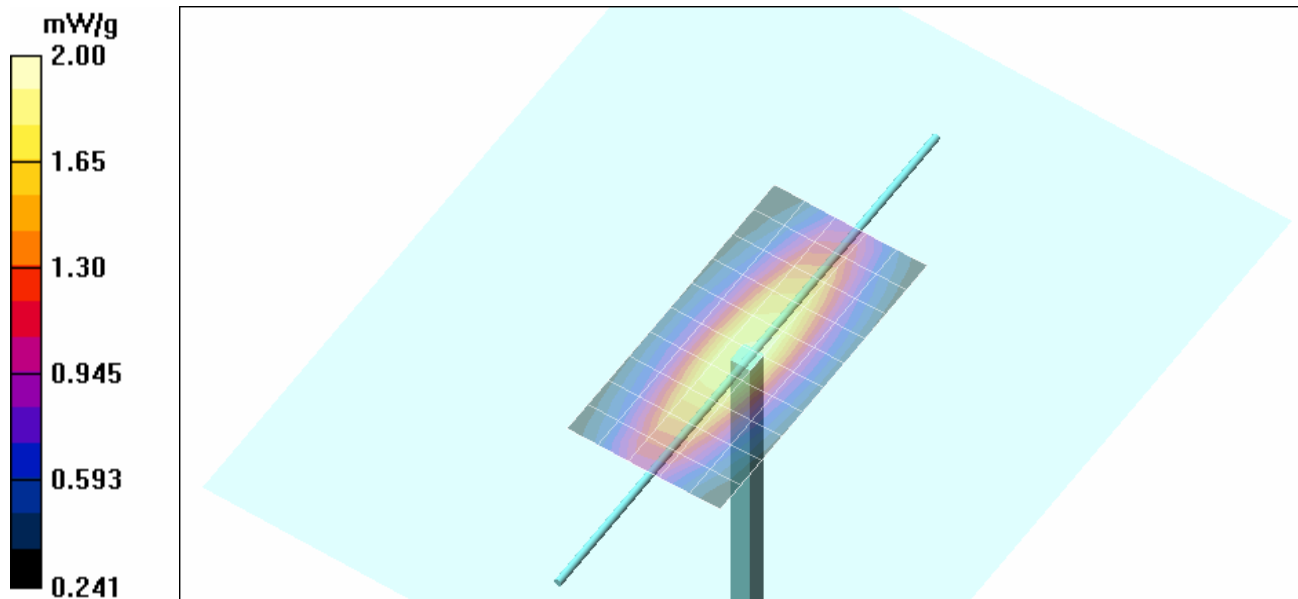
Head d=15mm Pin=398mW 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm


Reference Value = 47.1 V/m; Power Drift = 0.020 dB



Peak SAR (extrapolated) = 2.98 W/kg

SAR(1 g) = 1.88 mW/g; SAR(10 g) = 1.27 mW/g

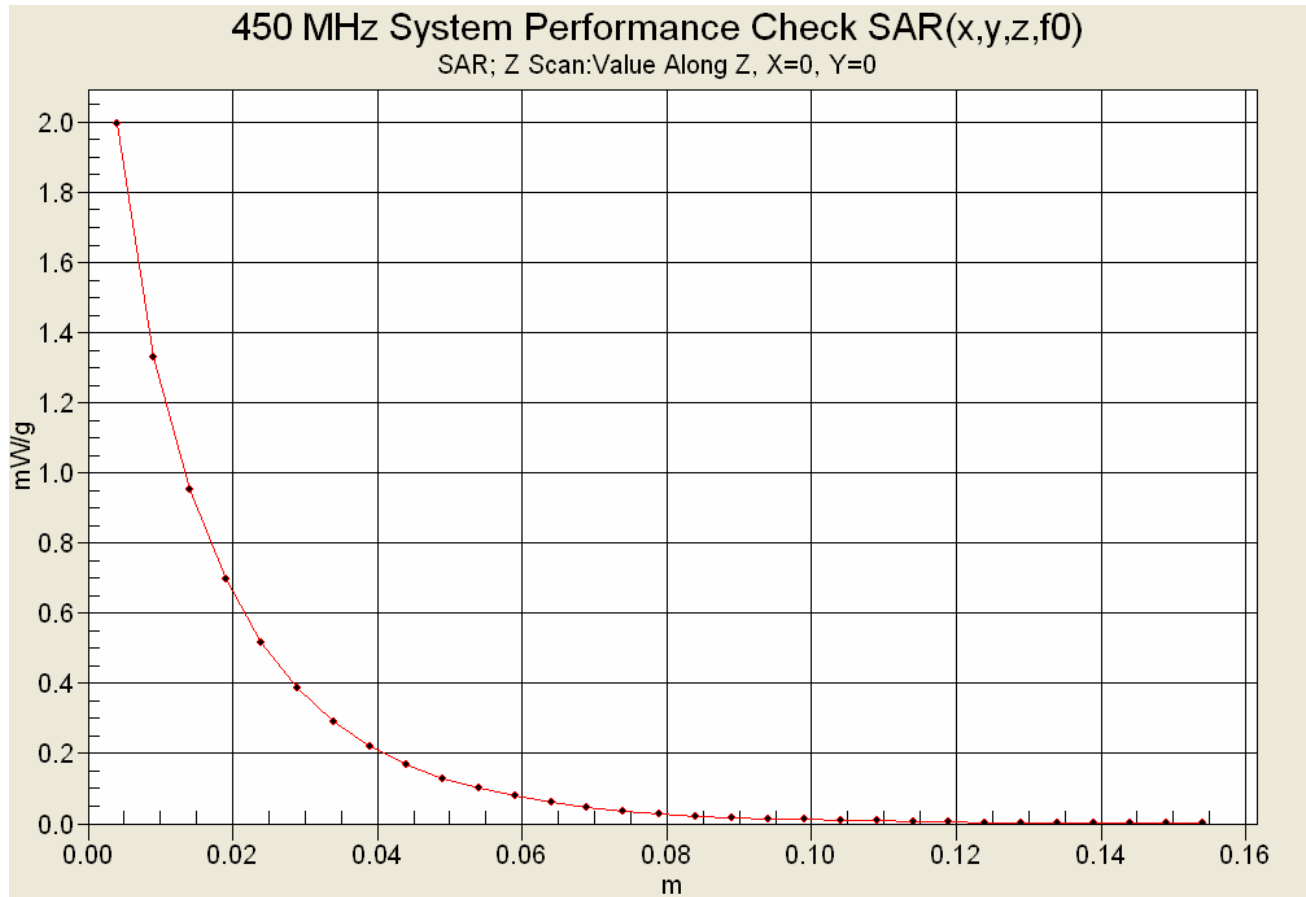
Maximum value of SAR (measured) = 2.00 mW/g






Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


Z-Axis Scan





Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	 Vertex Standard
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

450 MHz Body

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter

02/Dec/2010

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	59.06	0.84
0.3600	57.60 0.93	59.12	0.84
0.3700	57.50 0.93	59.35	0.84
0.3800	57.40 0.93	58.98	0.85
0.3900	57.30 0.93	58.80	0.86
0.4000	57.20 0.93	58.20	0.90
0.4100	57.10 0.93	58.98	0.90
0.4200	57.00 0.94	58.19	0.90
0.4300	56.90 0.94	57.47	0.91
0.4400	56.80 0.94	58.35	0.91
0.4500	56.70 0.94	58.39	0.91
0.4600	56.66 0.94	58.08	0.93
0.4700	56.62 0.94	57.60	0.92
0.4800	56.58 0.94	57.64	0.93
0.4900	56.54 0.94	57.66	0.94
0.5000	56.51 0.94	57.08	0.95
0.5100	56.47 0.94	57.66	0.94
0.5200	56.43 0.95	57.46	0.94
0.5300	56.39 0.95	57.05	0.97
0.5400	56.35 0.95	57.25	0.99
0.5500	56.31 0.95	56.83	1.00

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-1094620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

450 MHz Head

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter

02/Dec/2010

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_sHF	Test_e	Test_s
0.3500	44.7	0.87	46.87	0.74
0.3600	44.58	0.87	46.82	0.74
0.3700	44.46	0.87	46.58	0.76
0.3800	44.34	0.87	46.89	0.77
0.3900	44.22	0.87	46.33	0.80
0.4000	44.1	0.87	45.63	0.83
0.4100	43.98	0.87	45.94	0.83
0.4200	43.86	0.87	45.42	0.83
0.4300	43.74	0.87	45.04	0.84
0.4400	43.62	0.87	44.87	0.84
0.4500	43.5	0.87	45.32	0.85
0.4600	43.45	0.87	44.61	0.85
0.4700	43.4	0.87	44.40	0.85
0.4800	43.34	0.87	44.70	0.88
0.4900	43.29	0.87	44.40	0.89
0.5000	43.24	0.87	44.34	0.87
0.5100	43.19	0.87	43.59	0.89
0.5200	43.14	0.88	43.49	0.89
0.5300	43.08	0.88	43.18	0.90
0.5400	43.03	0.88	43.18	0.91
0.5500	42.98	0.88	42.68	0.93

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	 Vertex Standard
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

450 MHz Body

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter

10/Dec/2010

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	59.18
0.3600	57.60	0.93	59.70
0.3700	57.50	0.93	58.46
0.3800	57.40	0.93	58.29
0.3900	57.30	0.93	59.05
0.4000	57.20	0.93	58.67
0.4100	57.10	0.93	58.33
0.4200	57.00	0.94	57.77
0.4300	56.90	0.94	57.80
0.4400	56.80	0.94	58.11
0.4500	56.70	0.94	57.73
0.4600	56.66	0.94	57.33
0.4700	56.62	0.94	57.02
0.4800	56.58	0.94	57.56
0.4900	56.54	0.94	57.07
0.5000	56.51	0.94	56.88
0.5100	56.47	0.94	56.73
0.5200	56.43	0.95	56.87
0.5300	56.39	0.95	56.95
0.5400	56.35	0.95	56.79
0.5500	56.31	0.95	56.44


Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-1094620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

