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Report On

FCC and Industry Canada Testing of the
SRT Marine
Neon 403-0001 AIS Class B Transceiver

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August 2009



Product Service

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC and Industry Canada Testing of the
SRT Marine
Neon 403-0001 AIS Class B Transceiver

Document 75906461 Report 01 Issue 1

August 2009

PREPARED FOR

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

PREPARED BY

N Bennett
Senior Administrator

APPROVED BY

M Jenkins
Authorised Signatory

DATED

19 August 2009

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 80, Industry Canada RSS-182 and RSS-Gen. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

N Forsyth



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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
SRT Marine
Neon 403-0001 AIS Class B Transceiver



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the SRT Marine Neon 403-0001 AIS Class B Transceiver to the requirements of FCC CFR 47: Part 80, RSS-182 and RSS-Gen.

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
Model Number(s)	NEON
Serial Number(s)	EP1-09
Software Version	Boot loader S/W: Ver 4 Application S/W: Ver 10.11.8.18 FPGA: Ver 5
Hardware Version	Sirius III Board: S/N:14182547, PCB Rev7, Assembly Rev 7.1
Number of Samples Tested	One
Test Specification/Issue/Date	FCC CFR 47: Part 80: 2006 RSS-182: Issue 4: 2003 RSS-Gen: Issue 2: 2007
Incoming Release Date	Application Form 27 May 2009
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	662 20 April 2009
Start of Test	13 May 2009
Finish of Test	14 May 2009
Name of Engineer(s)	N Forsyth
Related Document(s)	ANSI 63.4: 2003



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47: Part 80, RSS-182 and RSS-Gen, is shown below.

Configuration 1 - Normal							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	FCC	IC					
2.1	80.209(a)	4.2 / 6.1	Frequency Stability Under Voltage Variations	Transmit	0	Pass	-
2.2	80.209(a)	4.2 / 6.1	Frequency Stability Under Temperature Variations	Transmit	0	Pass	-
2.3	80.211(f)(1)(2)	6.3.1	Emission Limitations (Emission Mask)	Transmit	0	Pass	-
2.4	80.205(a)	2.10	Occupied Bandwidth	Transmit	0	Pass	ANSI 63.4: 2003
2.5	80.211(c)(f)(3)	4.4 / 6.3.1	Emission Limitations (Conducted Transmitter Spurious)	Transmit	0	Pass	-
2.6	-	4.5(b) / 6.7	Receiver Spurious Emissions (Conducted)	Receive	0	Pass	-
	80.211 (f)(3)	4.4, 6.3	Emission Limitations (Radiated Transmitter Spurious)	Transmit	-	Note 1	-
2.7	80.213(d)	-	Modulation Characteristics	Transmit	0	Pass	-
2.8	80.215	4.3 / 6.2	Transmitter Power	Transmit	0	Pass	-
2.9	80.217(b)	-	Suppression of Interference Aboard Ships	Receive	0	Pass	-

Note 1: Client requested for only conducted radio testing to be done. Radiated emissions testing although required, was not performed by TUV.



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1.3 APPLICATION FORM

APPLICANT'S DETAILS	
COMPANY NAME :	SRT Marine Technology
ADDRESS :	Wireless House First Avenue Westfield Ind. Estate Midsomer Norton Bath BA3 4BS
NAME FOR CONTACT PURPOSES : .	Neil Peniket
TELEPHONE NO: +44 1761 409500	FAX NO: +44 1761 410093
	E-MAIL: neil.peniket@srt-marine.com

EQUIPMENT INFORMATION	
<u>Equipment designator:</u>	
Model name/number	Neon Identification number 403-0001
<u>Supply Voltage:</u>	
[No] AC mains	State AC voltage V and AC frequency Hz
[Yes] DC (external)	State DC voltage 12V and DC current 300 mA
[No] DC (internal)	State DC voltage V and Battery type
<u>Frequency characteristics:</u>	
Frequency range	156.025 MHz to 162.025 MHz Channel spacing 25kHz.... (if channelized)
Designated test frequencies:	
Bottom: 156.025 MHz Middle: 159.025 MHz	Top: 162.025 MHz



Product Service

EQUIPMENT INFORMATIONPower characteristics:

Maximum transmitter power 2 W

Minimum transmitter power W
(if variable)

[No] Continuous transmission

[Yes] Intermittent transmission

State duty cycle: 0.08% max

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

Antenna characteristics:

[Yes] Antenna connector

State impedance ...50 ohm

[No] Temporary antenna connector

State impedance ohm

[No] Integral antenna

State gain dBi

Modulation characteristics:

[No] Amplitude

[Yes] Other

[No] Frequency

Details: GMSK.....

