FCC PART 80
RSS-182, ISSUE5 JANUARY 2012

MEASUREMENT AND TEST REPORT

For

Raymarine UK Limited

Marine House, Cartwright Drive Segensworth, Fareham, Hampshire, PO15 5RJ, United Kingdom

FCC ID:PJ5-RAY50
IC: 4069B-RAY50D

Report Type:	**Product Type:**
Class II Permissive Change	RAY52 DSC Class D VHF Radio

Test Engineer:	Simon Wang
Report Number:	RDG151116006A1
Report Date:	2015-12-07
Reviewed By:	Candy Li RF Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Raymarine UK Limited*'s product, model number: *RAY52 (FCC ID: PJ5-RAY50, IC:4069B-RAY50D)* or the "EUT" in this report was a *RAY52 DSC Class D VHF Radio,* which was measured approximately: 173.75 mm (L) × 168 mm (W) × 88.5 mm (H), rated with input voltage: DC 12 V.

** All measurement and test data in this report was gathered from production sample serial number: 151116006 (Assigned by Shenzhen BACL). The EUT supplied by the applicant was received on 2015-11-16.*

Objective

This test report is prepared on behalf of *Raymarine UK Limited* in accordance with Part 2 and Part 80 of the Federal Communication Commissions rules and in accordance with RSS-182 of the Industry Canada.

The objective of the manufacturer is to determine the compliance of the EUT with FCC Part 80 and RSS-182.

This is a CIIPC application of the device, the differences between the original device and the current one are as follows:

1. Changed the model from "*RAY50*"to" *RAY52*",the model *RAY52* is adding the GPS Module.
2. Changed the product name,

For the change made to the device, the test item "Radiated Spurious Emissions" were performed. So other test data are referred to FCC ID: PJ5-RAY50, IC: 4069B-RAY50D granted on 2015-02-17 and 2015-02-12, report No.: RSZ141203001, which was tested by Bay Area Compliance Laboratories Corp. (Shenzhen).

Related Submittal(s)/Grant(s)

No related submittal(s)

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the RSS-182 and the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 80 –Stations in the Maritime Services Applicable Standards: TIA 603-D and ANSI 63.4-2014.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters. Applicable Standards: RSS-182, Issue5 January 2012. Radio Transmitters and Receivers Operating in the Land Mobile and Fixed Services in the Frequency Range 156-162.5 MHz

Measurement uncertainty with radiated emission is 5.81 dB for 30MHz-1GHz.and 4.88 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a test mode which has been done in the factory.

Equipment Modifications

No modification was made to the EUT tested.

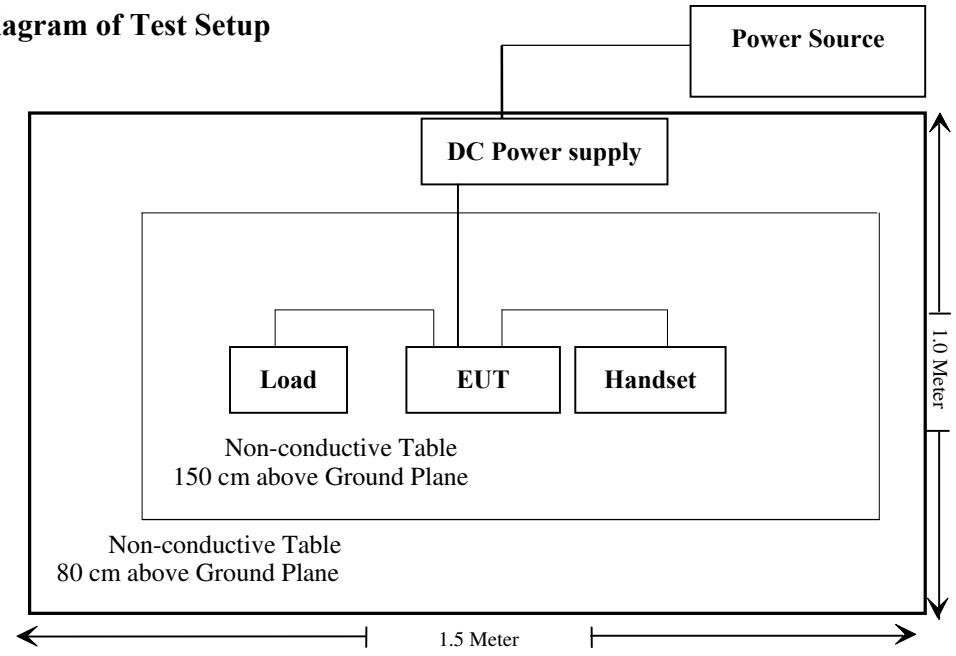
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DC Power Supply	MEAN WELL	SP-320	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Detachable DC Cable	2.5	DC Power Supply	EUT
Shielding Detachable RF Cable	0.3	EUT Tx port	Load
Un-shielding Detachable AC Cable	1.8	Power Source	DC Power Supply