450 MHz Head

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
10/Dec/2010
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
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHFCC	sHFCC	Test_e	Test_s
0.3500	44.70	0.87	46.84	0.79
0.3600	44.58	0.87	45.59	0.79
0.3700	44.46	0.87	46.29	0.80
0.3800	44.34	0.87	45.57	0.80
0.3900	44.22	0.87	45.24	0.82
0.4000	44.10	0.87	45.14	0.83
0.4100	43.98	0.87	45.01	0.83
0.4200	43.86	0.87	44.91	0.84
0.4300	43.74	0.87	44.07	0.84
0.4400	43.62	0.87	44.78	0.85
0.4500	43.50	0.87	44.21	0.86
0.4600	43.45	0.87	43.20	0.87
0.4700	43.40	0.87	43.30	0.88
0.4800	43.34	0.87	43.49	0.89
0.4900	43.29	0.87	43.71	0.89
0.5000	43.24	0.87	43.25	0.90
0.5100	43.19	0.87	42.77	0.91
0.5200	43.14	0.88	42.97	0.91
0.5300	43.08	0.88	42.15	0.93
0.5400	43.03	0.88	42.67	0.92
0.5500	42.98	0.88	42.17	0.94

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-1094620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

450 MHz Body

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter

17/Dec/2010

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	58.42	0.86
0.3600	57.60 0.93	57.96	0.84
0.3700	57.50 0.93	58.41	0.86
0.3800	57.40 0.93	58.08	0.87
0.3900	57.30 0.93	58.07	0.88
0.4000	57.20 0.93	57.82	0.90
0.4100	57.10 0.93	57.91	0.90
0.4200	57.00 0.94	57.63	0.91
0.4300	56.90 0.94	57.91	0.92
0.4400	56.80 0.94	56.97	0.90
0.4500	56.70 0.94	57.17	0.91
0.4600	56.66 0.94	56.88	0.92
0.4700	56.62 0.94	57.40	0.94
0.4800	56.58 0.94	57.25	0.95
0.4900	56.54 0.94	56.99	0.95
0.5000	56.51 0.94	57.08	0.95
0.5100	56.47 0.94	57.27	0.97
0.5200	56.43 0.95	56.49	0.98
0.5300	56.39 0.95	56.53	0.98
0.5400	56.35 0.95	56.32	0.99
0.5500	56.31 0.95	56.06	1.01

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

450 MHz Body

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter

18/Dec/2010

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	58.19	0.86
0.3600	57.60 0.93	58.17	0.85
0.3700	57.50 0.93	58.45	0.87
0.3800	57.40 0.93	58.51	0.88
0.3900	57.30 0.93	57.92	0.87
0.4000	57.20 0.93	58.01	0.90
0.4100	57.10 0.93	57.94	0.91
0.4200	57.00 0.94	57.61	0.92
0.4300	56.90 0.94	57.66	0.92
0.4400	56.80 0.94	57.57	0.91
0.4500	56.70 0.94	57.57	0.91
0.4600	56.66 0.94	56.73	0.93
0.4700	56.62 0.94	57.06	0.95
0.4800	56.58 0.94	57.27	0.95
0.4900	56.54 0.94	57.25	0.96
0.5000	56.51 0.94	57.01	0.96
0.5100	56.47 0.94	56.94	0.97
0.5200	56.43 0.95	56.60	0.98
0.5300	56.39 0.95	56.92	0.99
0.5400	56.35 0.95	56.27	1.00
0.5500	56.31 0.95	56.47	1.01


Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-1094620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

450 MHz Head


Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
18/Dec/2010
Frequency (GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.3500	44.70 0.87	50.43	0.83
0.3600	44.58 0.87	46.31	0.78
0.3700	44.46 0.87	44.86	0.79
0.3800	44.34 0.87	42.66	0.73
0.3900	44.22 0.87	45.39	0.80
0.4000	44.10 0.87	44.80	0.83
0.4100	43.98 0.87	44.15	0.83
0.4200	43.86 0.87	44.87	0.84
0.4300	43.74 0.87	44.02	0.84
0.4400	43.62 0.87	43.54	0.84
0.4500	43.50 0.87	43.97	0.85
0.4600	43.45 0.87	43.48	0.84
0.4700	43.40 0.87	43.25	0.86
0.4800	43.34 0.87	42.82	0.87
0.4900	43.29 0.87	43.22	0.88
0.5000	43.24 0.87	42.50	0.87
0.5100	43.19 0.87	42.58	0.89
0.5200	43.14 0.88	41.97	0.89
0.5300	43.08 0.88	41.93	0.92
0.5400	43.03 0.88	41.83	0.91
0.5500	42.98 0.88	42.00	0.93

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-1094620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX E - DIPOLE CALIBRATION

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	 Vertex Standard
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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Accreditation No.: **SCS 108**

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 Function Signature
Laboratory Technician

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

Issued: January 20, 2010

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Accreditation No.: **SCS 108**

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 cm ³ (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 cm ³ (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: $f = 450$ MHz; $\sigma = 0.86$ mho/m; $\epsilon_r = 44.2$; $\rho = 1000$ kg/m³

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=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.99 mW/g

