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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

REPORT ON

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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

UKAS TESTING 0141

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CONTENTS

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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
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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

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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	

Product Service

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: gmassey@johnsonoutdoors.com

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

Supply Voltage:

[ ]	AC mains	State AC voltage V	and AC frequency ..... Hz
[x]	DC (external)	State DC voltage 12/24 V	and DC current 200m A
[ ]	DC (internal)	State DC voltage V	and Battery type .....

Frequency characteristics:

Transmitter Frequency range 156.025. MHz to 162.025. MHz Channel spacing .....25kHz (if channelized)

Receiver Frequency range ..... MHz to ..... MHz Channel spacing ..... (if channelized)
(if different)

Designated test frequencies:
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

Power characteristics:

Maximum transmitter power ...2..... W Minimum transmitter power ..... W (if variable)

[ ] Continuous transmission
[ ] Intermittent transmission State duty cycle .....<1%
If intermittent, can transmitter be set to continuous transmit test mode? Y/N (Low power only)

Antenna characteristics:

[X]	Antenna connector	State impedance .....50... ohm
[ ]	Temporary antenna connector	State impedance ..... ohm
[ ]	Integral antenna Type	State gain ..... dBi
[X]	External Antenna Type Quarter wave vertical....	State gain .....3..... dBi

Modulation characteristics:

[ ] Amplitude [x] Other
[ ] Frequency Details: ...GMSK.....
[ ] Phase (GMSK, QSPK etc)
Can the transmitter operate un-modulated? Y/N (In test mode only)
ITU Class of emission: 12K5GXW

Battery/Power Supply

Model name/number	N/A.....	Identification/Part number	.....
Manufacturer	.....	Country of Origin	.....

Ancillaries (if applicable)

Model name/number	N/A.....	Identification/Part number	.....
Manufacturer	.....	Country of Origin	.....

Extreme conditions:

Maximum temperature	+55 °C	Minimum temperature	-15 °C
Maximum supply voltage	31.2 V	Minimum supply voltage	9.6V

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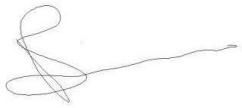
I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.



Signature :

Name : Richard McMahon Engineer

Position held : Certification Engineer

Date : 03/12/13

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.

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SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
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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%

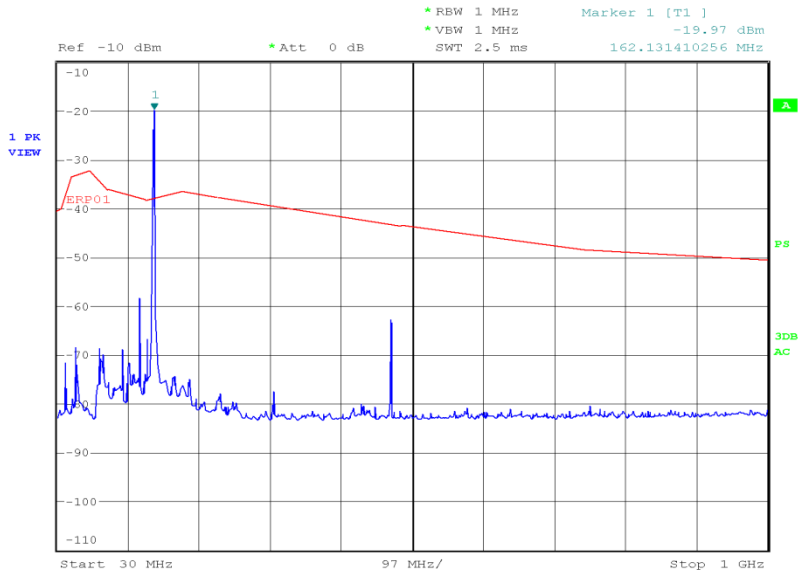
2.1.7 Test Results

12 V DC Supply

AIS - Radiated

161.975 MHz and 162.025 MHz

30 MHz to 1 GHz



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

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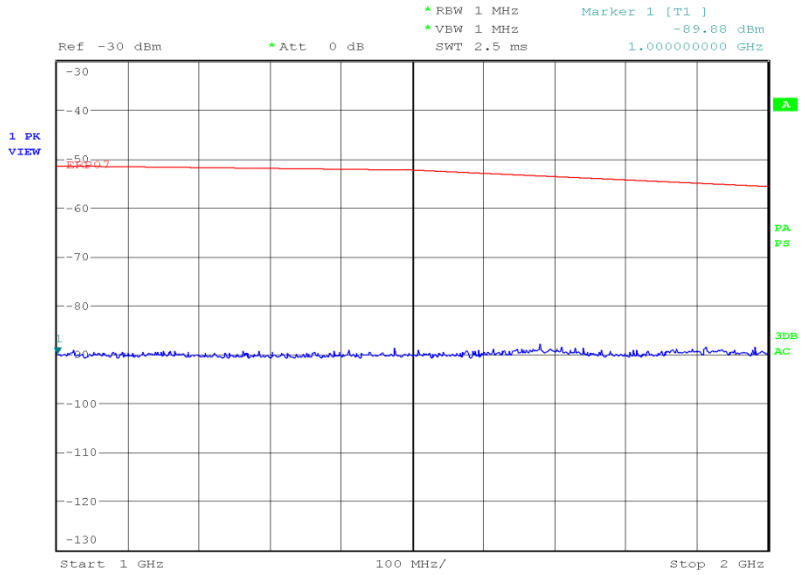
1 GHz to 2 GHz



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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

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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 - Emission Limitations					
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	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo 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

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Emission Limitations	Radiated: ± 3.08 dB Conducted: ± 3.454 dB

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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).