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# Report On

Radio Testing of the  
SRT Marine Technology AIS AtoN Express  
In accordance with IEC 62320-2, Section 8

COMMERCIAL-IN-CONFIDENCE

Document 75925174 Report 04 Issue 1

June 2014



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**REPORT ON**

Radio Testing of the  
SRT Marine Technology AIS AtoN Express  
In accordance with IEC 62320-2, Section 8

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**DATED**

05 June 2014





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## **SECTION 1**

### **REPORT SUMMARY**

Radio Testing of the  
SRT Marine Technology AIS AtoN Express  
In accordance with IEC 62320-2 Section 8



## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Radio Testing of the SRT Marine Technology AIS AtoN Express to the requirements of IEC 62320-2, Section 8

Objective	To perform Radio 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)	S04905141484
Number of Samples Tested	1
Test Specification/Issue/Date	IEC 62320-2 (2008)
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	14 April 2014
Finish of Test	16 May 2014
Name of Engineer(s)	N Forsyth



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with IEC 62320 is shown below.

Section	Spec Clause	Test Description	Result	Comments
2.1	8.1	Tests for configuration method	Pass	
2.2	8.2	Tests for synchronisation accuracy	Pass	
2.3	8.3	Tests for EPFS	Pass	
2.4	8.4	Additional messages	N/A	Not applicable for a type 1 AtoN.
-	8.5	Additional functionality	Pass	
-	8.6	Test for BIIT	N/A	The EUT does not implement a BIIT, the manufacturer has declared that as the EUT has no receiver and the antenna is integral to the product, it is not possible to disconnect the antenna.
-	8.7	Transmitter shutdown procedure	Pass	Annex A shows the hardware transmitter time out circuitry which prevents the transmitter from transmitting continuously for more than approximately 500ms.
2.5	8.8	Tests for power supply	Pass	Subject to user manual inclusion of power consumption data as per section 2.5 and 2.6.
-	8.9	Environmental tests	N/T	
2.6	8.10	Other tests	Pass	Subject to user manual inclusion of power consumption data as per section 2.5 and 2.6.

N/A = Not Applicable

N/T = Not Tested



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## 1.3 APPLICATION FORM

APPLICANT'S DETAILS			
COMPANY NAME :SRT-Marine Technology Ltd...			
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	AtoN Express.	Identification/Part number	418-0013.
Hardware Version	418-0012:1/PCBA:011-0072:1.	Software Version	090200.01.00.04.
Manufacturer	SRT-Marine Technology Ltd.	Country of Origin	Hungary.
FCC ID	UYW-4180013	Industry Canada ID	7075-4180013
Technical description (a brief description of the intended use and operation)			
Type 1 AtoN for use on land or buoy			
<u>Supply Voltage:</u>			
<input type="checkbox"/>	AC mains	State AC voltage ..... V	and AC frequency ..... Hz
<input type="checkbox"/>	DC (external)	State DC voltage ..... V	and DC current ..... A
<input checked="" type="checkbox"/>	DC (internal)	State DC voltage 3.7 V	and Battery type Li-on....
<u>Frequency characteristics:</u>			
Transmitter Frequency range	156.025 MHz to 162.025MHz	Channel spacing 25kHz.	(if channelized)
Receiver Frequency range (if different)	...N/A.... MHz to ..... MHz	Channel spacing .....	(if channelized)
Designated test frequencies:			
Bottom: .....	MHz	Middle: .....	MHz Top: .....
Intermediate Frequencies :		19.655... MHz	
Highest Internally Generated Frequency :		LO=142.37MHz and RF = 162.025 MHz	
<u>Power characteristics:</u>			
Maximum transmitter power	.....2 W	Minimum transmitter power	..... W
(if variable)		State duty cycle ..... <1%	
<input type="checkbox"/>	Continuous transmission	If intermittent, can transmitter be set to continuous transmit test mode? Y/N	
<input checked="" type="checkbox"/>	Intermittent transmission		
<u>Antenna characteristics:</u>			
<input type="checkbox"/>	Antenna connector	State impedance .....	ohm
<input type="checkbox"/>	Temporary antenna connector	State impedance .....	ohm
<input checked="" type="checkbox"/>	Integral antenna Type .....	State gain .....	1 dBi
<input type="checkbox"/>	External Antenna Type .....	State gain .....	dBi
<u>Modulation characteristics:</u>			
<input type="checkbox"/>	Amplitude	[] Other	
<input checked="" type="checkbox"/>	Frequency	Details: GMSK-TDMA.	
<input type="checkbox"/>	Phase	(GMSK, QSPK etc)	
Can the transmitter operate un-modulated?		Y/N	
ITU Class of emission: 25K0Q1DDT			
<u>Battery/Power Supply</u>			
Model name/number	LIC/18650-22L	Identification/Part number	160-0001
Manufacturer	VARTA	Country of Origin	China
<u>Ancillaries (if applicable)</u>			
Model name/number	...N/A.....	Identification/Part number	...N/A.....
Manufacturer	.....	Country of Origin	.....
<u>Extreme conditions:</u>			
Maximum temperature	...+55 °C	Minimum temperature	...-20 °C
Maximum supply voltage	...4.1 V	Minimum supply voltage	...3.66... 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 :