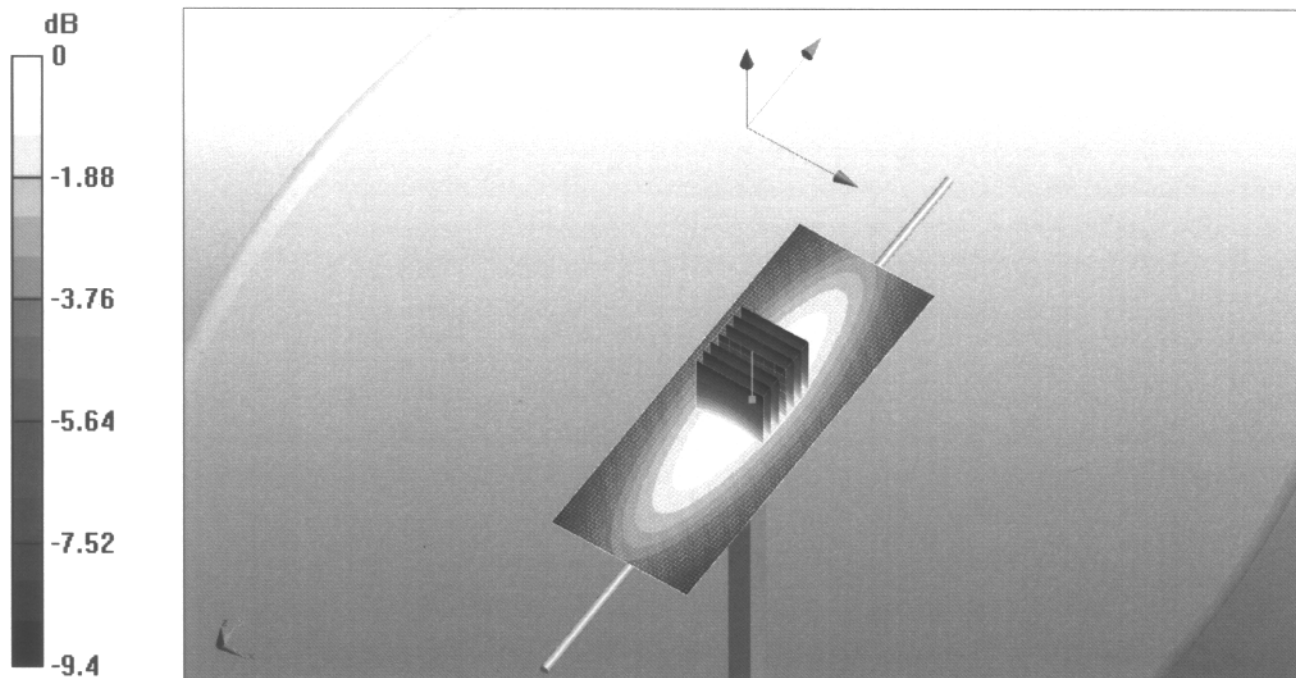
Head/d=15mm, Pin=398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

