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Report On

FCC and IC Testing of the
Garmin International Inc
VHF200 fixed mount marine radio

COMMERCIAL-IN-CONFIDENCE

FCC ID: IPH-GARVHF12
IC ID: 1792A-GARVHF12

Document 75904785 Report 05 Issue 2

January 2009



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TUV Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk

COMMERCIAL-IN-CONFIDENCE

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PREPARED FOR

Garmin International Inc
1200 E 151st Street
Olathe
KS 66062
USA

PREPARED BY

J Holcombe
EMC Engineer

APPROVED BY

J Adams
Authorised Signatory

DATED

23 January 2009

This report has been up-issued to Issue 2 to report repeat-test results.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Part 15 B: 2006 and RSS-Gen Issue 2: 2007. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

G Lawler





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SECTION 1

REPORT SUMMARY

FCC and IC Testing of the
Garmin International Inc
VHF200 fixed mount marine radio



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Garmin International Inc VHF200 fixed mount marine radio to the requirements of FCC CFR 47 Part 15B: 2006 and RSS-Gen Issue 2: 2007.

Objective	To perform FCC and IC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Garmin International
Model Number(s)	VHF 200
Declared Variant	VHF 100
Serial Number(s)	VHF 200, Radio No.3
Software Version	2.00
Hardware Version	1.00 or Later
Firmware Version	Radio: 1029 Extender Microphone: 1206
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B: 2006 RSS Gen Issue 2: 2007
Incoming Release Date	Declaration of Build Status 17 October 2008
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	144892 Rev 0 18 September 2008
Start of Test	13 January 2009
Finish of Test	13 January 2009
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI 63.4: 2003



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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 15B and RSS Gen Issue 2, is shown below.

Configuration 1 - Normal							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	FCC	IC					
2.1	15.109	RSS-GEN, 6(a), 7.3.2	Radiated Emissions (Enclosure Port)	Transmit		N/A	ANSI 63.4
				Receive	0	Pass	
	15.107		Conducted Emissions (AC Power Port)	Transmit		N/A	ANSI 63.4
				Receive		N/A	

N/A – Not Applicable



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	
MANUFACTURER	Garmin International
TYPE	VHF200 (VHF100 as a listed variant)
PART NUMBER	VHF200
SERIAL NUMBER	TBD
HARDWARE VERSION	1.00 or later
SOFTWARE VERSION	2.00
TRANSMITTER OPERATING RANGE	156.025MHz to 157.425 MHz
RECEIVER OPERATING RANGE	156.025MHz to 163.275MHz
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	1 st – 21.6MHz, 2 nd – 450kHz
ITU DESIGNATION OF EMISSION	16K0G3EJN, 16K0G2BJN
HIGHEST INTERNALLY GENERATED FREQUENCY	163Mhz
OUTPUT POWER (W or dBm)	1W or 25W
FCC ID	IPH-GARVHF12
INDUSTRY CANADA ID	1792A-GARVHF12
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The VHF200 is a fixed mount Class D DSC VHF marine radio.
BATTERY/POWER SUPPLY (not applicable – vehicle direct wired)	
MODULES (not applicable)	
ANCILLARIES (none - not applicable)	

Signature

17 Oct 2008

Date

(Serial numbers on products)

Declaration of Build Status Serial Number

No responsibility will be accepted by TÜV Product Service as to the accuracy of the information declared in this document by the manufacturer.



1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Garmin International Inc VHF200 fixed mount marine radio as shown in the photograph below. A full technical description can be found in the Manufacturers documentation.



Equipment Under Test



1.4.2 Test Configuration

Scanning and Saving Channels

Scanning All Channels

When you scan channels, the radio searches for channels that are broadcasting. If a channel is broadcasting, the radio pauses on that channel until the broadcast stops. After four seconds of inactivity on the channel, the radio resumes scanning.

1. Select **SCAN > ALL**.
2. Choose from the following options:
 - **SKIP**—this option is displayed if active channels are detected. When you select this option, the system resumes the scan and does not include that channel in subsequent passes.
 - **+CH16**—Channel 16 is scanned every other channel (for example: 21, 16, 22, 16, and so on). "ALL SCAN +CH16" is displayed on the screen.
 - **-CH16**—Channel 16 is scanned in its normal order (for example, 14, 15, 16, 17, and so on). "ALL SCAN" is displayed on the screen.
 - **EXIT**—returns you to Home screen. The system ends the current scan and continues to receive on the channel where you ended the scan.

EUT operated in Receive Mode (EUT scanning all channels as detailed above) with a Handset connected to its front Port. A 50 Ω , 30Watt (JFW, 50T-054) Terminating Load was connected to the EUT's Antenna Port. EUT had a 10m extension cable fitted to its rear port, which in turn has a 15 Ω terminating resistor connected across the cable's fly lead. EUT also had a cable connected with a PCB fitted, to simulate a Speaker.