A handwritten signature in black ink, consisting of a large, stylized 'S' followed by a horizontal line that tapers off to the right.

Name : Richard McMahon  
Position held : Certification Engineer  
Date : 11.04.14





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## 1.4 PRODUCT INFORMATION

### 1.4.1 Technical Description

The Equipment Under Test (EUT) was a SRT Marine Technology AIS AtoN Express as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.



Equipment Under Test



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**1.5 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standards or test plan were made during testing.

**1.6 MODIFICATION RECORD**

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
<b>Serial Number: TSR0004 (AtoN Express #5)</b>			
0	As supplied by manufacturer.	N/A	N/A
1	Updated software from 090200.01.00.04 to 090200.01.00.05, to fix a problem with off position behaviour, as per clause 8.3.3 of the specification.	N Forsyth	12/05/2014

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test are recorded on the appropriate test pages.



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## **SECTION 2**

### **TEST DETAILS**

Radio Testing of the  
SRT Marine Technology AIS AtoN Express  
In accordance with IEC 62320-2, Section 8



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## 2.1 TESTS FOR CONFIGURATION METHOD

### 2.1.1 Specification Reference

IEC 62320-2, Clause 8.1

### 2.1.2 Equipment Under Test

AIS AtoN Express, S/N: S04906140773

### 2.1.3 Date of Test and Modification State

14 and 15 April 2014 - Modification State 0

### 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 Environmental Conditions

Ambient Temperature 21.6°C

Relative Humidity 53.1%

### 2.1.6 Test Results

#### 8.1.1 Configure test Message 21

The EUT was initially sent a query for ACE, ACF and AID sentence, the sentences received were as follows:

```
$AIACE,991234567,00,0200,1,0,0,TEST FLOATING AIS ATON STATION4,0050050505,R*15
$AIACF,991234567,1,5052.3333,N,00114.6667,W,0,0,0,2087,2088,0,20,0,R*20
$AIAID,991234567,,991234567,R,R*68
```

The power was removed for 5 minutes and re-applied, then EUT was sent a query for ACE, ACF and AID sentence, the sentences received were as follows:

```
$AIACE,991234567,00,0200,1,0,0,TEST FLOATING AIS ATON STATION4,0050050505,R*15
$AIACF,991234567,1,5052.3333,N,00114.6667,W,0,0,0,2087,2088,0,20,0,R*20
$AIAID,991234567,,991234567,R,R*68
```



Parameter	Initial Value	Value after Power Cycle	Verdict
MMSI	991234567	991234567	✓
Type of AtoN	20 – Cardinal Mark North	20	✓
Name of AtoN	TEST FLOATING AIS ATON STATION4	TEST FLOATING AIS ATON STATION4	✓
Position accuracy	to accuracy of EPFS	1	✓
Assigned position	50°52.333N 1°14.6667W	50°52.333N 1°14.6667W	✓
Dimension/Reference for position	A=B=C=D=5	A=B=C=D=5	✓
Type of EPFS	1 - GPS	1 - GPS	✓
Off position threshold	200 m	200 m	✓
Set power level	0	0	✓
Channel 1	2087	2087	✓
Channel 2	2088	2088	✓
Virtual AtoN Flag	0	0	✓
AtoN Status	0	0	✓
Off position behaviour	0	0	✓
UTC lost behaviour	0	0	✓