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
FCC Part §1.1307 (b)(1), §2.1091;RSS-102	Maximum Permissible Exposure (MPE)	Compliance*
FCC Part §2.1046,§80.215; RSS-182 § 7.5	RF Output Power	Compliance*
FCC Part §2.1047,§80.213; RSS-182 § 7.3,7.8	Modulation requirements	Compliance*
FCC Part §2.1049,§80.205; RSS-182 § 7.3	Bandwidth	Compliance*
FCC Part §2.1051,§80.211 RSS-182 § 7.9	Emission limitations	Compliance*
FCC Part §80.217	Suppression of Interference Aboard Ships	Compliance*
FCC Part §2.1051,§80.211; RSS-182 § 7.9	Radiated Spurious Emissions	Compliance
FCC Part §2.1055,§80.209; RSS-182 § 7.4	Transmitter Frequency Tolerances	Compliance*
RSS-182 § 7.11; RSS-Gen §7	Receiver Spurious Emissions	Compliance*

Note:

Compliance*: The device is identical to the previously certified device except for Adding the GPS Components, the FCC ID: PJ5-RAY50, IC: 4069B-RAY50D granted on 2015-02-17 and 2015-02-12, report No.: RSZ141203001.

FCC §2.1053&§80.211&RSS-182§7.9 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053, § 80.211 and RSS-182 §7.9

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =10 1g (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-11-03	2016-11-03
HP	Amplifier	8447E	1937A01046	2015-05-06	2016-05-06
Sunol Sciences	Broadband Antenna	JB3	A111513	2014-06-18	2017-06-17
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2015-08-22	2016-08-22
Sunol Sciences	Horn Antenna	DRH-118	A052304	2015-12-01	2018-11-30
HP	Synthesized Sweeper	8341B	2624A00116	2015-06-03	2016-06-03
Mini-Circuits	Amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
A.H. System	Horn Antenna	SAS-200/571	135	2015-02-11	2018-02-10
COM POWER	Dipole Antenna	AD-100	041000	2015-08-18	2016-08-18

Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	47 %
ATM Pressure:	100.0 kPa

The testing was performed by Simon Wang on 2015-12-03.

Test Mode: Transmitting

30 MHz – 5 GHz:

Frequency (MHz)	Receiver Reading (dBμV)	Turn Table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 80/RSS-182	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
Radio telephony: 156.8 MHz										
313.6	49.98	349	1.5	H	-47.0	0.36	0	-47.36	-13	34.36
313.6	40.63	262	1.8	V	-56.4	0.36	0	-56.76	-13	43.76
470.4	46.96	254	1.5	H	-50.0	0.47	0	-50.47	-13	37.47
470.4	39.93	302	1.3	V	-57.1	0.47	0	-57.57	-13	44.57
627.2	44.31	195	2.0	H	-52.7	0.57	0	-53.27	-13	40.27
627.2	44.82	164	2.3	V	-52.2	0.57	0	-52.77	-13	39.77
1097.6	42.27	239	1.2	H	-54.6	1.5	6.1	-50.00	-13	37.00
1097.6	41.56	234	2.4	V	-56.8	1.5	6.1	-52.20	-13	39.20
DSC: 156.525 MHz										
313.6	48.08	111	1.6	H	-48.9	0.36	0	-49.26	-13	36.26
313.6	40.15	84	1.9	V	-56.9	0.36	0	-57.26	-13	44.26
470.4	42.42	128	2.1	H	-54.6	0.47	0	-55.07	-13	42.07
470.4	39.13	113	2.5	V	-57.9	0.47	0	-58.37	-13	45.37
627.2	44.5	130	2.0	H	-52.5	0.57	0	-53.07	-13	40.07
627.2	43.55	283	1.3	V	-53.5	0.57	0	-54.07	-13	41.07
1097.6	43.02	330	2.4	H	-54.3	1.5	6.1	-49.27	-13	36.27
1097.6	41.11	355	1.3	V	-57.1	1.5	6.1	-52.07	-13	39.07

Note:
Absolute Level = SG Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

******* END OF REPORT *******