



Product Service

---

**Choose certainty.  
Add value.**

# Report On

FCC and Industry Canada Testing of the  
Johnson Outdoors Marine Electronics  
Humminbird TX AIS, Class B AIS Transceiver  
In accordance with FCC CFR 47 Part 80  
and Industry Canada RSS-182

COMMERCIAL-IN-CONFIDENCE  
FCC ID: 2AAHS-4220002  
IC ID: 4397C-4220002B

Document 75924295 Report 04 Issue 1

December 2013



Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,  
Fareham, Hampshire, United Kingdom, PO15 5RL  
Tel: +44 (0) 1489 558100. Website: [www.tuv-sud.co.uk](http://www.tuv-sud.co.uk)

COMMERCIAL-IN-CONFIDENCE

**REPORT ON**

FCC and Industry Canada Testing of the  
Johnson Outdoors Marine Electronics  
Humminbird TX AIS, Class B AIS Transceiver  
In accordance with FCC CFR 47 Part 80  
and Industry Canada RSS-182

Document 75924295 Report 04 Issue 1

December 2013

**MANUFACTURER**

Johnson Outdoors Marine Electronics  
678 Humminbird Lane  
Eufaula, AL  
36027  
USA

**PREPARED FOR**

SRT Marine Technology Ltd  
Wireless House  
Westfield Industrial Estate  
Midsomer Norton  
Bath  
BA3 4BS

**PREPARED BY**

**Natalie Bennett**  
Senior Administrator, Technical Solutions

**APPROVED BY**

**Simon Bennett**  
Authorised Signatory

**DATED**

13 December 2013

---

**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 80 and Industry Canada RSS-182. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

T Guy

Document 75924295 Report 04 Issue 1



Page 1 of 17

COMMERCIAL-IN-CONFIDENCE



Product Service

**CONTENTS**

<b>Section</b>		<b>Page No</b>
<b>1</b>	<b>REPORT SUMMARY .....</b>	<b>3</b>
1.1	Introduction .....	4
1.2	Brief Summary of Results .....	5
1.3	Application Form .....	6
1.4	Product Information .....	8
1.5	Test Conditions .....	8
1.6	Deviations from the Standard .....	8
1.7	Modification Record .....	8
<b>2</b>	<b>TEST DETAILS .....</b>	<b>9</b>
2.1	Emission Limitations .....	10
<b>3</b>	<b>TEST EQUIPMENT USED .....</b>	<b>13</b>
3.1	Test Equipment Used .....	14
3.2	Measurement Uncertainty .....	15
<b>4</b>	<b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT.....</b>	<b>16</b>
4.1	Accreditation, Disclaimers and Copyright.....	17



Product Service

## **SECTION 1**

### **REPORT SUMMARY**

FCC and Industry Canada Testing of the  
Johnson Outdoors Marine Electronics  
Humminbird TX AIS, Class B AIS Transceiver  
In accordance with FCC CFR 47 Part 80 and Industry Canada RSS-182



Product Service

## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC and Industry Canada Testing of the Johnson Outdoors Marine Electronics Humminbird TX AIS, Class B AIS Transceiver to the requirements of FCC CFR 47 Part 80 and Industry Canada RSS-182.

Objective	To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Johnson Outdoors Marine Electronics
Model Number(s)	TX AIS
Serial Number(s)	P323-FTU03-TX
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 80 (2012) and Industry Canada RSS-182 (Issue 5, 2012)
Incoming Release Date	Application Form 03 December 2013
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	POR004215 25 September 2013
Start of Test	30 November 2013
Finish of Test	30 November 2013
Name of Engineer(s)	T Guy



Product Service

**1.2 BRIEF SUMMARY OF RESULTS**

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 80 and Industry Canada RSS-182 is shown below.

Section	Spec Clause		Test Description	Result	Comments/Base Standard
	Pt 80	RSS-182			
Transmit					
2.1	80.211	7.9	Emission Limitations	Pass	



1.3 APPLICATION FORM

APPLICANT'S DETAILS	
COMPANY NAME :	Johnson Outdoors Marine Electronics
ADDRESS :	678 Humminbird Lane Eufaula, AL 36027.....USA
NAME FOR CONTACT PURPOSES :	Greg Massey
TELEPHONE NO: ...770-888-6292 Ext: 1045	FAX NO:
E-MAIL: <a href="mailto:gmassey@johnsonoutdoors.com">gmassey@johnsonoutdoors.com</a>	

