Report On

FCC and Industry Canada Testing of the
SRT Marine Technology Ltd AtoN Express
In accordance with FCC CFR 47 Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

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May 2014

PREPARED FOR

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DATED 05 June 2014

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 15B and ICES-003. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

J Tuckwell

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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 the verification of FCC and Industry Canada Testing of the SRT Marine Technology Ltd AtoN Express to the requirements of FCC CFR 47 Part 15B and ICES-003.

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	SRT Marine Technology Ltd
Model Number(s)	AtoN Express
Serial Number(s)	#4
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2013) ICES-003 (2012)
Incoming Release Date	Application Form 11 April 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	POR004373 19 December 2013
Start of Test	1 May 2014
Finish of Test	1 May 2014
Name of Engineer(s)	J Tuckwell
Related Document(s)	ANSI C63.4 (2003)

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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 15B and ICES-003 is shown below.

Section	Spec Clause		Test Description	Result	Comments/Base Standard
	15B	ICES			
2.1	15.109	6.2	Radiated Emissions	Pass	ANSI C63.4 (2003)

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1.3 DECLARATION OF BUILD STATUS

MAIN EUT			
MANUFACTURING DESCRIPTION	AIS AtoN Type 1		
MANUFACTURER	SRT-Marine Technology Ltd		
TYPE	AtoN Express		
PART NUMBER	418-0013		
SERIAL NUMBER	#1 - S04905141484, #3 - S04907140811, #4 - S04906140773 #5 - S04907141477		
HARDWARE VERSION	418-0012:1 / PCBA:011-0072:1		
SOFTWARE VERSION	090200.01.00.05		
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	156.025 MHz to 162.025 MHz		
RECEIVER FREQUENCY OPERATING RANGE (MHz)	N/A		
COUNTRY OF ORIGIN	HUNGARY		
INTERMEDIATE FREQUENCIES	19.655 MHz		
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	25K0Q1D		
MODULATION TYPES: (i.e. GMSK, QPSK)	GMSK-TDMA		
HIGHEST INTERNALLY GENERATED FREQUENCY	LO=142.37MHz and RF = 162.025 MHz		
OUTPUT POWER (W or dBm)	2W		
FCC ID	UYW-4180013		
INDUSTRY CANADA ID	7075A-4180013		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	AIS Type 1 AtoN, for use on buoys and on shore. Only operates with message 21.		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	Li-on rechargeable battery		
MANUFACTURER	VARTA		
TYPE	Li-on		
PART NUMBER	LIC/18650-22L 160-0001(SRT Part number)		
VOLTAGE	3.7V		
COUNTRY OF ORIGIN	China		
MODULES (if applicable)			
MANUFACTURING DESCRIPTION	N/A		
MANUFACTURER			
TYPE			
POWER			
FCC ID			
COUNTRY OF ORIGIN			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION	N/A		
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

Signature
Date 03.06.2014

Declaration of Build Status Serial Number 418-0013

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a SRT Marine Technology Ltd AtoN Express. 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 3.7 V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

Industry Canada Company Address Code
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard 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
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In accordance with FCC CFR 47 Part 15B and ICES-003

2.1 RADIATED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.109
ICES-003, Clause 6.2

2.1.2 Equipment Under Test and Modification State

AtoN Express S/N: #4 - Modification State 0

2.1.3 Date of Test

1 May 2014

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 test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane.

The horizontal reference ground plane encompasses a turntable which is used to adjust the azimuth of the EUT. An antenna positioner is used to elevate the measuring antenna above the horizontal reference ground plane whereby the antenna elevation is adjustable between 1 m and 4 m.

Exploratory radiated emissions measurements were made by azimuth emissions searches over a range of 0° and 360°. These exploratory radiated emissions measurements were made using a peak detector over a frequency range of 30 MHz to 2 GHz, with the measuring antenna in both vertical and horizontal polarizations.

At least six of the greatest peak emissions, frequency positions were selected from the exploratory radiated emissions measurements for further evaluation as final measuring points.

To ascertain the azimuth and measuring antenna polarization that yields the highest peak emission level, each final measurement frequency was investigated by continuous azimuth emissions searching with the measuring antenna in both vertical and horizontal polarizations. For each final measurement frequency, the respective peak emission azimuth and measuring antenna polarization was used during a measuring antenna elevation search from 1 m to 4 m. Each final measurement frequency was then measured with the EUT azimuth, measuring antenna height and polarization that yielded the greatest peak emission level.