[No] Phase

Can the transmitter operate un-modulated?

Y/N

ITU Class of emission:15K4G1DXT

Extreme conditions:

Maximum temperature +55 °C

Minimum temperature -15°C

Maximum supply voltage 9.6V V

Minimum supply voltage 15.6 V

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature : Held on file at TÜV Product Service Ltd

Name : Neil Peniket

Position held : Managing Director

Date : 27.05.09

TÜV Product Service Ltd formally certifies that the manufacturer's declaration as typed out in this report, is a true and accurate record of the original received from the applicant.



1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a SRT Marine Neon 403-0001 AIS Class B Transceiver as shown in the photograph below. A full technical description can be found in the Manufacturers documentation.



Equipment Under Test



Product Service

1.4.2 Test Configuration

Configuration 1: Normal

The EUT was connected to a drive laptop via the EUT's RS232 cable and all other ports were terminated as appropriate.

1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 – Transmit

Mode 2 – Receive

Information on the specific test modes utilised are detailed in the test procedure for each individual test.



Product Service

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, test laboratories or an open test area as appropriate.

The EUT was powered from a 12V 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 standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.



Product Service

SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
SRT Marine
Neon 403-0001 AIS Class B Transceiver



Product Service

2.1 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.1.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.209(a)
RSS-182 Clause 4.2, and 6.1

2.1.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.1.3 Date of Test and Modification State

13 May 2009 - 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 Test Procedure

The EUT was set to transmit on maximum power with no modulation. A Spectrum Analyser was used to measure the frequency error. The results were recorded at each voltage interval on the top, middle and bottom channels

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.1.6 Environmental Conditions

	13 May 2009
Ambient Temperature	22.7°C
Relative Humidity	45.0%



2.1.7 Test Results

Configuration 1 - Mode 1

Bottom Channel (156.025 MHz)

DC Voltage (V)	Test Frequency (MHz)	Error (kHz)	Limit (kHz)	ppm
9.6	156.025	-0.0481	±1.56025	±10
12.0	156.025	-0.449	±1.56025	±10
15.6	156.025	-0.0481	±1.56025	±10

Middle Channel (159.025 MHz)

DC Voltage (V)	Test Frequency (MHz)	Error (kHz)	Limit (kHz)	ppm
9.6	159.025	-0.0497	± 1.59025	±10
12.0	159.025	-0.0497	± 1.59025	±10
15.6	159.025	-0.0481	± 1.59025	±10

Top Channel (162.025 MHz)

DC Voltage (V)	Test Frequency (MHz)	Error (kHz)	Limit (kHz)	ppm
9.6	162.025	-0.0519	± 1.62025	±10
12.0	162.025	-0.0526	± 1.62025	±10
15.6	162.025	-0.0516	± 1.62025	±10

Limit:
Industry Canada Clause 6.1
FCC Clause 80.209(a)

±1.56025 kHz / ± 1.57425 kHz or 10ppm



Product Service

2.2 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.2.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.209(a)
RSS-182, Clause 4.2, 6.1

2.2.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.2.3 Date of Test and Modification State

14 May 2009 - 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 Test Procedure

The EUT was set to transmit on maximum power with no modulation. A Spectrum Analyser was used to measure the frequency error. The results were recorded at each temperature and voltage interval on the top, middle and bottom channels.

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.2.6 Environmental Conditions

	14 March 2009
Ambient Temperature	24.6°C
Relative Humidity	43.9%



2.2.7 Test Results

Configuration 1 – Mode 1

Transmitting at 2W

Bottom Channel (156.025 MHz)

