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Report On

FCC and Industry Canada Testing of the
SRT Marine Technology Ltd CARBON Type 1 AtoN
In accordance with FCC CFR 47 Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

FCC ID: UYW-4180003
IC ID: 7075A-418-0003

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REPORT ON

FCC and Industry Canada Testing of the
SRT Marine Technology Ltd CARBON Type 1 AtoN
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November 2012

PREPARED FOR

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

PREPARED BY

Natalie Bennett
Senior Administrator (Technical)

APPROVED BY

Mark Jenkins
Authorised Signatory

DATED 28 November 2012

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);

G Lawler

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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
SRT Marine Technology Ltd CARBON Type 1 AtoN
In accordance with FCC CFR 47 Part 15B and ICES-003

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC and Industry Canada Testing of the SRT Marine Technology Ltd CARBON Type 1 AtoN 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)	A to N
Serial Number(s)	P216FTU034
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2011) ICES-003 (2012)
Incoming Release Date	Application Form 15 October 2012
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	POR003047 22 March 2012
Start of Test	12 November 2012
Finish of Test	12 November 2012
Name of Engineer(s)	G Lawler

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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
	FCC	IC			
Idle					
2.1	15.109	6.2	Radiated Emissions	Pass	

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1.3 APPLICATION FORM

APPLICANT'S DETAILS

COMPANY NAME : SRT-Marine Technology…
ADDRESS : Wireless House, Westfield Industrial Estate, Midsomer Norton, Bath, England. BA3 4BS
NAME FOR CONTACT PURPOSES : Richard McMahon

TELEPHONE NO: +44(0)1761409500 FAX NO: +44(0)1761410093
E-MAIL: richard.mcmahon@srt-marine.com

EQUIPMENT INFORMATION

Model name/number	TRS-418-0003/TR-418-0001	Identification/Part number	…P216FTU034…
Hardware Version	……EP3…….	Software Version	.080200.00.10.05.
Manufacturer	SRT-Marine Technology.	Country of Origin	Hungary
FCC ID	UYW-4180003	Industry Canada ID	7075A-418-0003

Technical description (a brief description of the intended use and operation)
…AIS Aid to Navigation……(Aton)

Supply Voltage:

[ ]	AC mains	State AC voltage …… V	and AC frequency …… Hz
[√]	DC (external)	State DC voltage .12-24. V	and DC current …2.5 peak. 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 .156.025 MHz to 162.025 MH z Channel spacing …25kHz….
(if different) (if channelized)
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 …12.5…… W Minimum transmitter power …1…… W
(if variable)

[ ]	Continuous transmission	
[√]	Intermittent transmission	State duty cycle <1%

If intermittent, can transmitter be set to continuous transmit test mode? Y/N N

Antenna characteristics:

[√]	Antenna connector	State impedance …… 50 ohm
[ ]	Temporary antenna connector	State impedance …… ohm
[ ]	Integral antenna	State gain …… dBi

Modulation characteristics:

[ ]	Amplitude	[√] Other
[ ]	Frequency	Details: GMSK-TDMA
[ ]	Phase	(GMSK, QSPK etc)

Can the transmitter operate un-modulated? Y/N N
ITU Class of emission: .25K0Q1DDT.

Battery/Power Supply

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

Ancillaries (if applicable)

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

Extreme conditions:

Maximum temperature	…55 °C	Minimum temperature	minus 25 °C
Maximum supply voltage	…31.2…… V	Minimum supply voltage	…9.6…… V

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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

Position held : Certification Engineer

Date : 15.10.12

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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a SRT Marine Technology Ltd CARBON Type 1 AtoN. 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 standard or test plan 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
SRT Marine Technology Ltd CARBON Type 1 AtoN
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

A to N S/N: P216FTU034 - Modification State 0

2.1.3 Date of Test

12 November 2012

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 is obtained up to the 5th harmonic of the EUT's highest internally generated fundamental frequency. For frequencies from 30MHz to 18GHz the EUT is placed on a test table 800mm above the ground plane. For frequencies above 18GHz, the EUT height is increased by 200mm to a height of 1000mm. This is to ensure the beam width of the measuring antenna gives sufficient vertical coverage of the EUT.