Final measurement points over the frequency range of 30 MHz to 1 GHz were measured using a quasi-peak detector. Final measurement points over the frequency range of 1 GHz and 2 GHz were measured using peak and average methods. Peak measurements were made using a peak detector with 1 MHz resolution and video bandwidths. Average measurements were made using a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

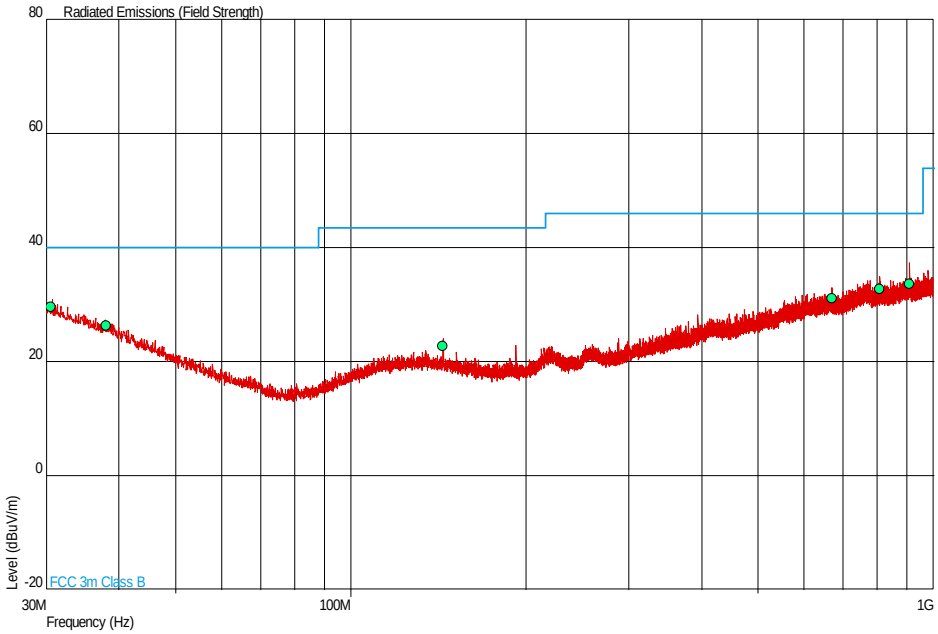
All final measurements were assessed against the Class B emission limits in Clause 15.109 of FCC CFR 47 FCC Part 15, in addition to the Class B emission limits in Clause 6.2 of ICES-003.

2.1.6 Environmental Conditions

Ambient Temperature	19.5°C
Relative Humidity	45.0%

2.1.7 Test Results

30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity	
30.574	29.6	30.2	40.0	100	-10.4	-69.8	360	1.00	Vertical	
37.953	26.3	20.7	40.0	100	-13.7	-79.3	119	1.00	Horizontal	
143.987	22.7	13.6	43.5	150	-20.8	-136.4	146	1.16	Horizontal	
668.939	31.1	35.9	46.0	200	-14.9	-164.1	227	1.00	Vertical	
808.098	32.8	43.7	46.0	200	-13.2	-156.3	352	1.02	Horizontal	
908.573	33.7	48.4	46.0	200	-12.3	-151.6	360	1.00	Horizontal	

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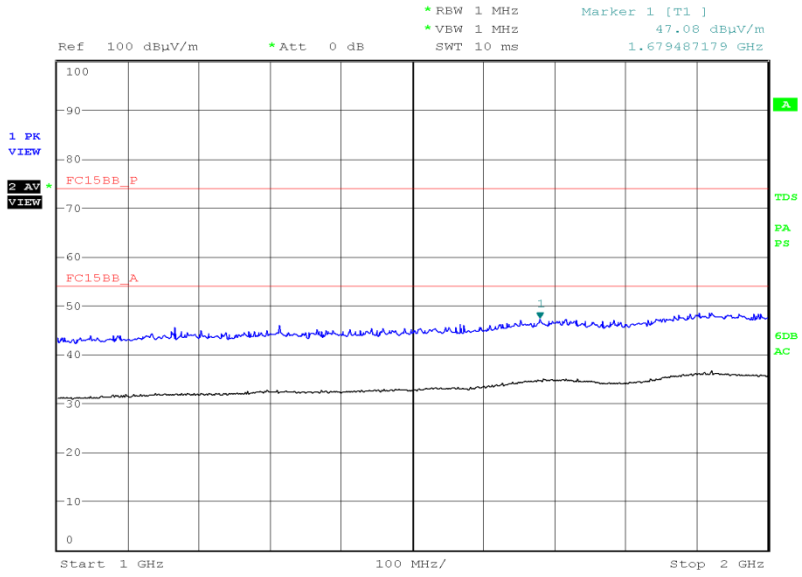
1 GHz to 2 GHz



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No emissions were detected within 6 dB of the limit.

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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
Section 2.1- Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-May-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
Compliance 5 Emissions	Schaffner	C5e Software V.5.00.00	3275	-	N/A - Software
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

TU – Traceability Unscheduled

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Radiated Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB

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).

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