Temperature Interval °C	DC Voltage (V)	Deviation (kHz)	Error (ppm)
-25	9.6	-0.0321	-0.206
	12.0	-0.0642	-0.411
	15.6	-0.0346	-0.222
-20	9.6	+0.0010	+0.026
	12.0	+0.0064	+0.041
	15.6	+0.0064	+0.041
-10	9.6	+0.0033	+0.023
	12.0	+0.0033	+0.023
	15.6	+0.0033	+0.023
0	9.6	+0.0417	+0.267
	12.0	+0.0409	+0.262
	15.6	+0.0409	+0.262
+10	9.6	+0.0089	+0.057
	12.0	+0.0089	+0.057
	15.6	+0.0105	+0.067
+20	9.6	-0.0289	-0.185
	12.0	-0.0289	-0.185
	15.6	-0.0289	-0.185
+30	9.6	-0.0441	-0.283
	12.0	-0.0461	-0.295
	15.6	-0.0465	-0.298
+40	9.6	-0.0990	-0.635
	12.0	-0.0990	-0.635
	15.6	-0.0990	-0.635
+50	9.6	-0.0994	-0.637
	12.0	-0.0994	-0.637
	15.6	-0.0994	-0.637
+55	9.6	-0.0786	-0.504
	12.0	-0.0794	-0.509
	15.6	-0.0818	-0.524



Middle Channel (159.025 MHz)

Temperature Interval °C	DC Voltage (V)	Deviation (kHz)	Error (ppm)
-25	9.6	-0.0129	-0.081
	12.0	-0.0241	-0.152
	15.6	-0.0321	-0.202
-20	9.6	+0.0112	+0.070
	12.0	+0.0088	+0.055
	15.6	+0.0088	+0.055
-10	9.6	+0.0033	+0.020
	12.0	+0.0034	+0.021
	15.6	+0.0034	+0.021
0	9.6	+0.0416	+0.262
	12.0	+0.0416	+0.262
	15.6	+0.0416	+0.262
+10	9.6	+0.0088	+0.055
	12.0	+0.0088	+0.055
	15.6	+0.0088	+0.055
+20	9.6	-0.0313	-0.197
	12.0	-0.0313	-0.197
	15.6	-0.0313	-0.197
+30	9.6	-0.0489	-0.307
	12.0	-0.0489	-0.307
	15.6	-0.0489	-0.307
+40	9.6	-0.0914	-0.574
	12.0	-0.0914	-0.574
	15.6	-0.0914	-0.574
+50	9.6	-0.1018	-0.640
	12.0	-0.1018	-0.640
	15.6	-0.1018	-0.640
+55	9.6	-0.0818	-0.514
	12.0	-0.0818	-0.514
	15.6	-0.0890	-0.560



Top Channel (162.025 MHz)

Temperature Interval °C	DC Voltage (V)	Deviation (kHz)	Error (ppm)
-25	9.6	+0.0064	+0.040
	12.0	+0.0136	+0.084
	15.6	+0.0192	+0.119
-20	9.6	+0.0112	+0.070
	12.0	+0.0136	+0.084
	15.6	+0.0136	+0.084
-10	9.6	+0.0033	+0.020
	12.0	+0.0033	+0.020
	15.6	+0.0034	+0.021
0	9.6	+0.0416	+0.257
	12.0	+0.0416	+0.257
	15.6	+0.0416	+0.257
+10	9.6	+0.0088	+0.054
	12.0	+0.0088	+0.054
	15.6	+0.0061	+0.038
+20	9.6	-0.0315	-0.194
	12.0	-0.0315	-0.194
	15.6	-0.0315	-0.194
+30	9.6	+0.0513	-0.317
	12.0	+0.0513	-0.317
	15.6	+0.0513	-0.317
+40	9.6	-0.0938	-0.579
	12.0	-0.0938	-0.579
	15.6	-0.0938	-0.579
+50	9.6	-0.1042	-0.643
	12.0	-0.1042	-0.643
	15.6	-0.1042	-0.643
+55	9.6	-0.0842	-0.520
	12.0	-0.0842	-0.520
	15.6	-0.0914	-0.520

Limit:
 Industry Canada Clause 4.2 and 6.1
 FCC Clause 80.209(a)

± 1.56025kHz / ± 1.57425kHz or 10ppm



Product Service

2.3 EMISSION LIMITATIONS (EMISSION MASK)

2.3.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.211(f)(1)(2)
RSS-182, Clause 6.3.1

2.3.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.3.3 Date of Test and Modification State

13 May 2009 - Modification State 0

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 Test Procedure

The EUT was connected to a Spectrum Analyser via a 30dB attenuator. The path loss between the Spectrum Analyser and the EUT was established within the measurement range and inserted into the Spectrum Analyser as a reference level offset. The emission mask, as defined in the test clauses above, was set and displayed on the Spectrum Analyser. The reference point of the emission mask, 0dB was achieved with the carrier unmodulated. The EUT was then modulated in accordance with 2.1049(c)(1), (Occupied Bandwidth). The measurement detector was set to max hold and the results established.