Configuration 1: Normal

The EUT was configured in accordance with FCC CFR 47 Part 15B and RSS-Gen Issue 2.



1.4.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
DC Power	1.5m	EUT Power	2 core	No
Signal	10.0m	Extension	Multicore	Yes
Signal	0.5m	Speaker	Multicore	Yes

1.4.4 Modes of Operation

Mode of operation of the EUT during testing was as follows:

Mode 2 – Receive (Scanning all Channels)

Information on the specific test modes utilised are detailed in the test procedure for each individual test.



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1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered from a 12V DC supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.



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SECTION 2

TEST DETAILS

FCC and IC Testing of the
Garmin International Inc
VHF200 fixed mount marine radio



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2.1 RADIATED EMISSIONS (ENCLOSURE PORT)

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.109
RSS Gen Issue 1, Clause 6(a), 7.3.2

2.1.2 Equipment Under Test

VHF200 fixed mount marine radio, S/N: Radio No.3

2.1.3 Date of Test and Modification State

13 January 2009 - Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI 63.4.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.1.6 Environmental Conditions

	13 January 2009
Ambient Temperature	20.9°C
Relative Humidity	33%
Atmospheric Pressure	1009mbar



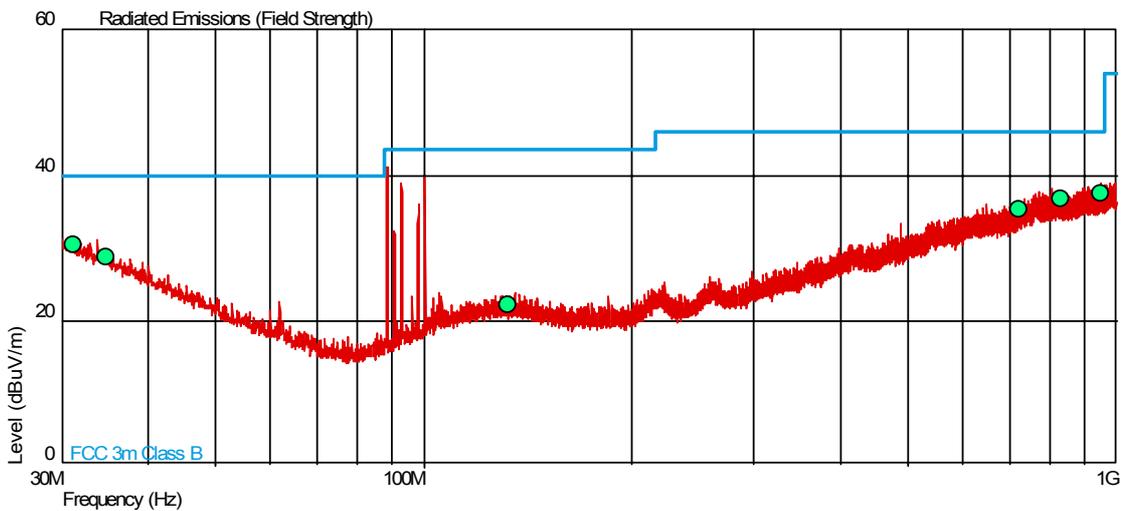
2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15B and RSS Gen Issue 2 for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 2

30MHz to 1GHz



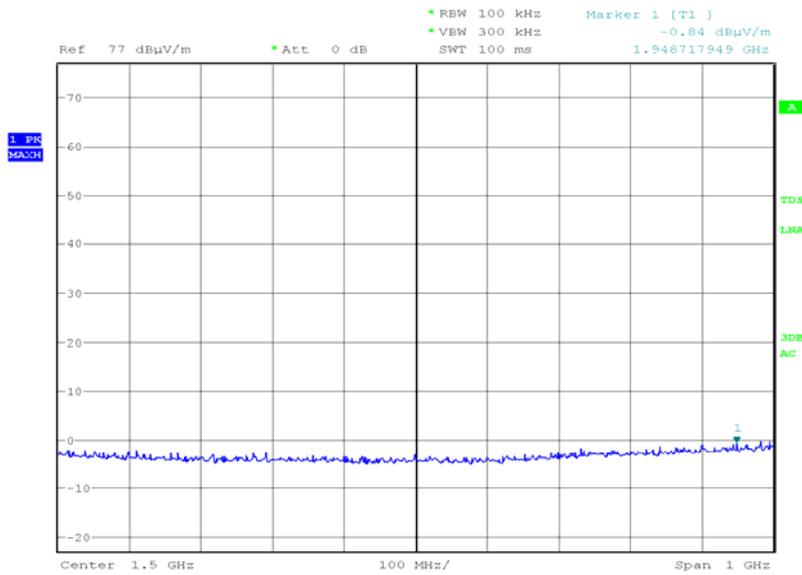
Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
31.129	30.4	40.0	-9.6	158	1.00	Vertical
34.696	28.6	40.0	-11.4	74	1.00	Horizontal
132.470	22.1	43.5	-21.4	18	1.00	Horizontal
721.940	35.2	46.0	-10.8	194	1.00	Vertical
832.022	36.6	46.0	-9.4	138	1.00	Horizontal
947.420	37.3	46.0	-8.7	322	1.00	Vertical

The emissions detected in the area of 85MHz and 100MHz were determined to be ambient radio broadcast stations and were therefore ignored for measurement purposes. All other measurements were of the system noise floor and were made to prove sensitivity in comparison to the specification limit.