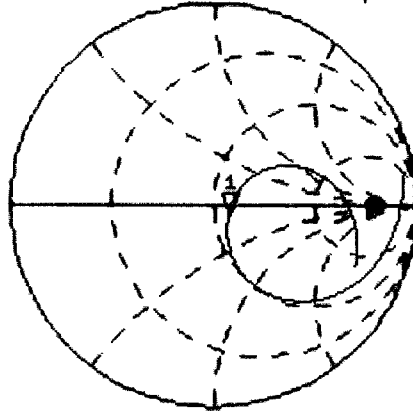
450.000 000 MHz

*
De1

Cor

Avg
16

↑

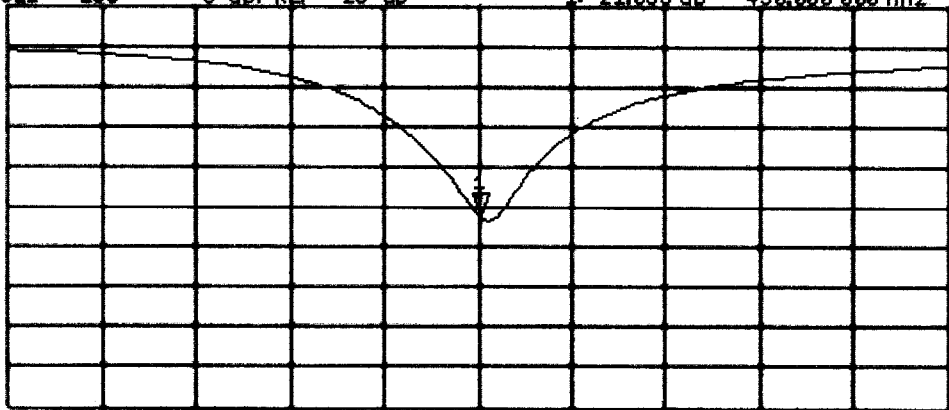


CH2 S11 LOG 5 dB/ REF -20 dB 1:-21.035 dB 450.000 000 MHz

Cor

Avg
16

↑



START 250.000 000 MHz

STOP 650.000 000 MHz

DASY5 Validation Report for Body TSL

Date/Time: 1/18/2010 1:24:11 PM

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

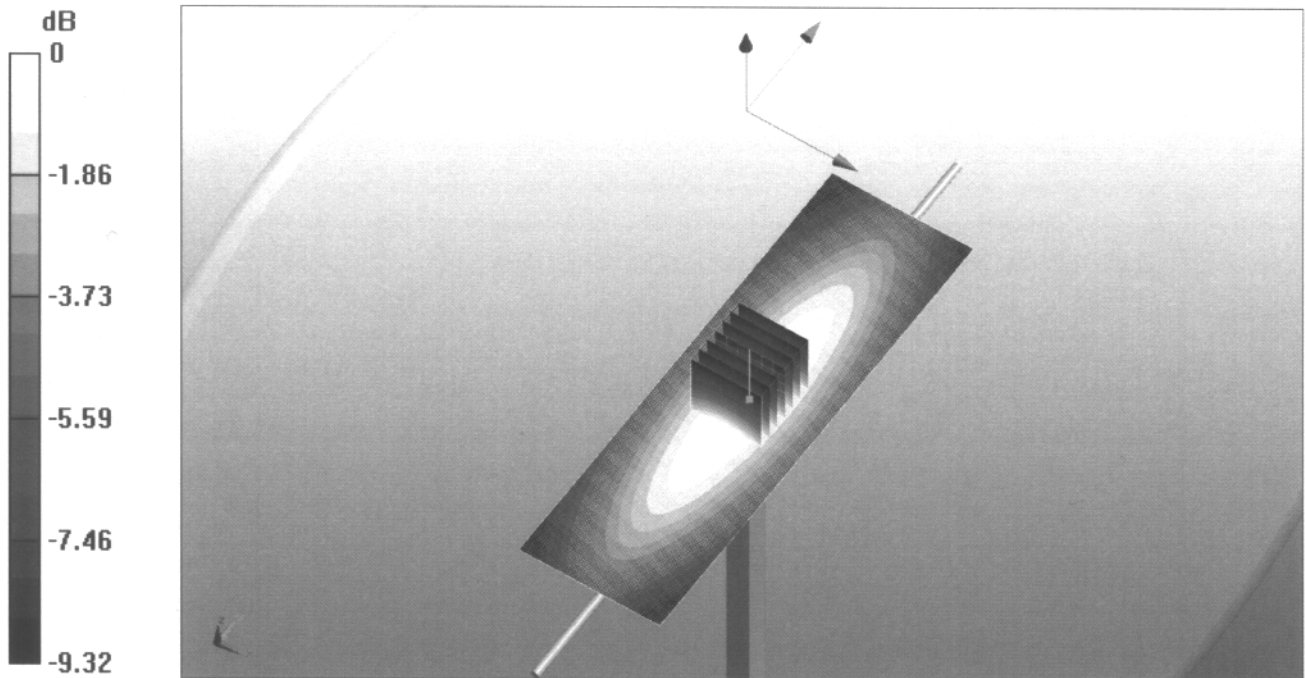
Body/d=15mm, Pin=398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

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



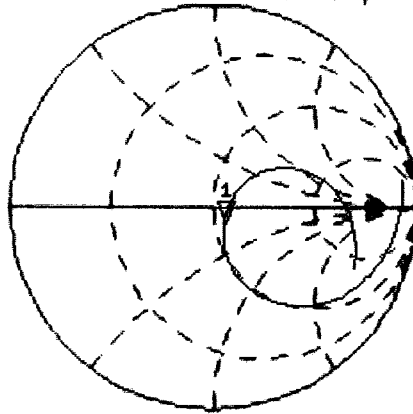
0 dB = 1.9mW/g

Impedance Measurement Plot for Body TSL

18 Jan 2010 12:18:41

CH1 S11 1 U FS 1: 54.824 Ω -9.3047 Ω 38.011 pF 450.000 000 MHz

*
De1
Cor



Avg
16

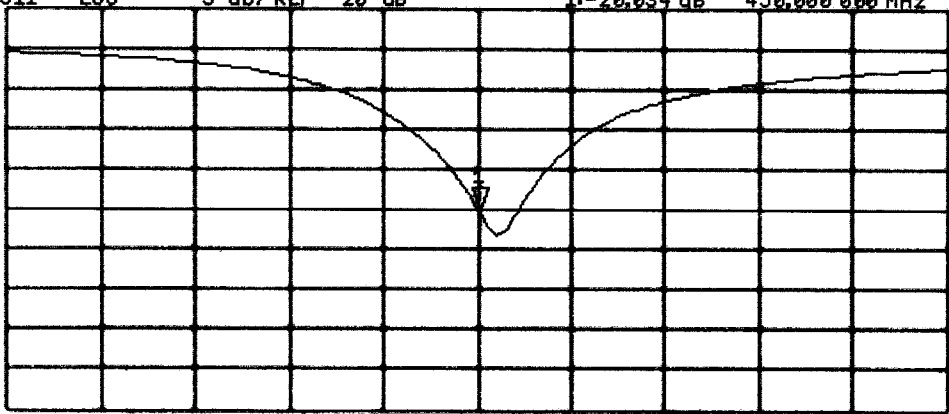
↑

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

Cor



Avg
16

↑




START 250.000 000 MHz

STOP 650.000 000 MHz

	<u>Date(s) of Evaluation</u> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX F - PROBE CALIBRATION

Applicant:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	 Vertex Standard
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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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 ± 3)°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	Name	Jeton Kastrati	Function	Laboratory Technician	Signature	
Approved by:	Katja Pokovic	Name	Katja Pokovic	Function	Technical Manager	Signature	

Issued: July 15, 2010

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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	± 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	± 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 recatangular 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

