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Report On

FCC and Industry Canada Testing of the
Navico NAIS-400

In accordance with FCC CFR 47 Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

FCC ID: RAY-NAIS400

IC ID: 4697A-NAIS400B

Document 75918695 Report 01 Issue 1

August 2012



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TÜV SÜD Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk

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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 August 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
Navico NAIS-400
In accordance with FCC CFR 47 Part 15B and ICES-003



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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 Navico NAIS-400 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	Navico
Applicant	SRT Marine Technology Ltd
Model Number(s)	NAIS-400
Serial Number(s)	P222NAIS400FTU02
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2011) ICES-003 (2004)
Incoming Release Date	Declaration of Build Status 06 August 2012
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	POR003308 10 July 2012
Start of Test	5 August 2012
Finish of Test	5 August 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	7.1	Radiated Emissions	Pass	



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1.3 DECLARATION OF BUILD STATUS

Manufacturer	<u>Navico Auckland Ltd</u>
Country of origin	<u>Hungary</u>
UK Agent	<u>SRT Marine Ltd</u>
Technical Description	<u>Class B Transceiver</u>
Model No	<u>NAIS-400</u>
Part No	<u>421-0001</u>
Serial No	<u>Sample 1</u>
Drawing Number	<u>421-0001</u>
Build Status	<u>Mod -5</u>
Software Issue	<u>040200.01.05</u>
IC ID	<u>4697A – NAIS400B</u>
FCC ID	<u>RAY-NAIS400</u>

Signature

A handwritten signature in blue ink, appearing to be 'Richard McMahon', written over a horizontal line.

Richard McMahon**Date**06th August 2012

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV Product Service as to the accuracy of the information declared in this document by the manufacturer.



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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Navico NAIS-400. 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
Navico NAIS-400
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 7.1

2.1.2 Equipment Under Test and Modification State

NAIS-400 S/N: P222NAIS400FTU02 - Modification State 0

2.1.3 Date of Test

5 August 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

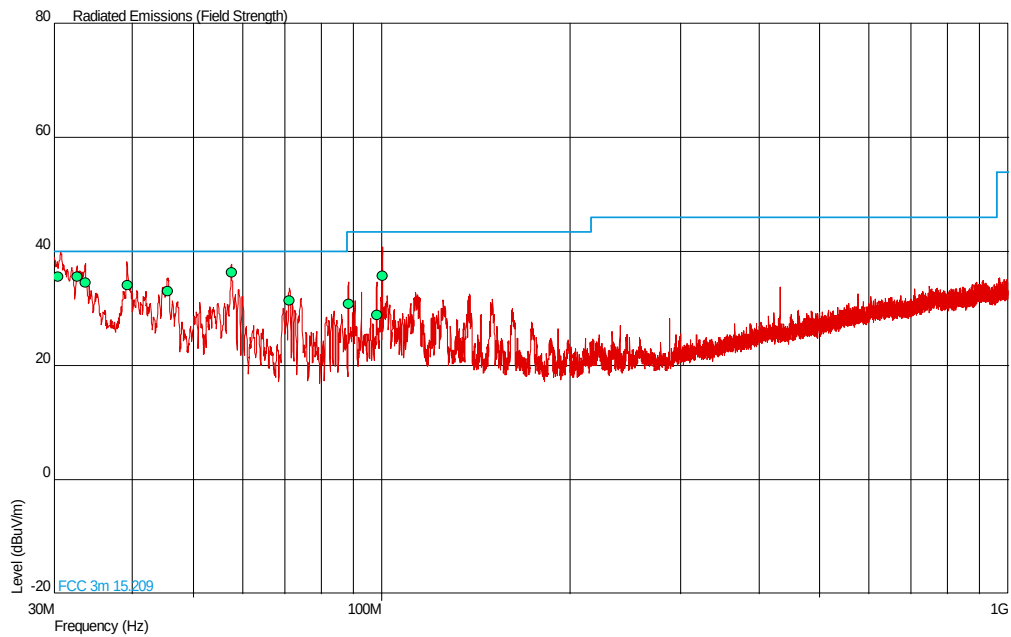
Ambient Temperature	20.5°C
Relative Humidity	56.0%



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
30.460	35.6	60.3	40.0	100	-4.4	39.7	65	1.00	Vertical
32.708	35.5	59.6	40.0	100	-4.5	40.4	271	1.08	Vertical
33.637	34.6	53.7	40.0	100	-5.4	46.3	247	1.00	Vertical
39.320	34.1	50.7	40.0	100	-5.9	49.3	5	1.00	Vertical
45.519	33.0	44.7	40.0	100	-7.0	55.3	264	1.00	Vertical
57.590	36.4	66.1	40.0	100	-3.6	33.9	63	1.00	Vertical
71.299	31.4	37.2	40.0	100	-8.6	62.8	93	2.34	Vertical
88.507	30.8	34.7	43.5	150	-12.7	115.3	7	1.00	Vertical
98.199	28.9	27.9	43.5	150	-14.6	122.1	54	1.00	Vertical
100.274	35.7	61.0	43.5	150	-7.8	89.0	188	1.00	Vertical



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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					
Transient Limiter	Hewlett Packard	11947A	15	12	1-Dec-2012
LISN (1 Phase)	Chase	MN 2050	336	12	23-Mar-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
GPS/SBAS Simulator	Spirent	STR4500	3056	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	26-Aug-2012
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU

TU – Traceability Unscheduled



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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



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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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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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