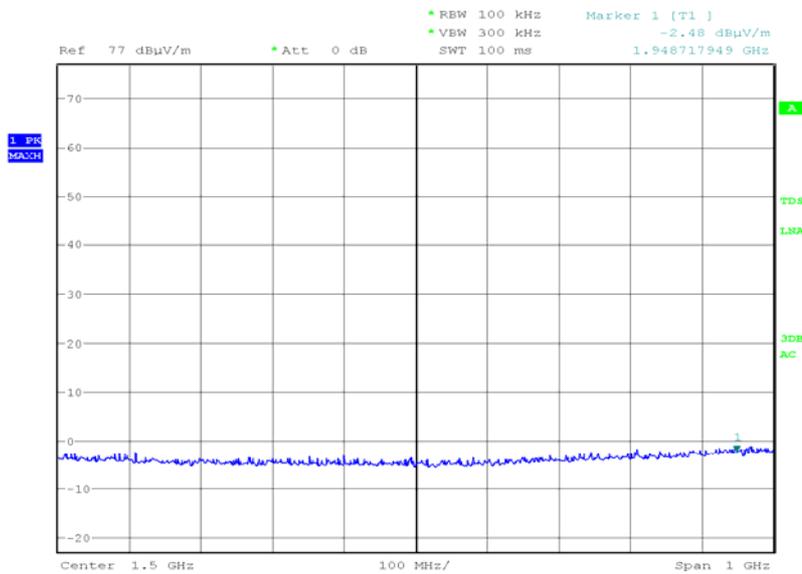


1GHz to 2GHz

Vertical



Horizontal





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SECTION 3

TEST EQUIPMENT USED



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3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 EMC - Radiated Emissions					
Load (50ohm, 30W)	JFW	50T-054	351	12	18-Jun-2009
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable/Mast Controller	EMCO	2090	1607	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	20-Aug-2009

TU – Traceability Unscheduled



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3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*

Worst case error for both Time and Frequency measurement 12 parts in 10^6 .

* In accordance with CISPR 16-4

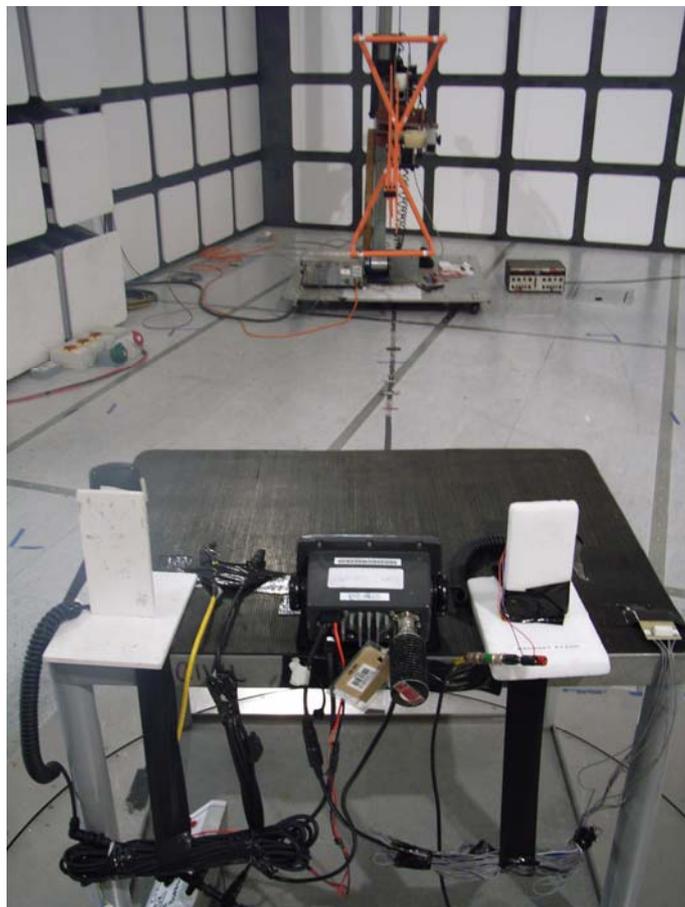


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SECTION 4

PHOTOGRAPHS

4.1 TEST SET UP PHOTOGRAPHS



Radiated Emissions (Enclosure Port)



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SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
(Not UKAS Accredited).

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