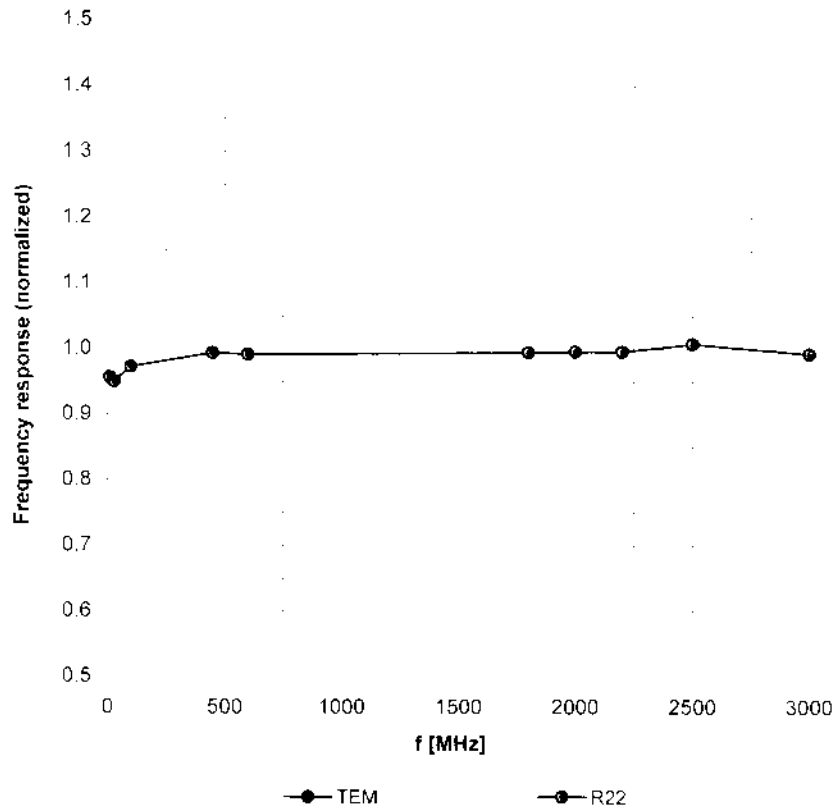
Calibration Parameter Determined in Body Tissue Simulating Media

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.

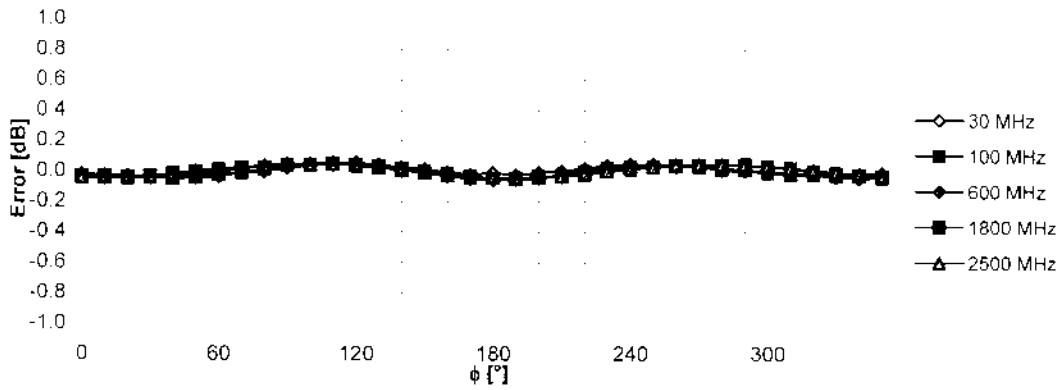
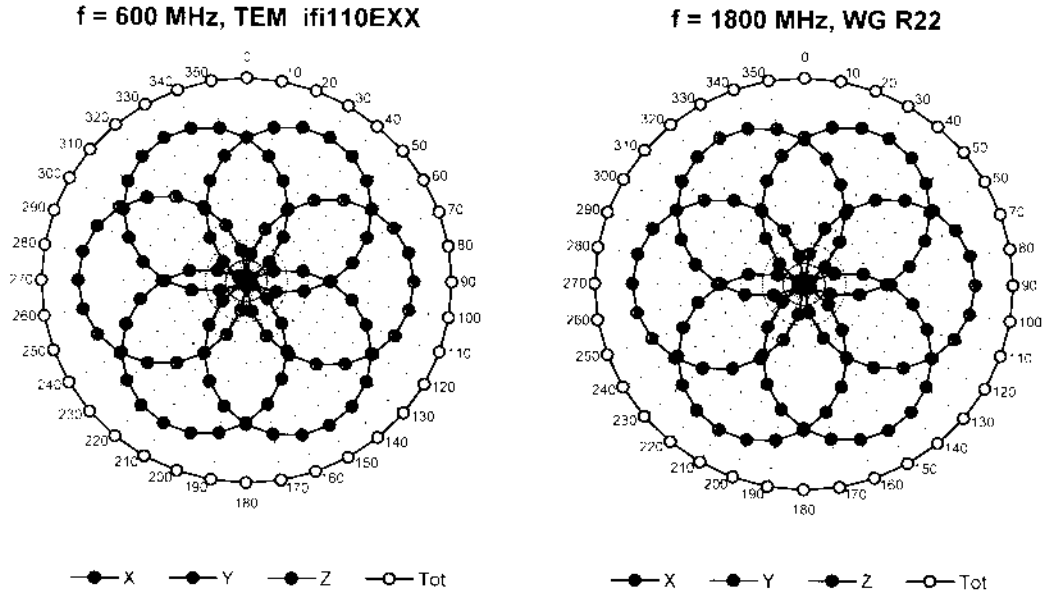
Frequency Response of E-Field