During characterisation the turntable azimuth is adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It is then repeated for the other polarity. Any frequencies of interest are noted for formal measuring later. The distance from the measuring antenna to the boundary of the EUT is 3m. Above 18GHz this distance may be reduced to 1m.

During formal measurement the spectrum analyser is tuned to the frequency of the emission. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurs. Then the height of the measuring antenna is adjusted from a height of 1m to 4m to determine the height at which the maximum emission level occurs. Once the point of maximum emission has been determined the emission is measured. Emissions in the 30MHz to 1GHz range are measured using a CISPR Quasi – Peak detector function in a 120kHz bandwidth. Emissions in the range 1GHz to 40GHz require Peak and Average measurements. The Peak measurements are made using a peak detector with 1MHz Resolution and Video bandwidths. The average measurements employ a peak detector with a Resolution bandwidth of 1MHz and a Video bandwidth of 10Hz. If measurements are made at a 1m measuring distance, then 10dB is added to the specification limit.

2.1.6 Environmental Conditions

Ambient Temperature	22.3°C
Relative Humidity	30.0%

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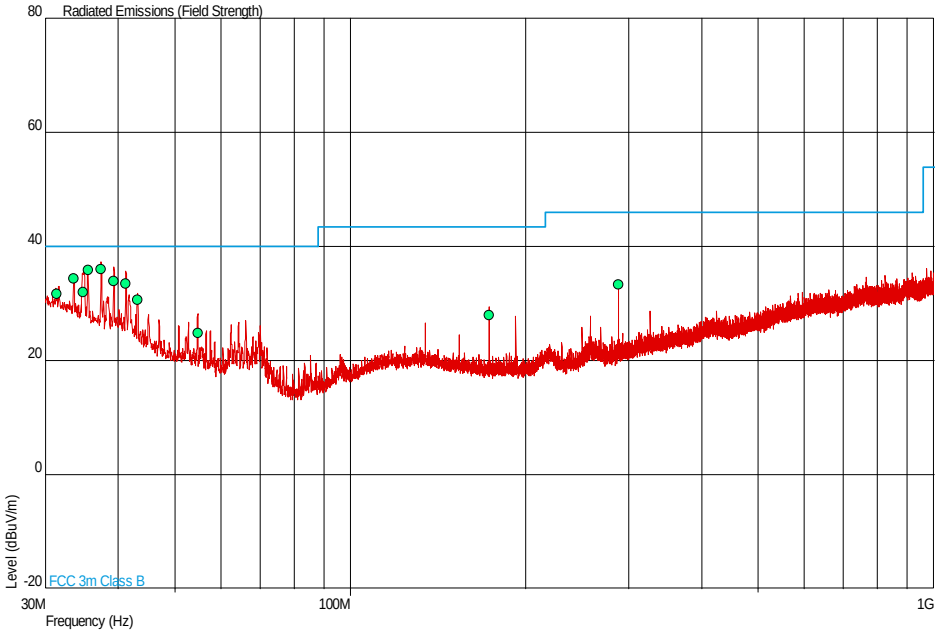
2.1.7 Test Results

Channel 1

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
31.365	31.7	38.5	40.0	100	-8.3	61.5	42	1.69	Vertical
33.608	34.5	53.1	40.0	100	-5.5	46.9	328	1.00	Vertical
34.888	32.1	40.3	40.0	100	-7.9	59.7	216	1.00	Vertical
35.531	35.9	62.4	40.0	100	-4.1	37.6	0	1.00	Vertical
37.440	36.0	63.1	40.0	100	-4.0	36.9	41	1.00	Vertical
39.354	34.0	50.1	40.0	100	-6.0	49.9	201	1.00	Vertical
41.257	33.5	47.3	40.0	100	-6.5	52.7	85	1.00	Vertical
43.170	30.6	33.9	40.0	100	-9.4	66.1	19	1.15	Vertical
54.741	24.8	17.4	40.0	100	-15.2	82.6	341	1.00	Vertical
172.803	28.0	25.1	43.5	150	-15.5	124.9	180	1.00	Vertical
288.001	33.4	46.8	46.0	200	-12.6	153.2	257	1.15	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 - Radiated Emissions					
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
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

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4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

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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