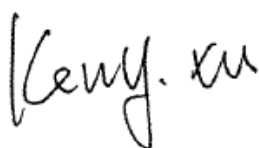


TEST REPORT

Application No.: SZEM2007006018CR
Applicant: Navico Inc.
Address of Applicant: 4500 S. 129th East Avenue, Ste. 200, Tulsa, Oklahoma, 74134 United States
Manufacturer: Navico Auckland Limited
Address of Manufacturer: Arrenway Drive, Rosedale, Auckland, 0632 New Zealand
Factory: Shenzhen Fastrain Technology Co., Ltd.
Address of Factory: No.3 Baolong 4th Rd., Baolong Industrial Area, Longgang District, Shenzhen, China
Equipment Under Test (EUT):
EUT Name: MARINE BLACK BOX DSC/AIS VHF RADIO SYSTEM
Model No.: NRS-1
Trade Mark: NAVICO
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2020-07-03
Date of Test: 2020-07-31 to 2020-09-04
Date of Issue: 2020-09-18

Test Result:	Pass*
---------------------	--------------

* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu
EMC Laboratory Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch, EMC Laboratory

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-09-18		Original

Authorized for issue by:				
		Edison Li		
		Edison Li /Project Engineer		
		Eric Fu		
		Eric Fu /Reviewer		

2 Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass
Radiated Emissions (above 1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass

Internal Source	Upper Frequency
Below 1.705MHz	30MHz
1.705MHz to 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5th harmonic of the highest frequency or 40GHz, whichever is lower

3 Test Summary of spot-check test data

Item	Worst test result for original report(FCC ID:RAYVHFNR52)	Worst test result for this report(FCC ID:RAYVHFNR51)
Radiated Emissions (30MHz-1GHz)	32.43dBuV/m	31.96dBuV/m
Radiated Emissions (above 1GHz)	47.69dBuV/m	47.69dBuV/m

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5 General Information

5.1 Details of E.U.T.

Power Supply:	12 VDC battery system
Cable:	DC cable: longer than 300cm unshielded
Sample Type:	Mobile device
Internal Source:	More than 108MHz

5.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
DC power	ZHAOXIN	RXN-305D	REF. No.SEA2700
Coaxial Attenuator	Provided by client	TS4	HYT168793
Cell Site Test Set	HP	8921A	3633A04615
Audio Analyzer	Rohde & Schwarz	UPV	SEM008-03
Wired Handset	SIMRAD	HS100	/
Wired Speaker	/	SP100	/
Wired Handset	B&G	H100	/
Wired Speaker	/	SP100	/

5.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radiated Emission	$\pm 4.5\text{dB}$ (30MHz-1GHz)
2	Temperature test	$\pm 1^\circ\text{C}$
3	Humidity test	$\pm 3\%$

5.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

5.6 Deviation from Standards

None

5.7 Abnormalities from Standard Conditions

None



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6 Equipment List

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2020-07-19	2023-07-18
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020-07-10	2021-07-09
MXE EMI receiver	KEYSIGHT	N9038A	SEM004-15	2019-12-16	2020-12-15
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-02	2019-05-24	2022-05-23
Pre-amplifier	Agilent Technologies	8447D	SEM005-01	2020-04-01	2021-03-31

Radiated Emissions (above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09
EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08
Horn Antenna	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-26	2020-09-25
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-04-07	2021-04-06

7 Emission Test Results

7.1 Radiated Emissions (30MHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Limit:	
30MHz -88MHz	40.0(dBμV/m) quasi-peak
88MHz-216MHz	43.5(dBμV/m) quasi-peak
216MHz-960MHz	46.0(dBμV/m) quasi-peak
960MHz-1000MHz	54.0(dBμV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

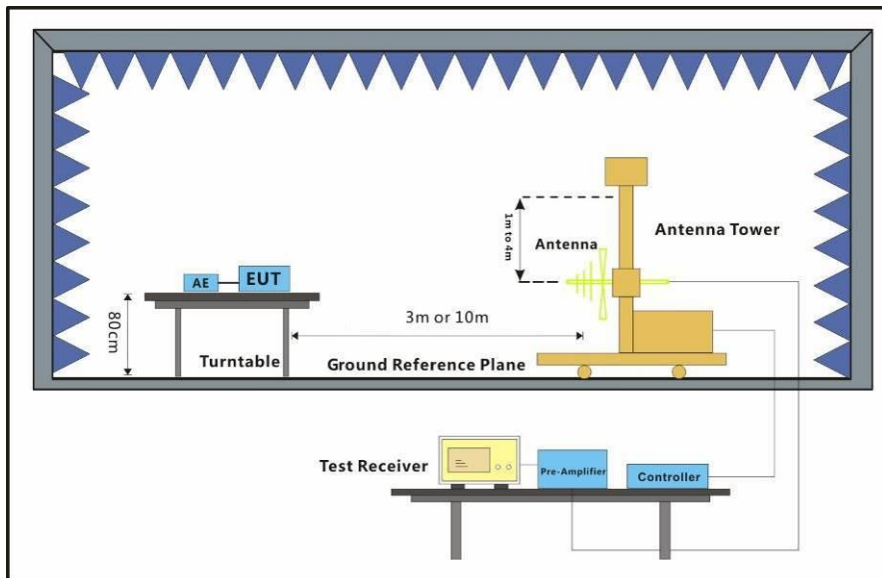
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 51 % RH Atmospheric Pressure: 1000 mbar

