



Product Service

**Choose certainty.
Add value.**

Report On

FCC and Industry Canada Testing of the
SRT Marine Technology Ltd CS100 Coast station
In accordance with FCC CFR 47 Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

FCC ID: UYW-4230002
IC: 7075A-4230002

Document 75928171 Report 03 Issue 1

November 2014



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

COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC and Industry Canada Testing of the
SRT Marine Technology Ltd CS100 Coast station
In accordance with FCC CFR 47 Part 15B and ICES-003

Document 75928171 Report 03 Issue 1

November 2014

PREPARED FOR

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

PREPARED BY

Natalie Bennett
Senior Administrator, Project Support

APPROVED BY

Ryan Henley
Authorised Signatory

DATED

28 November 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);

G Lawler



**CONTENTS**

Section		Page No
1	REPORT SUMMARY	3
1.1	Introduction	4
1.2	Brief Summary of Results	5
1.3	Application Form	6
1.4	Product Information	7
1.5	Test Conditions	7
1.6	Deviations from the Standard	7
1.7	Modification Record	7
2	TEST DETAILS	8
2.1	AC Line Conducted Emissions	9
2.2	Radiated Emissions	12
3	TEST EQUIPMENT USED	15
3.1	Test Equipment Used	16
3.2	Measurement Uncertainty	17
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT	18
4.1	Accreditation, Disclaimers and Copyright	19



Product Service

SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
SRT Marine Technology Ltd CS100 Coast station
In accordance with FCC CFR 47 Part 15B and ICES-003



Product Service

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 CS100 Coast station 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)	CS100
Serial Number(s)	4230001033940002
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2013) ICES-003 (2012)
Incoming Release Date	Application Form 09 October 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	POR004895 03 October 2014
Start of Test	14 October 2014
Finish of Test	19 November 2014
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4 (2009)



Product Service

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
	Pt 15B	ICES-003			
Idle					
2.1	15.107	6.1	AC Line Conducted Emissions	Pass	ANSI C63.4
2.2	15.109	6.2	Radiated Emissions	Pass	ANSI C63.4



Product Service

1.3 APPLICATION FORM

MAIN EUT			
MANUFACTURING DESCRIPTION	Coast Station (AtoN)		
MANUFACTURER	SRT Marine System Solutions		
TYPE	CS100		
PART NUMBER	423-0002 (423-0001 packaged product)		
SERIAL NUMBER	Sample 1:4230002033940002 Sample 2:4230002033940012 Sample 3:4230002033940013 Sample 4:4230002033940008		
HARDWARE VERSION	Rev 3		
SOFTWARE VERSION	Application Software: 080201.01.00.01 Bootloader Software: 080100.01.04.02		
TRANSMITTER OPERATING RANGE	156.025 MHz – 162.025 MHz		
RECEIVER OPERATING RANGE	156.025 MHz – 162.025 MHz		
COUNTRY OF ORIGIN	UK		
INTERMEDIATE FREQUENCIES	19.655 MHz and 29.255MHz		
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	25KQ1DDT		
MODULATION TYPES: (i.e. GMSK, QPSK)	QMSK-TDMA		
HIGHEST INTERNALLY GENERATED FREQUENCY	191.28MHz		
OUTPUT POWER (W or dBm)	12W		
FCC ID	UYW-4230002		
INDUSTRY CANADA ID	7075A-4230002		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	AtoN		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	No Battery		
MANUFACTURER			
TYPE			
PART NUMBER			
VOLTAGE			
COUNTRY OF ORIGIN			
MODULES (if applicable)			
MANUFACTURING DESCRIPTION	Wi-Fi module		
MANUFACTURER	WIZNET Co. Ltd		
TYPE	WIZ630WI		
POWER	DC 5.0V		
FCC ID	XR2WIZ630WI		
COUNTRY OF ORIGIN	S Korea		
INDUSTRY CANADA ID	n/a		
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION	Wi-Fi Antenna	GPS Antenna	
MANUFACTURER	Pulse Electronics Corp	2J	
TYPE	W1030	279001	
PART NUMBER	260-0011	260-0007	
SERIAL NUMBER	-	-	
COUNTRY OF ORIGIN	-	-	