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



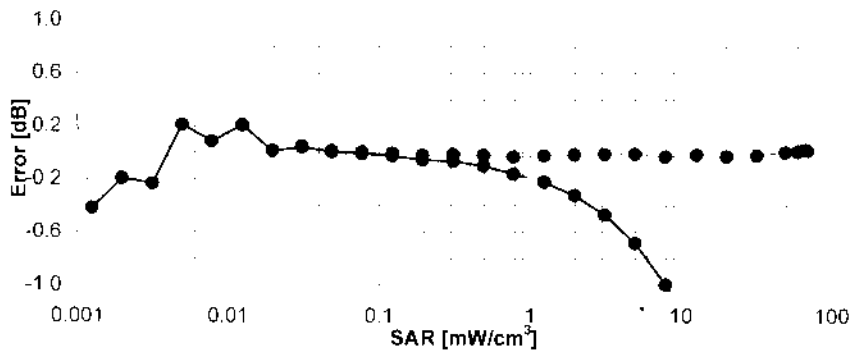
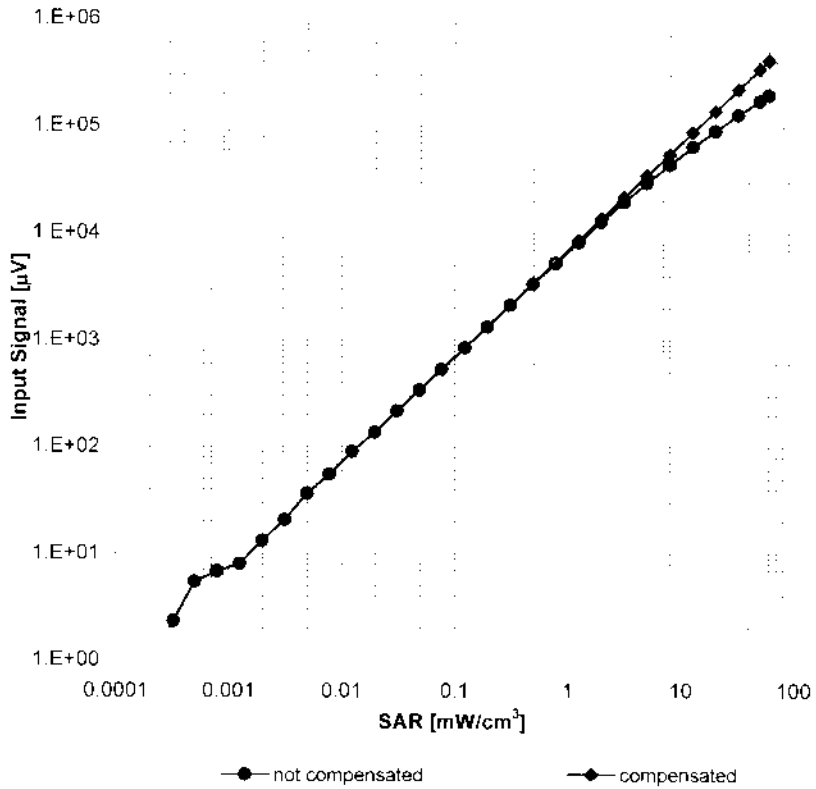
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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



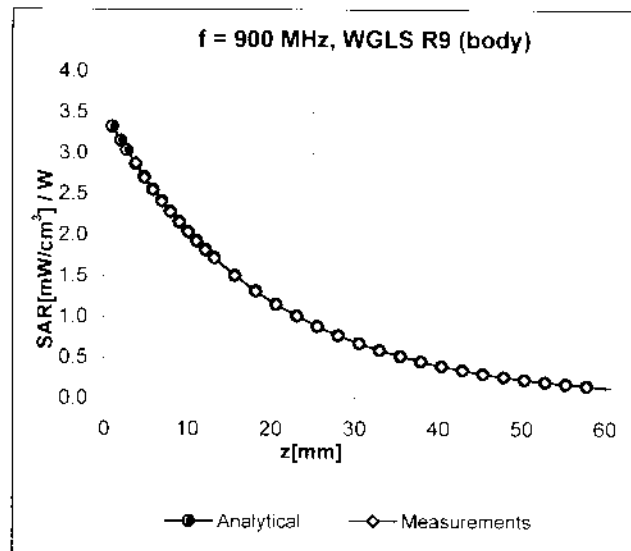
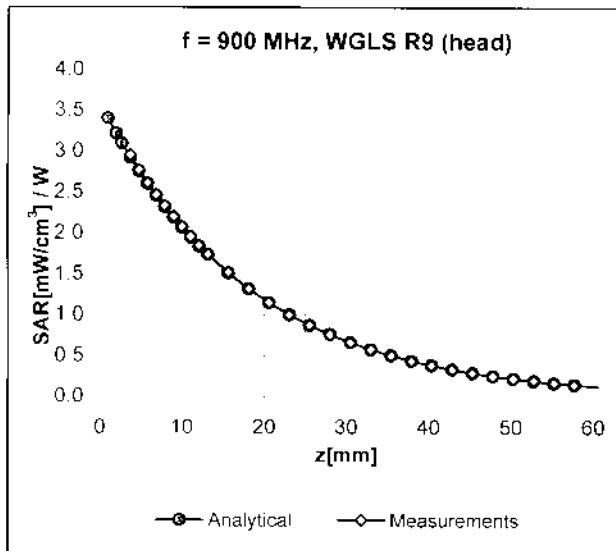
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