#### 8.1.2 Schedule mode A FATDMA Message 21 (single report, alternating channel operation)

Requirement	Result	Verdict
EUT transmits Test Message 21 in the configured slots on both channels.	See results below.	✓
EUT starts transmission within one reporting interval and should not wait until UTC minute 1	Yes.	✓
Reporting behaviour is consistent through the hour and day boundaries	See results below.	✓
Transmitted data is correct	Data is correct.	✓



Time	Slot	Channel	Message
08:52:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3u>KAop50''''Vf23k`4m0E2Ckd@0,4*18
08:55:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
08:58:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
09:01:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:04:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3u>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:07:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*47
09:10:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
09:13:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:16:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
09:19:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:22:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
09:25:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:28:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
09:31:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:34:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
09:37:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*19
09:40:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*1A
09:43:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:46:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
09:49:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:52:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
09:55:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*18
09:58:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
10:01:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3u>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
10:04:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*1A
10:07:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*19
10:10:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
10:13:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*19
10:16:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*1A

Time	Slot	Channel	Message
23:55:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*46
23:58:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*45
00:01:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*47
00:04:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*45
00:07:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*47



## 8.1.3 Schedule mode B FATDMA Message 21 (dual report, dual channel operation)

Requirement	Result	Verdict
EUT transmits Test Message 21 in the configured slots on both channels.	See results below.	✓
EUT starts transmission within one reporting interval and should not wait until UTC minute 1	Yes.	✓
Reporting behaviour is consistent through the hour and day boundaries	See results below.	✓
Transmitted data is correct	Data is correct.	✓

Time	Slot	Channel	Message
00:35:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*04
00:38:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
00:41:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''>23k`4m0E2Ckd@0,4*76
00:44:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
00:47:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*04
00:50:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
00:53:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*04
00:56:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*45
00:59:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*04
01:02:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*45
01:05:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*5B
01:08:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*44
01:11:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*04
01:14:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*44
01:17:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*5B
01:20:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*44
01:23:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3w>KAop50''''>03k`4m0E2Ckd@0,4*5A
01:26:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
01:29:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*04
01:32:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi40>KAop50''''Vf23k`4m0E2Ckd@0,4*5A
01:35:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3w>KAop50''''>03k`4m0E2Ckd@0,4*05
01:38:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*44

Time	Slot	Channel	Message
23:56:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*44
23:59:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3v>KAop50''''>03k`4m0E2Ckd@0,4*5B
00:02:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k`4m0E2Ckd@0,4*1B
00:05:16	612	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0b?oi3w>KAop50''''>03k`4m0E2Ckd@0,4*5A
00:08:13	512	A	!AIVDM,1,1,,A,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAop50''''Vf23k`4m0E2Ckd@0,4*45



#### 8.1.4 Schedule mode C FATDMA Message 21 (Single report, single channel operation)

Requirement	Result	Verdict
EUT transmits Test Message 21 in the configured slots on one channel.	See results below.	✓
EUT starts transmission within one reporting interval and should not wait until UTC minute 1	Yes.	✓
Reporting behaviour is consistent through the hour and day boundaries	See results below.	✓
Transmitted data is correct	Data is correct.	✓

Time	Slot	Channel	Message
22:52:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
22:55:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
22:58:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAoh50''''Vf23k'4m0E2Ckd@0,4*00
23:01:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
23:04:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAoh50''''Vf23k'4m0E2Ckd@0,4*00
23:07:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:10:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:13:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:16:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k'4m0E2Ckd@0,4*18
23:19:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:22:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
23:25:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
23:28:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:31:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k'4m0E2Ckd@0,4*18
23:34:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:37:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:40:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
23:43:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k'4m0E2Ckd@0,4*18
23:46:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:49:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:52:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
23:55:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAop50''''Vf23k'4m0E2Ckd@0,4*18
23:58:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
00:01:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
00:04:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47
00:07:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAoh50''''Vf23k'4m0E2Ckd@0,4*00
00:10:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
00:13:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3w>KAp050''''Vf23k'4m0E2Ckd@0,4*46
00:16:13	512	B	!AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050''''Vf23k'4m0E2Ckd@0,4*47