Signature

Date 09.10.14

Declaration of Build Status Serial Number 002



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a SRT Marine Technology Ltd CS100 Coast station. 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 110 V AC 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 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
SRT Marine Technology Ltd CS100 Coast station
In accordance with FCC CFR 47 Part 15B and ICES-003



Product Service

2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.107
ICES-003, Clause 6.1

2.1.2 Equipment Under Test and Modification State

CS100 Coast station S/N: 4230001033940002 - Modification State 0

2.1.3 Date of Test

19 November 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. A vertical reference ground plane was situated 40 cm from the EUT and bonded to the horizontal reference ground plane.

The EUT was powered by a Line Impedance Stabilization Network (LISN), whereby emissions measurements of the current-carrying conductors were made through this LISN. The LISN was bonded to the horizontal reference ground plane with a separation distance greater than 80 cm from the EUT. A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

A preliminary emissions scan was conducted for each current-carrying conductor of the EUT, using a peak detector over a frequency range of 150 kHz to 30 MHz. At least six of the greatest peak emissions, frequency positions were selected from each preliminary emissions scan for further evaluation as final measuring points.

Final measurement points were measured using quasi-peak and average detectors. All final measurements were assessed against the Class A emission limits in Clause 15.107 of FCC CFR 47 FCC Part 15 and Clause 6.1 of ICES-003.

