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FCC Part 15 Test Report
on

Avalanche Transceiver/Beacon
Model: 3+

Customer Name: Ortovox USA, Inc.

Customer P.O.: 5843

Date of Report: August 9, 2010

Test Report No.: R-5344N, Rev. A

Test Start Date: July 14, 2010

Test Finish Date: July 15, 2010

Test Technician: M. Seamans

Laboratory Supervisor: T. Hannemann

Supervisor: S. Wentworth

Results Prepared By: J. Ramsey

FCC ID: KF5ORTOVOX3

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Scott Wentworth
Branch Manager
NVLAP Approved Signatory



Todd Hannemann
Laboratory Supervisor
iNARTE Certified ATL-0255-T

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Revision History

Revisions to this document are listed below; the latest revised document supersedes all previous issues of this document.

Revision	Date	Pages Affected
-	July 26, 2010	Original Release
A	August 9, 2010	5, 6



Retlif Testing Laboratories

Test Report No. R-5344N, Rev. A
FCC ID: KF5ORTOVOX3

Test Program Summary

Job Number: R-5344N
Customer: Ortovox USA, Inc.
Address: 455 Irish Hill Road
Hopkinton, NH 03229
Test Sample: Avalanche Transceiver/Beacon
Model Number: 3+
Serial Number: N/A
Type: Avalanche Transceiver
Power Requirements: 1.5 VDC Internal Battery
Frequency Operation: 457 kHz
Application: Locates avalanche victims
Manufacturer/Applicant: Ortovox Sportartikel
Manufacturer Address: Rotwandweg 5
D-82024 Taufkirchen Germany

Test Specification:

FCC Rules and Regulations Part 15, Subpart C, Paragraph 15.209

Test Procedure:

ANSI C3.4:2003

Purpose:

The purpose of this test program was to demonstrate compliance of the Avalanche Transceiver/Beacon to the requirements of FCC Part 15.209.

Test Methods:

The following table depicts the test methods that were performed on the EUT and the corresponding test results:

Testing Date(s)	Test Method	Test Results
July 14-15, 2010	15.209, Radiated Emissions (450 kHz to 1 GHz)	Complied

Test Sample Operation:

The Avalanche Transceiver/Beacon is used to locate avalanche victims and is powered by 1.5 VDC via internal battery. It is manually activated by the user and in transmit mode, will continuously transmit at 457 kHz. During testing, the EUT was continuously transmitting at 457 kHz with a new battery installed. As the test sample operates at close to 100% duty cycle no duty cycle factor was applied.



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Test Sample/Test Program:

- 15.203 Antenna Requirements -The device uses a permanently attached internal antenna. The antenna is totally enclosed inside the case.
- 15.205 Restricted Bands - No emissions were observed from the EUT in any restricted bands.
- 15.207 Conducted Emissions-Not applicable (battery operated device)
- 15.209 Radiated Emissions-Fundamental Frequency 457 kHz, Harmonic/Spurious Emissions 450 kHz to 1000MHz
- No harmonic or spurious emissions above the third harmonic were observed within 10dB of the specified limit at test distances of 1 or 3 meters.
- Radiated Emissions from the EUT were measured in all three axis. The attached Radiated Emissions test data shows the maximized fundamental emission of each orientation.

Determination of Field Strength Limits:

The field strength limits shown below were calculated as instructed in Section 15.209.

Fundamental Frequency: 457 kHz

Where F is the frequency in kHz, the formula for calculating the maximum permitted fundamental field strength at 300 meters is:

$2400/(F) = \text{Field Strength Limit (uV/M @ 300 meters)}$

$2400/(457) = 5.25\text{uV/M}$

Field Strength Limit of $5.25\text{uV/M} = 14.4 \text{ dBuV/M}$

The maximum permitted unwanted emission level cannot exceed the level of the fundamental emission.

Distance Factor:

Testing was performed at a 3 meter distance and the field strength reading extrapolated to 300 meters for comparison to the 300 meter limit. The field strength reading was extrapolated using the extrapolation (distance) factor of 40dB/decade as specified in 15.31 (f) (2) for frequencies below 30MHz.

Distance Factor from 300 meters to 3 meters (2 decades) = -80dB



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Test Methods:**15.209 Radiated Emissions**

The test sample was placed on an 80cm high wooden test stand which was located 3 meters from the test antenna on an FCC listed open area test site. Emissions from the EUT were maximized by rotating the test sample and adjusting the test sample orientation and antenna polarization.

Test Results: The maximized peak field strength at 457 kHz was 1.49uV/M (3.49 dB μ V/M) and met the average limit specified in 15.209 therefore also meeting the peak emission requirement specified in 15.35. No harmonic/spurious emissions were observed at 3 or 1 meter test distances. The maximized corrected peak field strength was calculated as follows:

$$R_C = M_R + C_F - D_F$$

Where:

R_C = Corrected Reading in dB μ V/M

M_R = Uncorrected Meter Reading in dB μ V

C_F = Correction Factor in dB (Antenna Factor + Cable Loss)

D_F = Distance Factor in dB

$M_R = 74.39$ dB μ V

$C_F = 9.10$ dB

$D_F = 80$ dB

$$R_C = 74.39 \text{ dB}\mu\text{V} + 9.1 \text{ dB} - 80 \text{ dB} = 3.49 \text{ dB}\mu\text{V/M}$$



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**Radiated Emissions
Test Setup Photographs**



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**Test Photographs
Radiated Emissions**



Test Setup



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Test Photographs Radiated Emissions



Test Setup, Horizontal Antenna Polarization



Test Setup, Vertical Antenna Polarization



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Test Photographs Radiated Emissions



Test Setup, Planar



Test Setup, Co-Planar



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Equipment List

Radiated Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
3207	EMCO	ACTIVE LOOP ANTENNA	10 kHz - 30 MHz	6502	8/5/2009	8/5/2010
4029	RETLIF	OPEN AREA TEST SITE	3 / 10 Meters	RNH	Inspect Before Use	
4029B	RETLIF	TEST SITE ATTENUATION	3 / 10 Meters	RNH	6/25/2009	7/25/2010
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/14/2009	8/14/2010
8165	EMCO	BICONILOG	26 - 2000 MHz	3142	11/12/2009	11/12/2010



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**Radiated Emissions
Test Data**



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RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Radiated Emissions 450 kHz to 1 GHz		
Customer:	Ortovox	Job No:	R-5344N
Test Sample:	Avalanche Transceiver		
Model No:	3+	Serial No:	N/A
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.209		
Operating Mode:	Transmitting signal @ 457 kHz		
Technician:	M. Seamans	Date:	7/15/2010
Notes:	Test Distance: 3 Meters Detector used: Peak		

The frequency range from 450 kHz to 1 GHz was scanned. No harmonic or spurious emissions were observed at 3 or 1 meter test distances.