Product Service

2.2 TESTS FOR SYNCHRONISATION ACCURACY

2.2.1 Specification Reference

IEC 62320-2, Clause 8.2

2.2.2 Equipment Under Test

AIS AtoN Express, S/N: S04906140773

2.2.3 Date of Test and Modification State

16 April 2014 - Modification State 0

2.2.4 Test Equipment Used

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

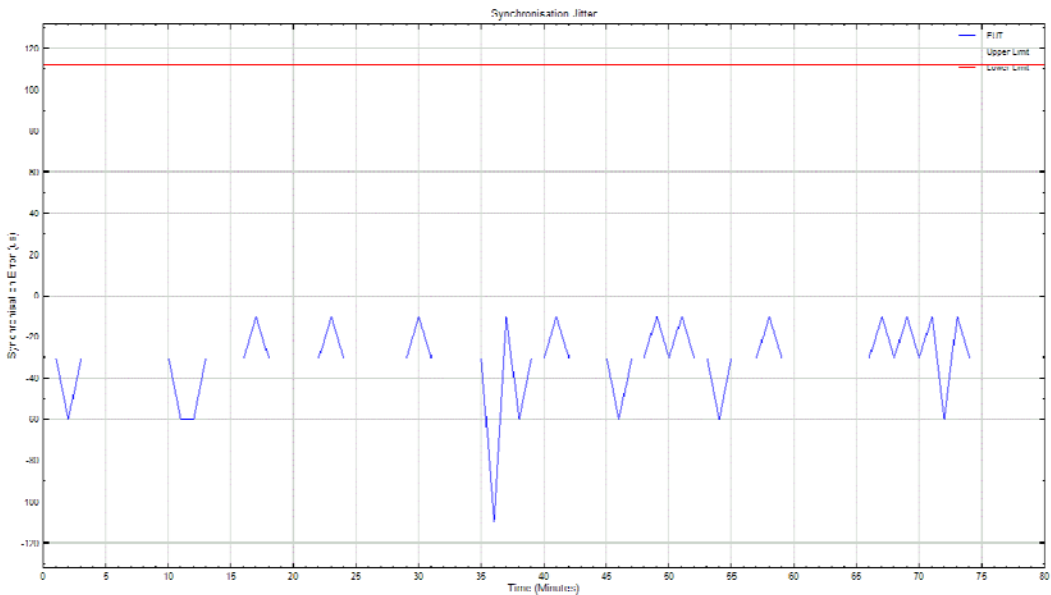
2.2.5 Environmental Conditions

Ambient Temperature 22.2°C  
Relative Humidity 42.3%

2.2.6 Test Results

The EUT will only transmit when it has a valid GPS position. Therefore it is not possible to evaluate the performance in UTC indirect or semaphore synchronisation modes.

Requirement	Verdict
The synchronisation error shall not exceed $\pm 104 \mu\text{s}$ using UTC direct synchronisation	✓





Product Service

## 2.3 TESTS FOR EPFS

### 2.3.1 Specification Reference

IEC 62320-2, Clause 8.3

### 2.3.2 Equipment Under Test

AIS AtoN Express, S/N: S04906140773

### 2.3.3 Date of Test and Modification State

17 April and 16 May 2014 - Modification State 0 &amp; 1

### 2.3.4 Test Equipment Used

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

### 2.3.5 Environmental Conditions

Ambient Temperature 23.1°C

Relative Humidity 33.4%

### 2.3.6 Test Results

#### 8.3.1 Position Source (Modification State 0)

Part a)		
Received Message: !AIVDM,1,1,,B,E>iD:1r:2ab@367Pb4W3h0Tah0bOoi3v>KAp050``Vf23k`4m0E2Ckd@0,4*47		
Requirement	Result	Verdict
The position field is valid, with a simulated position of 50°25.4016N 3°35.8338.	Decoded position: 50°25.4016N 3°35.8338.	✓
The time stamp field is valid.	13, slot 512 occurs during second 13.	✓