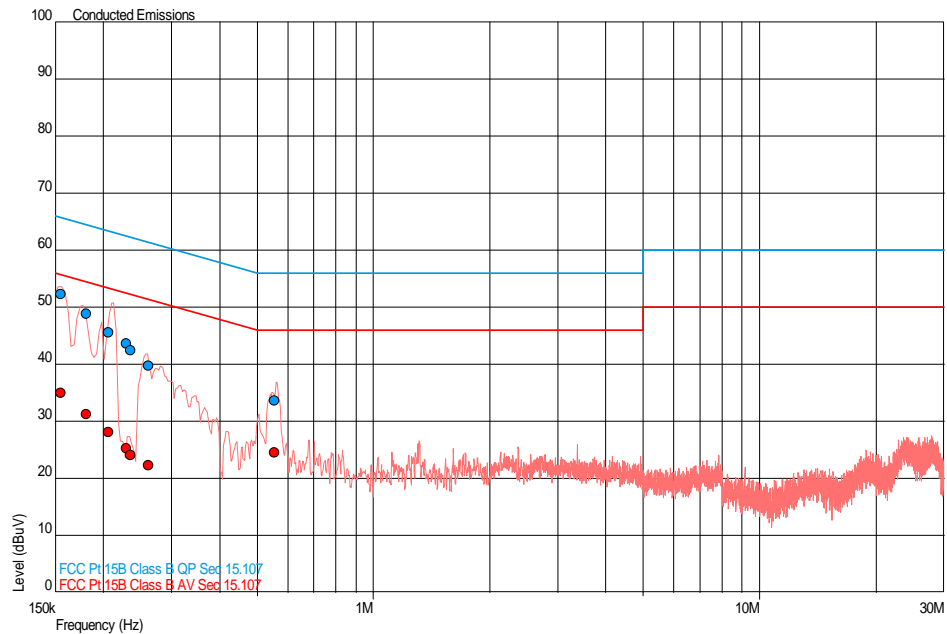
2.1.6 Environmental Conditions

Ambient Temperature	20.3°C
Relative Humidity	40.0%



2.1.7 Test Results

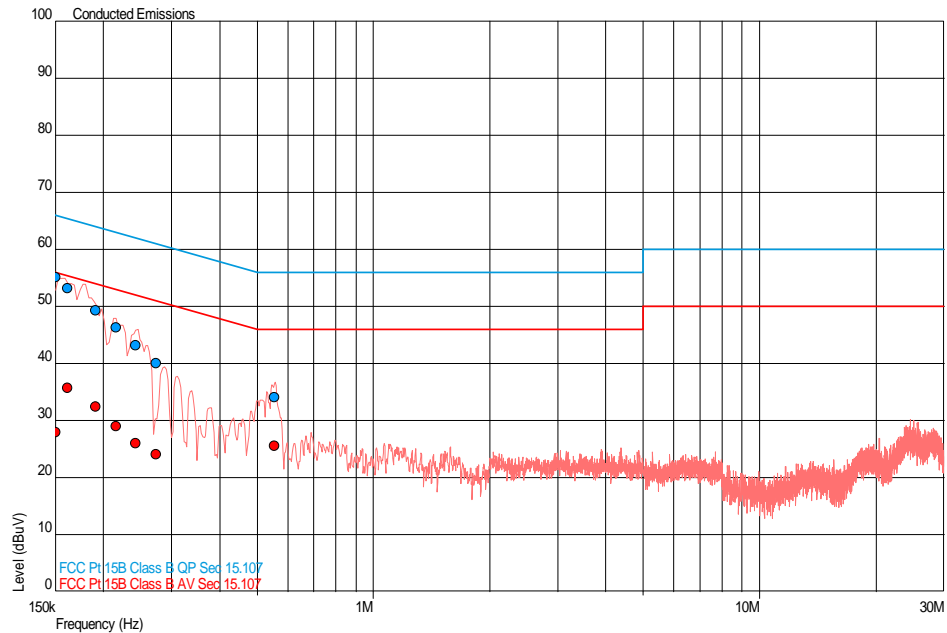
Live Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.155	52.4	65.7	-13.3	35.0	55.7	-20.7
0.180	48.8	64.5	-15.6	31.2	54.5	-23.2
0.206	45.6	63.4	-17.8	28.2	53.4	-25.2
0.229	43.7	62.5	-18.8	25.3	52.5	-27.2
0.235	42.5	62.3	-19.8	24.1	52.3	-28.1
0.261	39.7	61.4	-21.7	22.3	51.4	-29.1
0.554	33.7	56.0	-22.3	24.5	46.0	-21.5



Neutral Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	55.2	66.0	-10.8	28.0	56.0	-28.0
0.162	53.1	65.4	-12.2	35.7	55.4	-19.7
0.191	49.3	64.0	-14.6	32.4	54.0	-21.6
0.216	46.3	63.0	-16.6	29.1	53.0	-23.9
0.243	43.2	62.0	-18.8	26.0	52.0	-26.0
0.274	40.1	61.0	-20.9	24.1	51.0	-26.9
0.554	34.1	56.0	-21.9	25.6	46.0	-20.4



Product Service

2.2 RADIATED EMISSIONS

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

CS100 Coast station S/N: 4230001033940002 - Modification State 0

2.2.3 Date of Test

14 October 2014

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 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 3 kHz.



Product Service

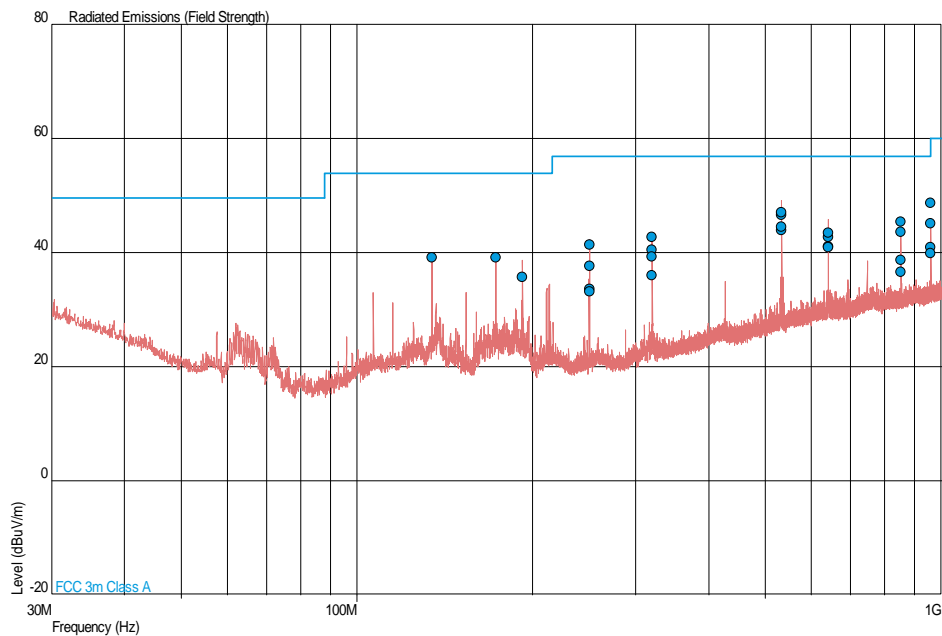
All final measurements were assessed against the Class A emission limits in Clause 15.109 of FCC CFR 47 FCC Part 15 and Clause 6.2 of ICES-003.