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.3.6 Environmental Conditions

	13 May 2009
Ambient Temperature	22.8°C
Relative Humidity	42.1%

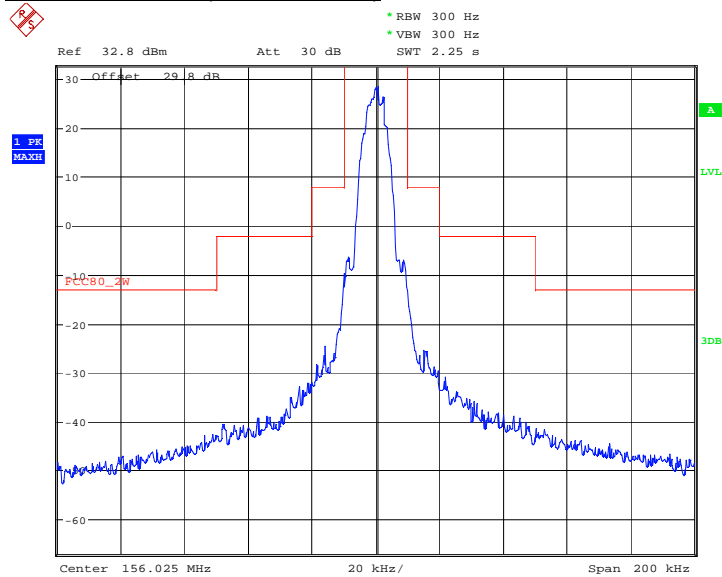


2.3.7 Test Results

Configuration 1 – Mode 1

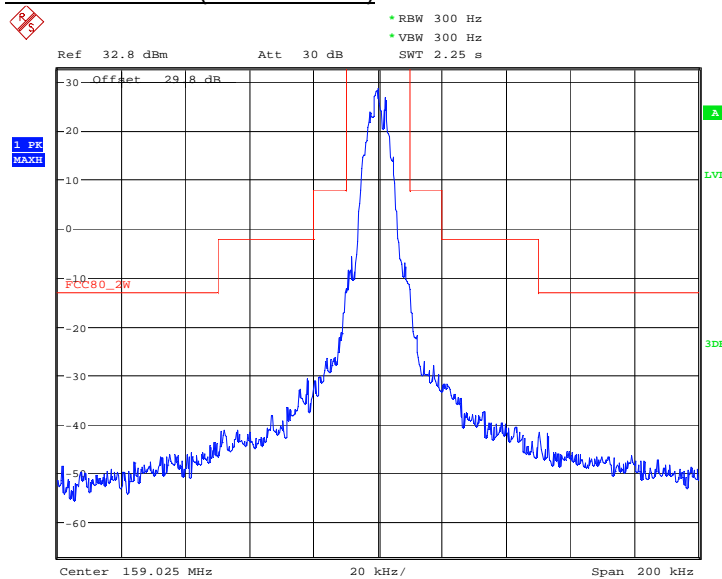
Transmitting at 25W

Bottom Channel (156.025 MHz)



Date: 13.MAY.2009 14:26:16

Middle Channel (159.025 MHz)

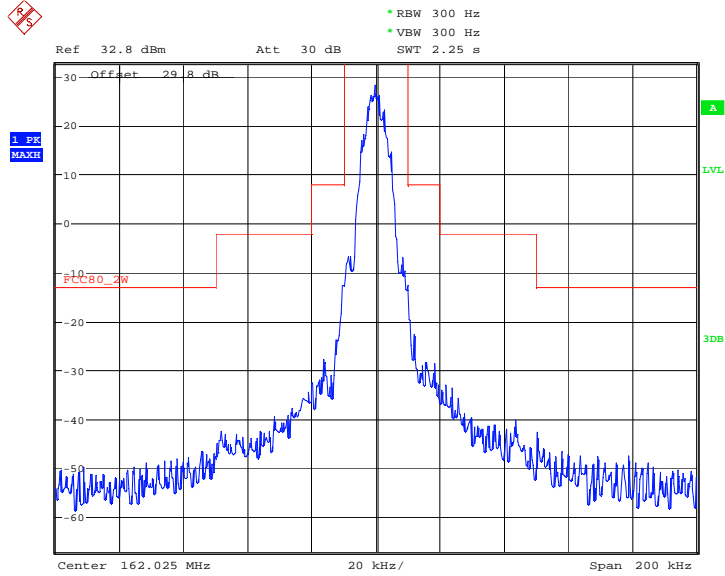


Date: 13.MAY.2009 14:28:21



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Top Channel (162.025 MHz)



Date: 13.MAY.2009 14:29:42



Product Service

2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.205(a)
RSS-182, Clause 2.10

2.4.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.4.3 Date of Test and Modification State

13 May 2009 - Modification State 0

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 Test Procedure

Test performed in accordance with ANSI C63.4.