EQUIPMENT INFORMATION			
Model name/number	Humminbird TX-AIS	Identification/Part number	422-0002
Hardware Version	v1	Software Version	040200.01.11.00
Manufacturer	Johnson Outdoors Marine Elec.	Country of Origin	Hungary
FCC ID	2AAHS-4220002	Industry Canada ID	4397C-4220002B
Technical description (a brief description of the intended use and operation)			
AIS Class B Transceiver, Maritime Navigation			
<u>Supply Voltage:</u>			
<input type="checkbox"/>	AC mains	State AC voltage .....	V and AC frequency ..... Hz
<input checked="" type="checkbox"/>	DC (external)	State DC voltage 12/24 V	and DC current 200m A
<input type="checkbox"/>	DC (internal)	State DC voltage .....	V and Battery type .....
<u>Frequency characteristics:</u>			
Transmitter Frequency range	156.025. MHz to 162.025. MHz	Channel spacing .....	25kHz
		(if channelized)	
Receiver Frequency range (if different)	..... MHz to ..... MHz	Channel spacing .....	(if channelized)
<u>Designated test frequencies:</u>			
Bottom: ...156.025 MHz	Middle: .....159.025... MHz	Top:162.025 MHz	
Intermediate Frequencies : 19.655 and 29.255 MHz			
Highest Internally Generated Frequency : 191.28 MHz			
<u>Power characteristics:</u>			
Maximum transmitter power	...2..... W	Minimum transmitter power	..... W
		(if variable)	
<input type="checkbox"/>	Continuous transmission		
<input type="checkbox"/>	Intermittent transmission	State duty cycle .....	<1%
	If intermittent, can transmitter be set to continuous transmit test mode?	Y/N (Low power only)	
<u>Antenna characteristics:</u>			
<input checked="" type="checkbox"/>	Antenna connector	State impedance .....	50... ohm
<input type="checkbox"/>	Temporary antenna connector	State impedance .....	ohm
<input type="checkbox"/>	Integral antenna Type .....	State gain .....	dBi
<input checked="" type="checkbox"/>	External Antenna Type Quarter wave vertical....	State gain .....	3..... dBi
<u>Modulation characteristics:</u>			
<input type="checkbox"/>	Amplitude	<input checked="" type="checkbox"/>	Other
<input type="checkbox"/>	Frequency	Details: ...GMSK.....	
<input type="checkbox"/>	Phase	(GMSK, QSPK etc)	
Can the transmitter operate un-modulated?		Y/N (In test mode only)	
ITU Class of emission: 12K5GXW			
<u>Battery/Power Supply</u>			
Model name/number	N/A.....	Identification/Part number	.....
Manufacturer	.....	Country of Origin	.....
<u>Ancillaries (if applicable)</u>			
Model name/number	N/A.....	Identification/Part number	.....
Manufacturer	.....	Country of Origin	.....
<u>Extreme conditions:</u>			
Maximum temperature	+55 °C	Minimum temperature	-15 °C
Maximum supply voltage	31.2 V	Minimum supply voltage	9.6V



Product Service

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

A handwritten signature in black ink, appearing to be 'Richard McMahon'.

Signature :

Name : Richard McMahon Engineer

Position held : Certification Engineer

Date : 03/12/13





Product Service

## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was a Johnson Outdoors Marine Electronics Ltd Humminbird TX AIS, Class B AIS Transceiver. A full technical description can be found in the manufacturer's documentation.

## **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.

The EUT was powered from a 12 V 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 were made during testing

## **1.7 MODIFICATION RECORD**

Modification 0 - No modifications were made to the test sample during testing.



Product Service

## **SECTION 2**

### **TEST DETAILS**

FCC and Industry Canada Testing of the  
Johnson Outdoors Marine Electronics  
Humminbird TX AIS, Class B AIS Transceiver  
In accordance with FCC CFR 47 Part 80 and Industry Canada RSS-182



## 2.1 EMISSION LIMITATIONS

### 2.1.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.211  
Industry Canada RSS-182, Clause 7.9

### 2.1.2 Equipment Under Test and Modification State

TX AIS S/N: P323-FTU03-TX - Modification State 0

### 2.1.3 Date of Test

30 November 2013

### 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 Procedure

A preliminary profile of the Spurious Radiated Emissions were obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth. A measurement bandwidth of 1 MHz was used (greater than 30 kHz as defined by RSS-182). This represents a worst case test scenario.

The EUT was set to transmit on maximum power with both channels operating simultaneously.

For any emissions found the EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result was determined by a calculation using the signal generator level, antenna gain and cable loss.

The measurements were performed at a 3m distance unless otherwise stated.