2.2.6 Environmental Conditions

Ambient Temperature 19.1°C
Relative Humidity 46.0%

2.2.7 Test Results

30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBμV/m)	QP Level (μV/m)	QP Limit (dBμV/m)	QP Limit (μV/m)	QP Margin (dBμV/m)	QP Margin (μV/m)	Angle (Deg)	Height (m)	Polarity
134.410	39.3	92.3	54.0	501	-14.7	-408.7	270	1.00	Vertical
172.798	39.2	91.2	54.0	501	-14.8	-409.8	0	1.00	Vertical
192.006	35.7	61.0	54.0	501	-18.3	-440.0	19	1.00	Vertical
250.000	41.4	117.5	56.9	700	-15.5	-582.5	223	1.42	Horizontal
320.010	42.8	138.0	56.9	700	-14.1	-562.0	203	2.42	Vertical
533.333	47.1	226.5	56.9	700	-9.8	-473.5	194	1.91	Horizontal
639.979	43.4	147.9	56.9	700	-13.5	-552.1	340	2.99	Vertical
853.329	45.4	186.2	56.9	700	-11.5	-513.8	14	1.04	Horizontal
959.974	48.8	275.4	56.9	700	-8.1	-424.6	6	1.02	Horizontal

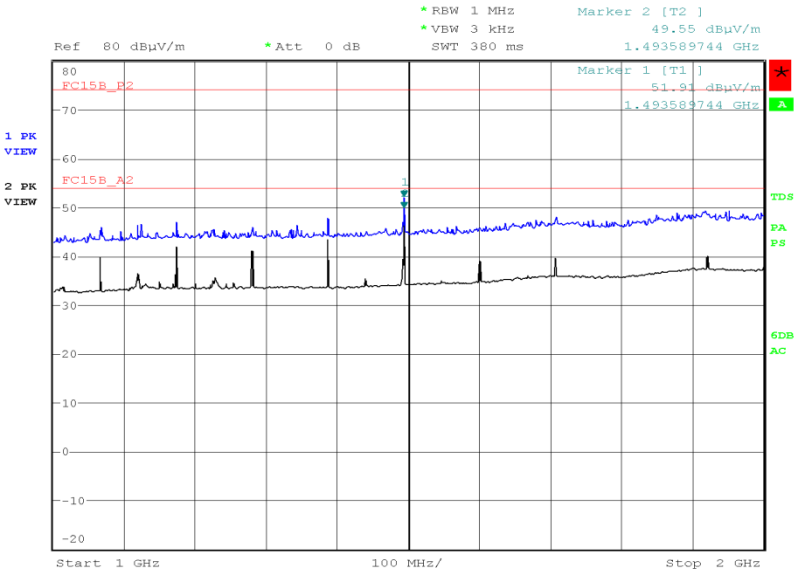


Product Service

1 GHz to 2 GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.493	Horizontal	100	012	53.49	49.56

1 GHz to 2 GHz



Date: 14.OCT.2014 22:58:32

No other emissions were detected within 10 dB of the limit.



Product Service

SECTION 3

TEST EQUIPMENT USED



Product Service

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– AC Line Conducted Emissions					
Transient Limiter	Hewlett Packard	11947A	15	12	10-Dec-2014
LISN (1 Phase)	Chase	MN 2050	336	12	28-Mar-2015
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
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
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000- NPS	3791	-	TU
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU

TU – Traceability Unscheduled



Product Service

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
AC Line Conducted Emissions	± 3.2 dB
Radiated Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 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

© 2014 TÜV SÜD Product Service