Test mode: 00:Normal Working_Blank

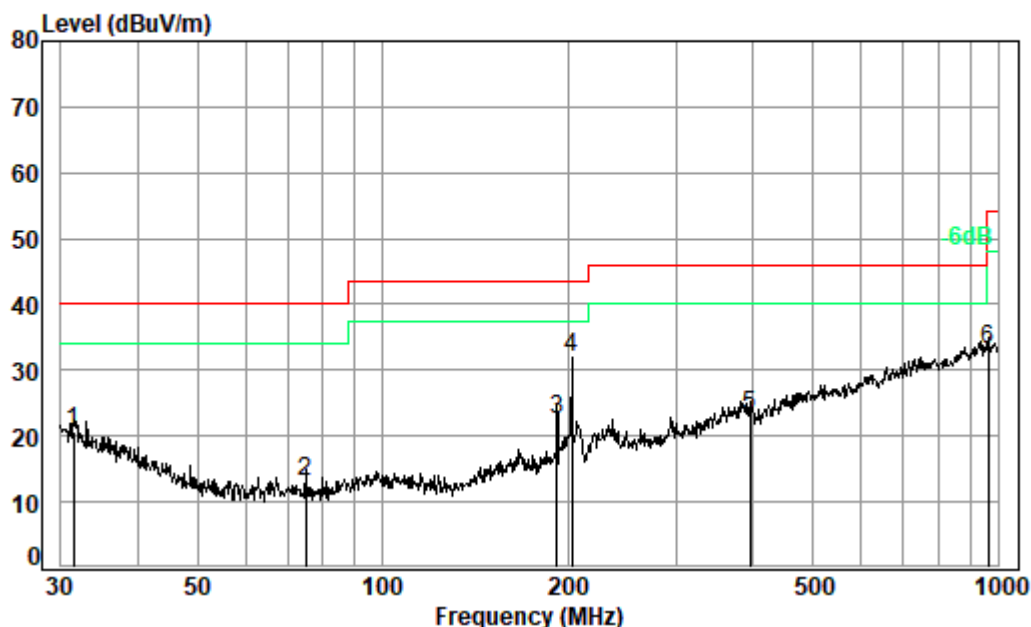
7.1.2 Test Setup Diagram



7.1.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Mode:00;Horizontal



Condition: 3m HORIZONTAL

Job No. : 06018CR

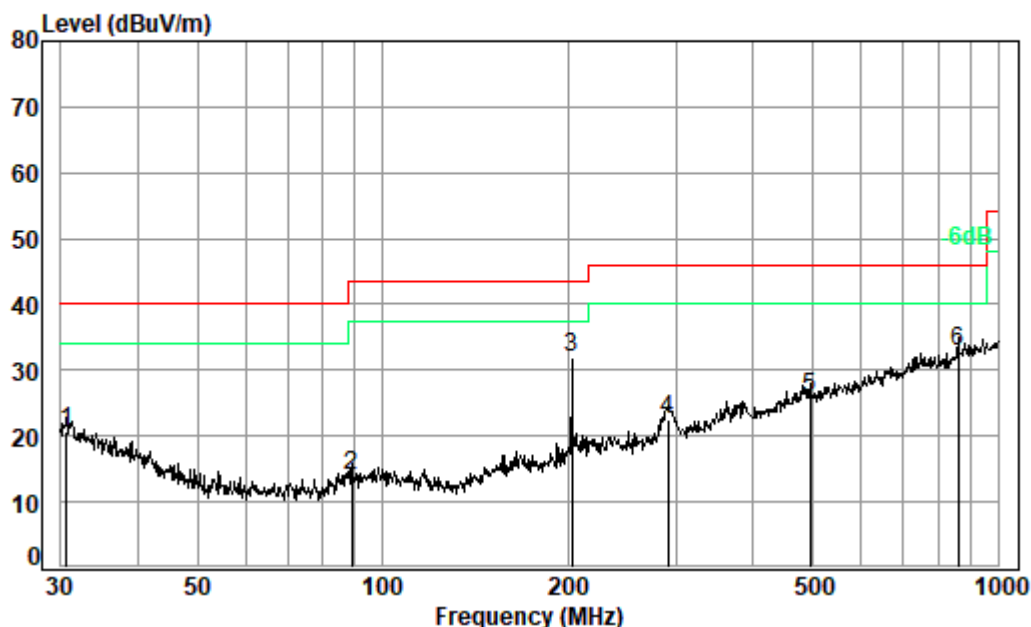
Test Mode: 00

: 2#

	Freq	Cable	Ant	Preamp	Read	Limit	Over	
	MHz	Loss	Factor	Factor	Level	Level	Line	Limit Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	31.51	0.62	21.86	27.73	25.78	20.53	40.00	-19.47 QP
2	74.92	1.00	12.40	27.64	27.22	12.98	40.00	-27.02 QP
3	191.75	1.19	15.55	27.17	33.01	22.58	43.50	-20.92 QP
4 pp	202.81	1.23	15.66	27.13	42.20	31.96	43.50	-11.54 QP
5	394.85	2.29	22.01	27.37	26.23	23.16	46.00	-22.84 QP
6	965.54	3.57	29.50	26.83	26.79	33.03	54.00	-20.97 QP



Mode:00 ;Vertical



Condition: 3m VERTICAL

Job No. : 06018CR

Test Mode: 00

: 2#

	Freq	Cable	Ant	Preamp	Read	Limit	Over	