Part b)		
Received Message: !AIVDM,1,1,,A,E>iD:1lb2ab@367Pb4W3h0Tah0b02lbq>SIL850``cvP03k`4m0E2CkP,0*00		
Requirement	Result	Verdict
Type of electronic position fixing device = Surveyed	7 - Surveyed.	✓
RAIM flag = 0	0	✓

#### 8.3.2 Invalid position

The EUT will not transmit without a valid GPS position. When GPS is lost, the last known position will be transmitted, after this, transmission ceases.



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## 8.3.3 Off-position monitor (Modification State 1)

Step	Method	Requirement	Result	Verdict
a)	EPFS Antenna at assigned position.	Off position indicator = 0	0	✓
b)	EPFS Antenna moved to off position.	Off position indicator = 1	1	✓
		Reporting schedule unchanged	3 minutes	✓
c)	EPFS Antenna moved to on position.	Off position indicator = 0	0	✓
d)	EUT reporting rate set to new interval. EPFS Antenna moved to off position.	Off position indicator = 1 Reporting schedule changed	EUT does not implement a configurable off position reporting interval	N/A
e)	EPFS Antenna moved to on position.	Off position indicator = 0 Reporting schedule reverts		

Results					
Time	Slot	Message	Latitude	Longitude	Off Position
23:32:49	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN>oR7'50''Vf23k'4m0E2Cke@0,4*63	51 57.9837 N	1 14.0002 W	0
23:35:49	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EO>oR7'50''Vf23k'4m0E2Cke@0,4*61	51 57.9837 N	1 14.0001 W	0
23:38:49	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN>oR7h50''Vf23k'4m0E2Cke@0,4*6B	51 57.9838 N	1 14.0002 W	0
23:41:49	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EL>oR7P50''Vf23k'4m0E2Cke@0,4*52	51 57.9836 N	1 14.0004 W	0
23:44:49	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN>oR7P50''Vf23k'4m0E2Cke@0,4*53	51 57.9836 N	1 14.0002 W	0
23:47:49	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN>oR7'50''Vf23k'4m0E2Cke@0,4*60	51 57.9837 N	1 14.0002 W	0
23:50:49	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EO>oR7H50''Vf23k'4m0E2Cke@0,4*4A	51 57.9835 N	1 14.0001 W	0
23:53:45	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EM?L9o@50''Vf23k'4m0E2Cke@0,4*52	53 57.9834 N	1 14.0003 W	0
23:56:45	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN?L9o'50''Vf23k'4m0E2Cke@0,4*72	53 57.9837 N	1 14.0002 W	0
23:59:45	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN?L9o'50''Vv23k'4m0E2Cke@0,4*61	53 57.9837 N	1 14.0002 W	1
00:02:45	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN?L9oH50''Vv23k'4m0E2Cke@0,4*4A	53 57.9835 N	1 14.0002 W	1
00:05:45	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EO?L9oP50''Vv23k'4m0E2Cke@0,4*50	53 57.9836 N	1 14.0001 W	1
00:08:45	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EM?L9oH50''Vv23k'4m0E2Cke@0,4*49	53 57.9835 N	1 14.0003 W	1
00:11:45	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EO?L9oP50''Vv23k'4m0E2Cke@0,4*50	53 57.9836 N	1 14.0001 W	1
00:14:45	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN>oR7'50''Vv23k'4m0E2Cke@0,4*73	51 57.9837 N	1 14.0002 W	1
00:17:45	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN>oR7P50''Vf23k'4m0E2Cke@0,4*50	51 57.9836 N	1 14.0002 W	0
00:20:45	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EM>oR7'50''Vf23k'4m0E2Cke@0,4*60	51 57.9837 N	1 14.0003 W	0
00:23:45	512	IAIVDM,1,1,,B,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EN>oR7'50''Vf23k'4m0E2Cke@0,4*60	51 57.9837 N	1 14.0002 W	0
00:26:45	512	IAIVDM,1,1,,A,E>ID:1r:2ab@367Pb4W3h0Tah0bOu;EO>oR7H50''Vf23k'4m0E2Cke@0,4*4A	51 57.9835 N	1 14.0001 W	0