### 2.1.6 Environmental Conditions

Ambient Temperature	19.5°C
Relative Humidity	29.0%



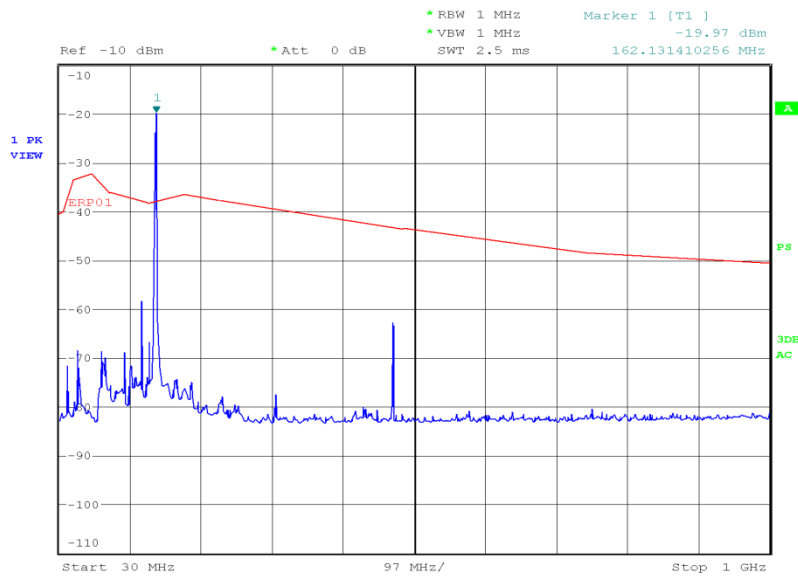
**2.1.7 Test Results**

12 V DC Supply

AIS - Radiated

161.975 MHz and 162.025 MHz

30 MHz to 1 GHz

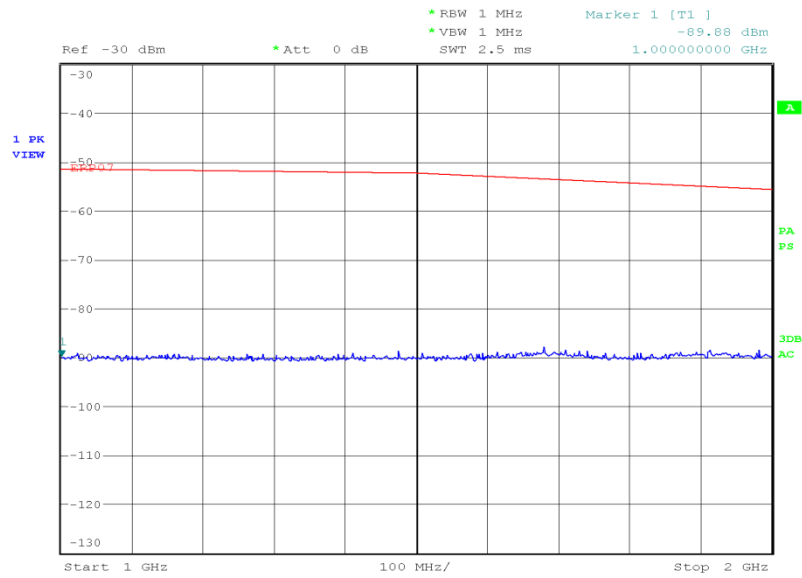


Date: 30.NOV.2013 16:38:11

Note: The emission shown exceeding the limit line was the fundamental.



1 GHz to 2 GHz



Date: 30.NOV.2013 17:26:37

Limit Clause FCC Part 80.211 and Industry Canada RSS-182, Clause 7.9.1

>250 % of authorised bandwidth  $43+10 \log P$  **OR** -13 dBm



Product Service

### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 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
<b>Section 2.1 - Emission Limitations</b>					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Jan-2014
Termination (50ohm)	Diamond Antenna	DL-30N	337	12	9-Oct-2014
Attenuator (20dB, 250W)	Weinschel	45-20-43	473	12	10-Jan-2014
Attenuator (10dB)	Weinschel	45-10-43	509	12	8-Oct-2014
Signal Generator	Rohde & Schwarz	SML01	1590	12	16-Apr-2014
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
GPS/SBAS Simulator	Spirent	STR4500	3056	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
Tilt Antenna Mast	maturu GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturu GmbH	NCD	3917	-	TU
20dB Attenuator	Weinschel	45-20-43	4321	12	18-Jun-2014

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



Product Service

### 3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Emission Limitations	Radiated: $\pm 3.08$ dB Conducted: $\pm 3.454$ dB





Product Service

## **SECTION 4**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



Product Service

#### 4.1 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).

This report must not be reproduced, except in its entirety, without the written permission of TÜV SÜD Product Service

© 2013 TÜV SÜD Product Service