	MHz	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.64	0.61	22.51	27.73	25.32	20.71	40.00	-19.29 QP
2	89.28	1.29	13.03	27.62	27.19	13.89	43.50	-29.61 QP
3 pp	202.81	1.23	15.66	27.13	42.04	31.80	43.50	-11.70 QP
4	291.04	1.94	18.38	26.89	29.11	22.54	46.00	-23.46 QP
5	495.93	2.49	24.18	27.78	27.09	25.98	46.00	-20.02 QP
6	863.06	3.43	28.51	27.37	28.29	32.86	46.00	-13.14 QP



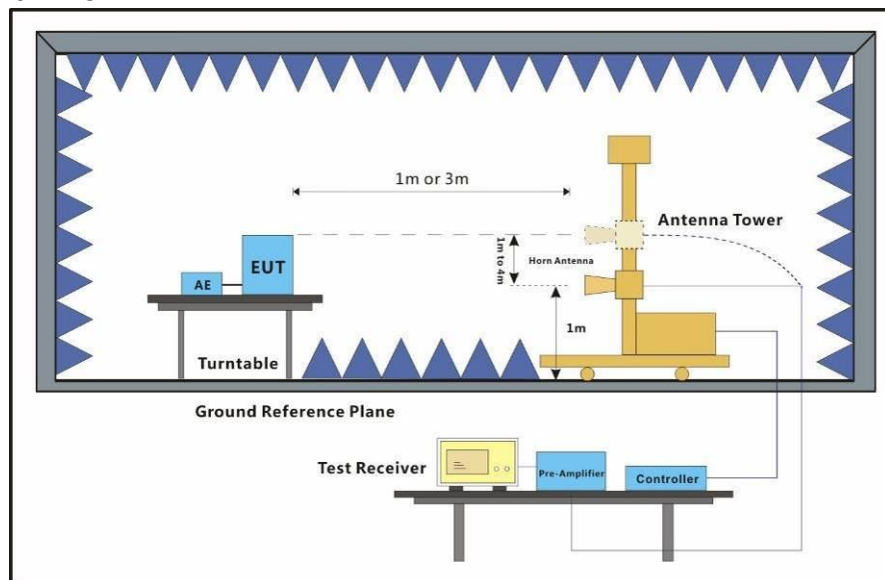
7.2 Radiated Emissions (above 1GHz)

Test Requirement: 47 CFR Part 15, Subpart B
 Test Method: ANSI C63.4:2014
 Frequency Range: Above 1GHz
 Measurement Distance: 3m
 Limit:
 Above 1GHz 74(dBμV/m) peak, 54(dBμV/m) average
 Detector: Peak for pre-scan (1000kHz resolution bandwidth) 1000M to18000MHz

7.2.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.4 °C Humidity: 60.6 % RH Atmospheric Pressure: 1010 mbar
 Test mode 00:Normal Working_Blank