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



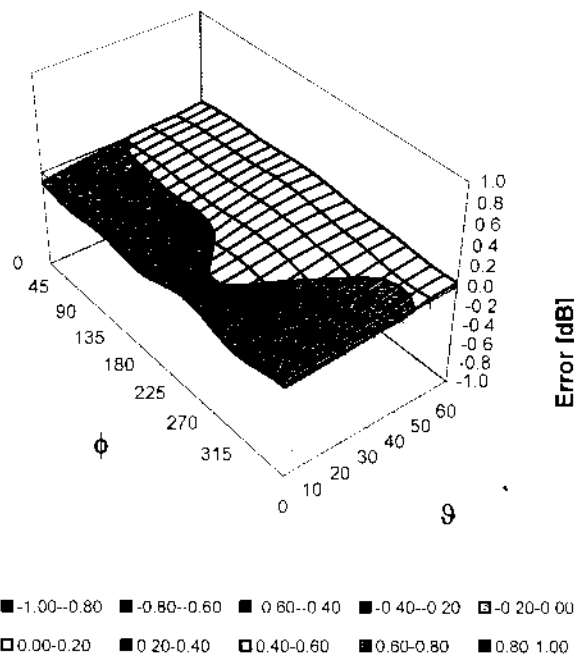
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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> December 2, 10, 17-18, 2010	<u>Test Report Serial No.</u> 112510K66-T1063-S90U	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> January 04, 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:	Vertex Standard Co., Ltd.	FCC ID:	K6610944620	IC:	511B-10944620	
DUT Type:	Portable UHF-L PTT Radio Transceiver	Models:	VX-451-G6-5 / VX-454-G6-5 / VX-459-G6-5			
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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



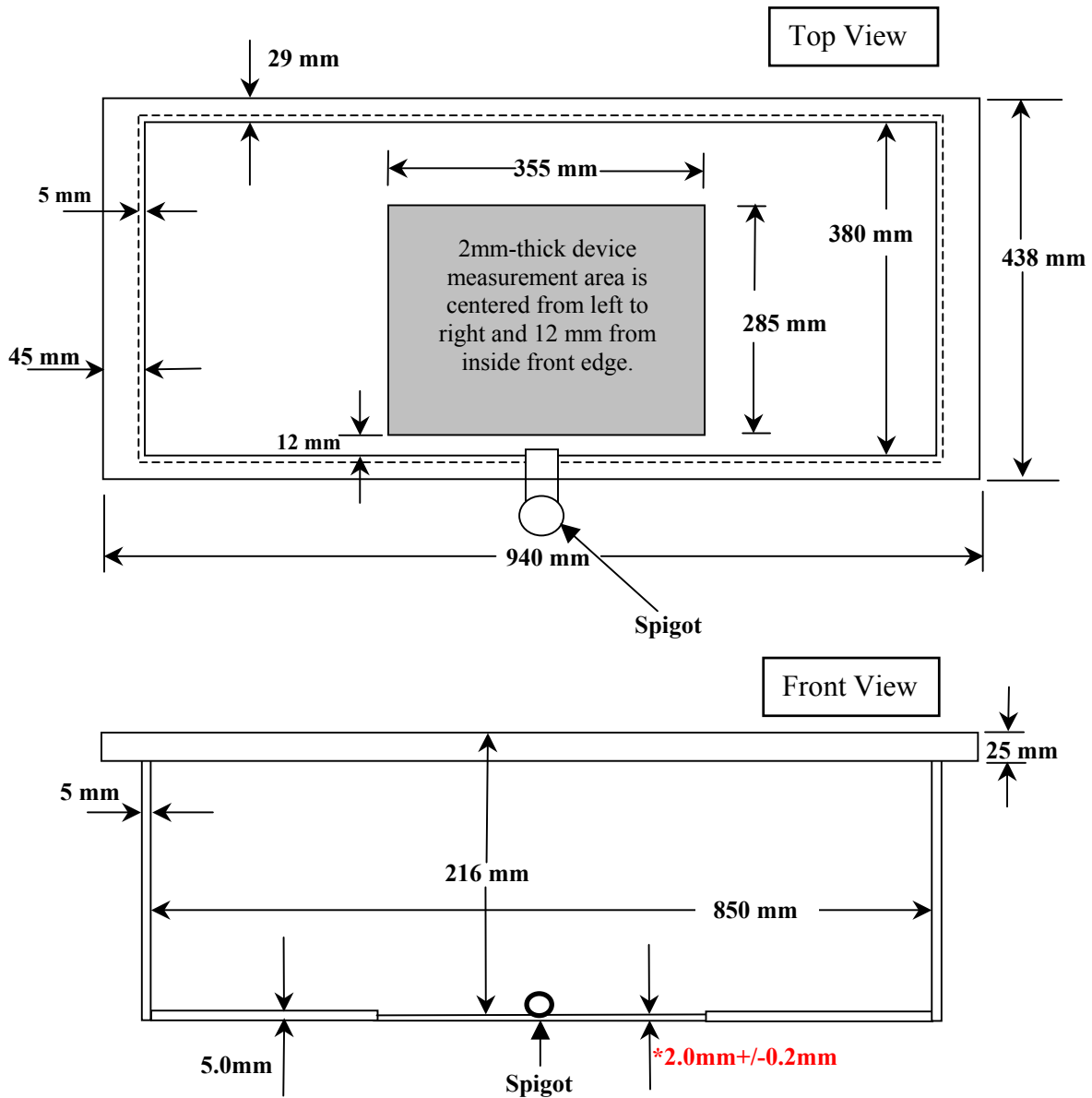
Fiberglass Planar Phantom - Back View



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.**