Product Service

## **2.4 ADDITIONAL FUNCTIONALITY**

### **2.4.1 Specification Reference**

IEC 62320-2, Clause 8.5

### **2.4.2 Equipment Under Test**

AIS AtoN Express, S/N: S04906140773

### **2.4.3 Date of Test and Modification State**

16 May 2014 - Modification State 1

### **2.4.4 Test Equipment Used**

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

### **2.4.5 Environmental Conditions**

Ambient Temperature 22.8°C

Relative Humidity 35.5%

### **2.4.6 Test Results**

#### 8.5.1 Test for configuration of the receiver turn-on times (Types 2 and 3)

Not applicable for a type 1 AtoN.

#### 8.5.2 Test for configure proprietary AtoN control

The EUT does not support the configuration of proprietary AtoN control data.

#### 8.5.3 Test for configuration of payload re-broadcast

The EUT does not support payload re-broadcast.

#### 8.5.4 Test for forced broadcast

The EUT does not support the forced broadcast of a message.



#### 8.5.5 Test for version information

Message sent to EUT: \$AIAIQ,VER*3C		
Received Message: \$AIVER,1,1,,AN,SMT,991234567,S04905141484,1,090200.01.00.04,3*79		
Data Field	Result	Verdict
Total number of sentences needed	1	✓
Sentence number	1	✓
Sequential message identifier	Null	✓
Device type	AN	✓
Vendor ID	SMT	✓
Unique identifier	991234567	✓
Manufacturer serial number	S04905141484	✓
Model code	1	✓
Software revision	090200.01.00.05	✓
Hardware revision	3	✓

#### 8.5.6 Test for AFC – AtoN function ID capability

The EUT does not support the ability to provide a list of supported functionality.

##### 8.5.6.4 Test for assigning an encryption key for VDL configuration

The EUT does not support encryption keys.

#### 8.5.7 Test for VDL configuration using chaining (Types 2 and 3)

Not applicable for a type 1 AtoN.



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## **2.5 TESTS FOR POWER SUPPLY**

### **2.5.1 Specification Reference**

IEC 62320-2, Clause 8.8

### **2.5.2 Equipment Under Test**

AIS AtoN Express, S/N: S04906140773

### **2.5.3 Date of Test and Modification State**

06 May 2014 - Modification State 0

### **2.5.4 Test Equipment Used**

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

### **2.5.5 Environmental Conditions**

Ambient Temperature 20.6°C

Relative Humidity 24.7%

### **2.5.6 Test Results**

The EUT was connected to a 12 V DC supply via a power box which is supplied with the EUT by the manufacturer. The EUT was fully charged before the test commenced.

The average current was measured as being 31 mA over a 30 minute period. The manufacturer has declared that power consumption will be stated in the user manual as being 1.2 Ah/day. This information was not present in the supplied draft user manual at the time of test. The measured value equates to 0.744 Ah/day, which is less than the manufacturer declared value.

#### Limit Clause 8.8.1.3

The average power consumption of the EUT does not exceed 110 % of the value stated in the manufacturer's documentation



Product Service

## **2.6 OTHER TESTS**

### **2.6.1 Specification Reference**

IEC 62320-2, Clause 8.10

### **2.6.2 Equipment Under Test**

AIS AtoN Express, S/N: S04906140773

### **2.6.3 Test Results**

#### 8.10.1 Quality assurance

SRT Marine Technology operate an ISO9001 Quality system administered through BSI, certificate number: FS 548550 (see Annex A)

#### 8.10.2 Additional features

The EUT does not support any additional features.



### 8.10.3 Manual

The manual was checked for information concerning the following items.