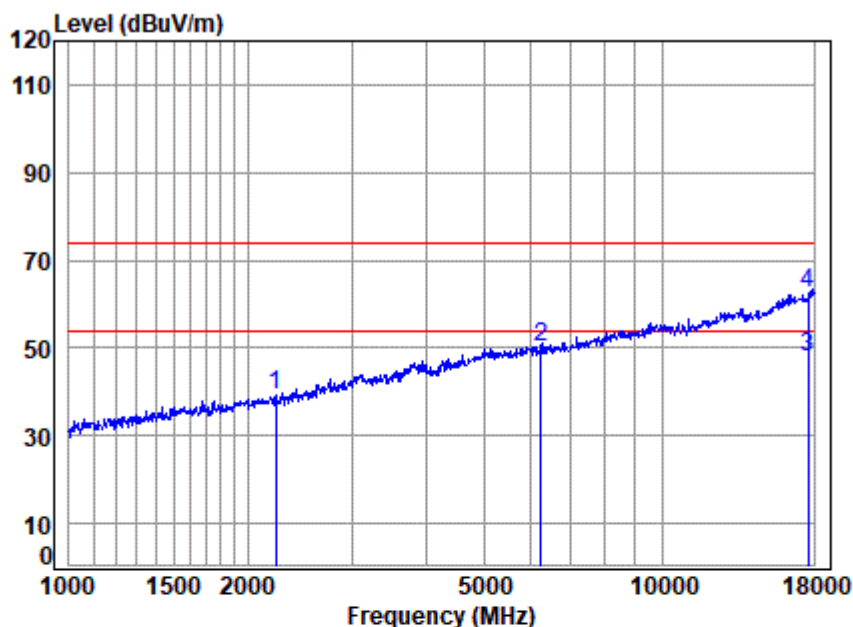
7.2.2 Test Setup Diagram



7.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Mode:00;Horizontal

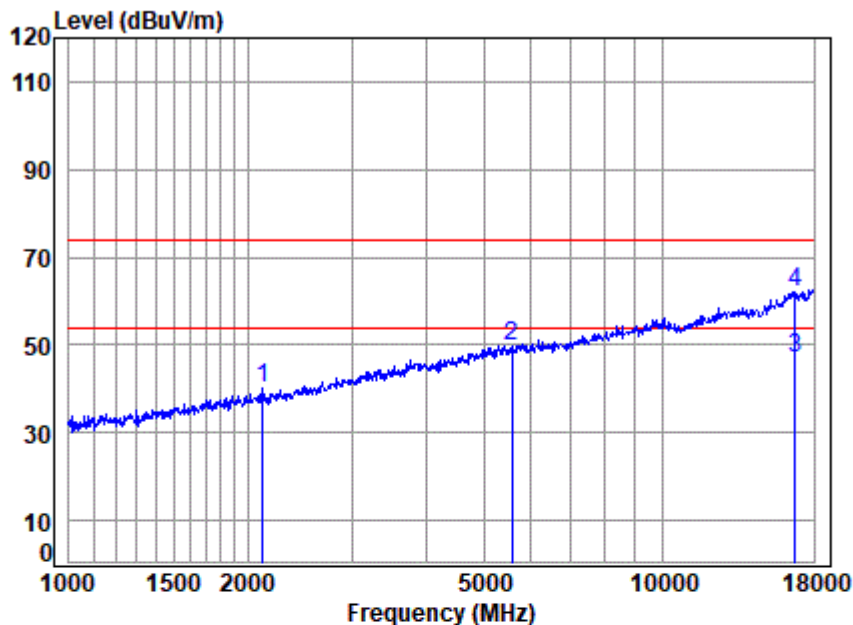


Site : chamber
Condition: 3m HORIZONTAL
Job No : 06018CR
Mode : 00
Note :

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2226.950	4.07	28.23	40.33	47.36	39.33	74.00	-34.67 Peak
2	6249.464	8.27	35.35	42.22	48.85	50.25	74.00	-23.75 Peak
3	17639.470	14.22	43.07	40.19	30.59	47.69	54.00	-6.31 Average
4	17639.470	14.22	43.07	40.19	45.59	62.69	74.00	-11.31 Peak



Mode:00 ;Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 06018CR
Mode : 00
Note :

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2120.171	3.88	28.04	40.27	48.53	40.18	74.00	-33.82	Peak
2	5583.251	8.19	34.69	42.36	49.17	49.69	74.00	-24.31	Peak
3	16745.210	14.50	42.40	40.41	30.64	47.13	54.00	-6.87	Average
4	16745.210	14.50	42.40	40.41	45.64	62.13	74.00	-11.87	Peak



8 Photographs

8.1 Setup photos.

Please refer to setup photos.

8.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

- End of the Report -