The EUT was connected via a 30dB attenuator to a Spectrum Analyser. The AIS transponder (EUT) output is a fixed digital signal and therefore cannot be adjusted in level or frequency. Therefore the EUT was transmitting a modulated signal. The Occupied Bandwidth was measured and plots taken.

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.4.6 Environmental Conditions

	13 May 2009
Ambient Temperature	23.1°C
Relative Humidity	42.8%



2.4.7 Test Results

Configuration 1 - Mode 1

Channel Frequency	Power Level (W)	Result (kHz)	Authorised Bandwidth (kHz)
156.025MHz	2	9.519230	< 20
159.025MHz	2	9.487179	< 20
162.025MHz	2	9.455128	< 20

Limit:

Industry Canada Clause 3.4(d)(e)

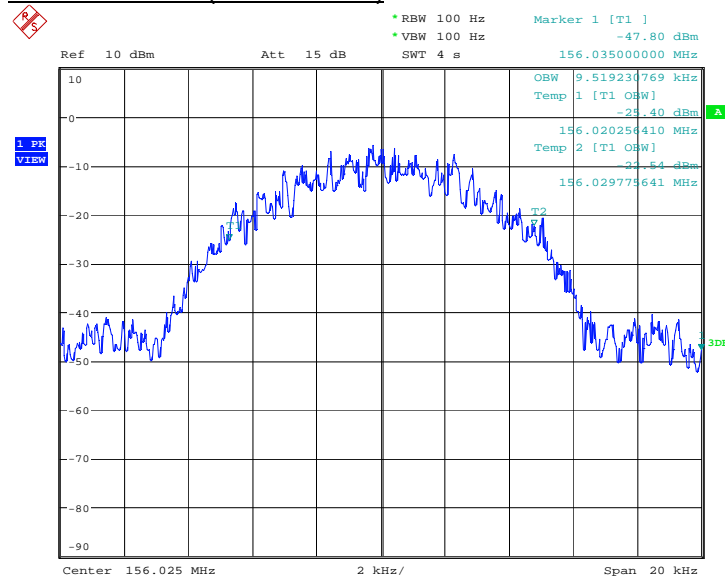
FCC Clause 80.205(d)

(d) The nominal authorised channel bandwidth for voice is 20kHz
(e) For data modulation, an authorised bandwidth of 16 kHz is permitted.

The test result plots are presented below.

Transmitting at 2W

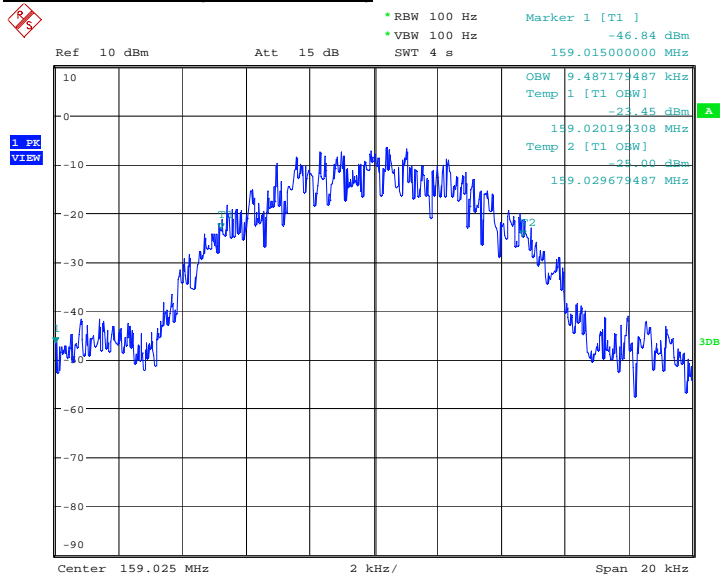
Bottom Channel (156.025 MHz)