Information	Comments	Verdict
Factory default MMSI	Does not detail a default MMSI, but explains that an MMSI number is required in order for the AIS transceiver to operate.	✓
External connectors	The manual does not mention a connector but it is implied by describing how to insert the EUT into a configuration dock.	✓
Correct installation of the unit and antennae	Information detailed in section 3 of the user manual.	✓
Configuration	Information detailed in section 4 of the user manual.	✓
Power consumption	This information was available but not in the version of the manual submitted at the time of test. The manufacturer has declared this will be added to the final version.	✓
Firmware upgrades	No information in manual, it will not be possible for a user to upgrade the firmware.	✓
Configuration interface, including hardware and electrical details.	Information in section 4 on how to connect the EUT to a PC for configuration.	✓

### 8.10.4 Marking and identification

Information	Comments	Verdict
Identification of the manufacturer	The manufacturer is clearly displayed.	✓
Model identification	The model name is clearly displayed.	✓
Serial number of the unit	The serial number was not displayed on the sample submitted for test. The manufacturer has declared this will be displayed on a "ratings label" on the final build.	✓
Operating voltage	The operating voltage was not displayed on the sample submitted for test. The manufacturer has declared this will be displayed on a "ratings label" on the final build. (see Annex A)	✓
The title and version of each software element included in the installed software system shall be either marked on the equipment or displayed on command.	Software version is displayed via the VER sentence. See section 2.5 of this test report.	✓





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 Description	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Section 2.1, 2.2 and 2.3 - Tests for Synchronisation Accuracy, Active Mode Tests and Test Mode Tests</b>					
VDL Analyser/Generator	Attingimus	AIS Tester	4057	-	TU
Power Supply Unit	Iso-Tech	IP2302A	2437	-	TU
GPS Simulator	Spirent	STR4500	3056	-	TU
Hygrometer	Rotronic	I-1000	3068	12	10-Apr-2015
Humidity & Temperature Meter	Radio Spares	1361C	4420	12	01-May-2015

TU – Traceability Unscheduled



Product Service

## **SECTION 4**

### **PHOTOGRAPHS**



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#### 4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



View 1



View 2



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## **SECTION 5**

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



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## 5.1 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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## **ANNEX A**

### **CUSTOMER SUPPLIED INFORMATION**



Product Service

bsi.



# Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2008

This is to certify that:

Software Radio Technology Plc  
Wireless House  
Westfield Industrial Estate  
Midsomer Norton  
Bath  
BA3 4BS  
United Kingdom

Holds Certificate Number:

FS 548550

and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope:

Design and supply of digital wireless communication technology and product solutions.

For and on behalf of BSI:

  
Gary Fenton, Global Assurance Director

Originally registered: 04/03/2010

Latest Issue: 25/02/2013

Expiry Date: 04/03/2016



Page: 1 of 1

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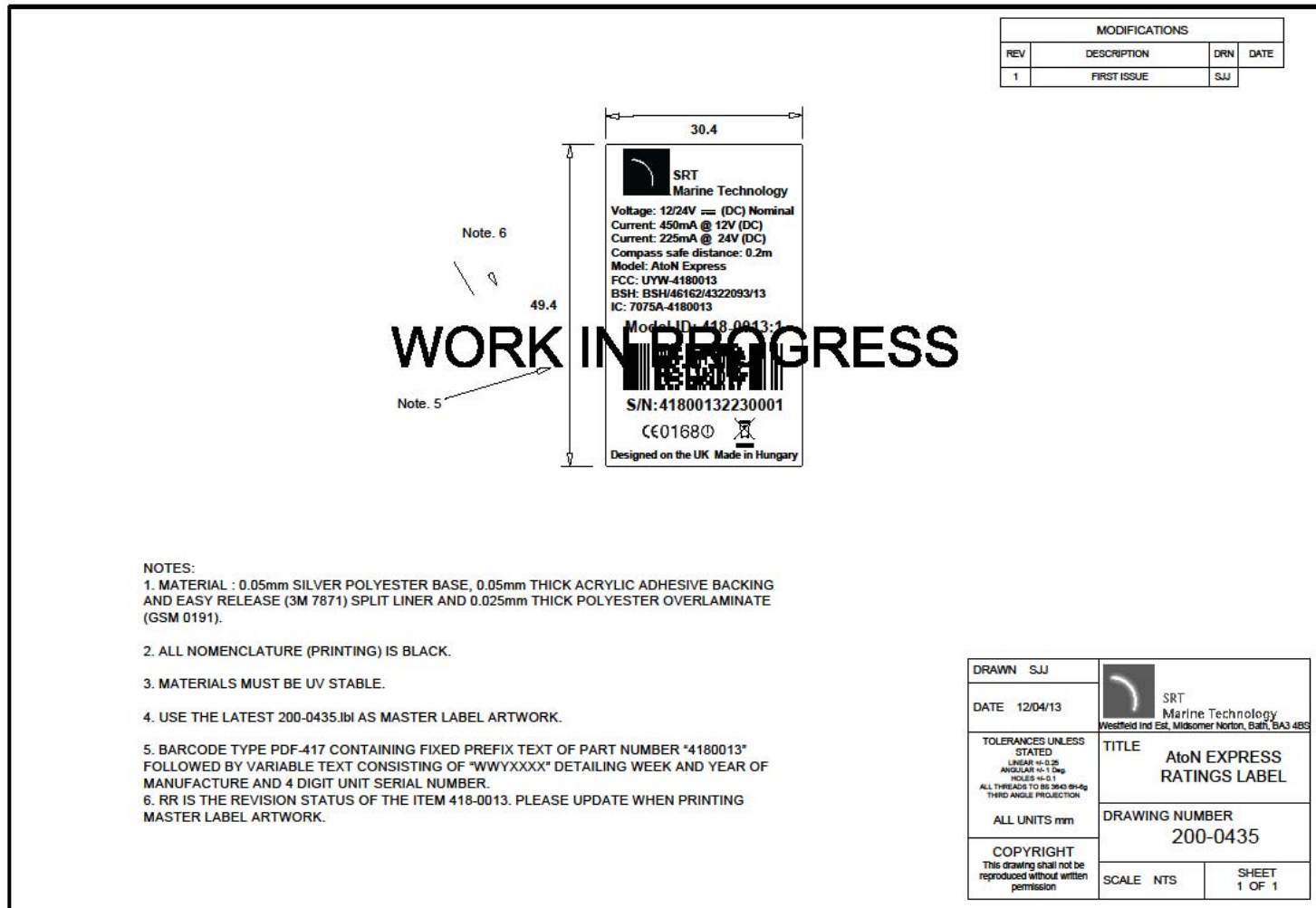
This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.  
An electronic certificate can be authenticated [online](http://www.bsigroup.com/ClientDirectory).  
Printed copies can be validated at [www.bsigroup.com/ClientDirectory](http://www.bsigroup.com/ClientDirectory)

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 845 080 9000  
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.  
A Member of the BSI Group of Companies.





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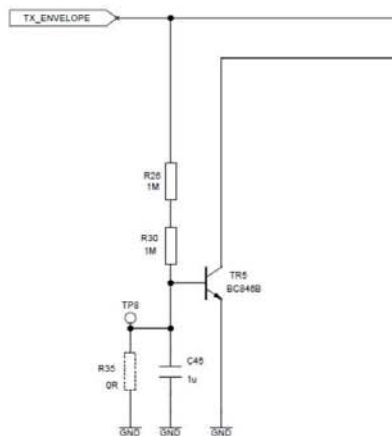


Product Service

SRT  
Marine Technology03/06/14**P238 AtoN Express****Transmitter shutdown procedure IEC62320-2 Clause 8.7**

SRT Marine Technology Ltd of Wireless house Westfield Industrial Estate Midsomer Norton England BA3 4BS, hereby declare that the AtoN Express being a Type 1 Aid to Navigation (AtoN) is in compliance with Clause 5.1.1.4, Transmitter shutdown requirements.

The AtoN Express hardware contains transmitter time out circuitry which prevents the transmitter from transmitting continuously for more than approximately 500ms and therefore functions as required.



HARDWARE TIME-OUT CIRCUIT.

FIT R35 TO DISABLE TIME-OUT CIRCUIT.

Richard McMahon-Certification Engineer  
SRT-Marine Technology