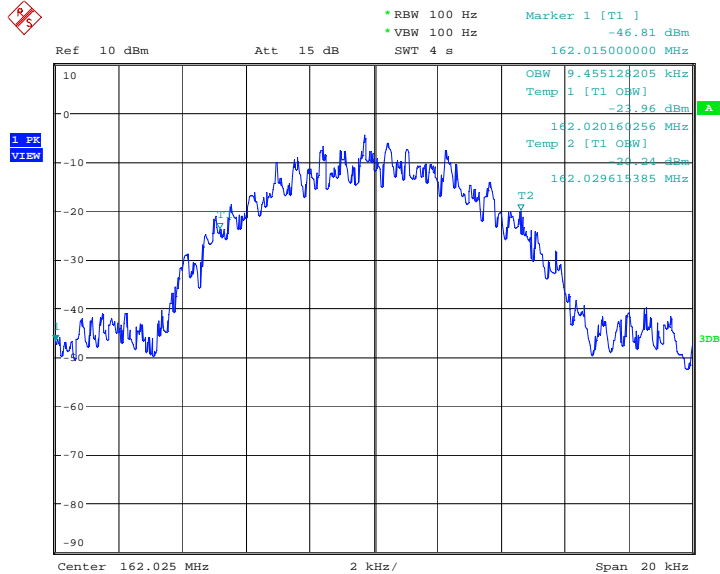
Date: 13.MAY.2009 15:26:17



Product Service

Middle Channel (159.025 MHz)

Date: 13.MAY.2009 15:28:01

Top Channel (162.025 MHz)

Date: 13.MAY.2009 15:24:32



2.5 EMISSION LIMITATIONS (CONDUCTED TRANSMITTER SPURIOUS)

2.5.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.211(c)(f)(3)
RSS-182, Clause 4.4 and 6.3.1

2.5.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.5.3 Date of Test and Modification State

13 May 2009 - 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 Test Procedure

The EUT was connected to a Spectrum Analyser via a 30dB attenuator for one test range, and a 10dB attenuator and High Pass Filter for the other. The path loss between the Spectrum Analyser and the EUT was established for both set-ups over the measurement ranges and inserted into the Spectrum Analyser as a reference level offset. Using a RBW of 30kHz and a VBW of 30kHz the emissions were measured over the frequency ranges 9kHz to 300MHz and 300MHz to 2GHz as defined in 2.1057(a)(1). Having entered the reference level offset, the limit line was displayed showing the -13dB, 43 + 10logP, limit.

The measurements were performed on the bottom, middle and top channels at a declared power level of 2W.

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.5.6 Environmental Conditions

	13 May 2009
Ambient Temperature	22.7°C
Relative Humidity	42.9%



Product Service

2.5.7 Test Results

Limit:
Industry Canada Clause 6.3.1
FCC Clause 80.211(c)(f)(3)

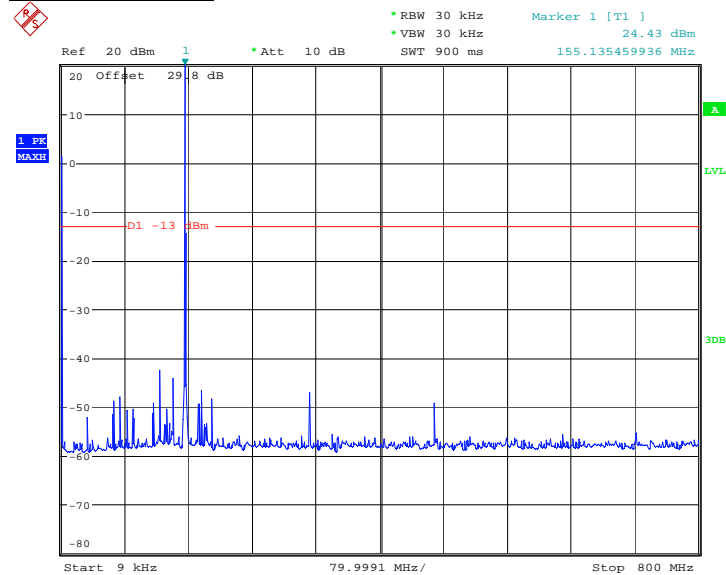
>250% of authorised bandwidth	43+10 Log P
-------------------------------	-------------

The test result plots are presented below.

Transmitting at 2W

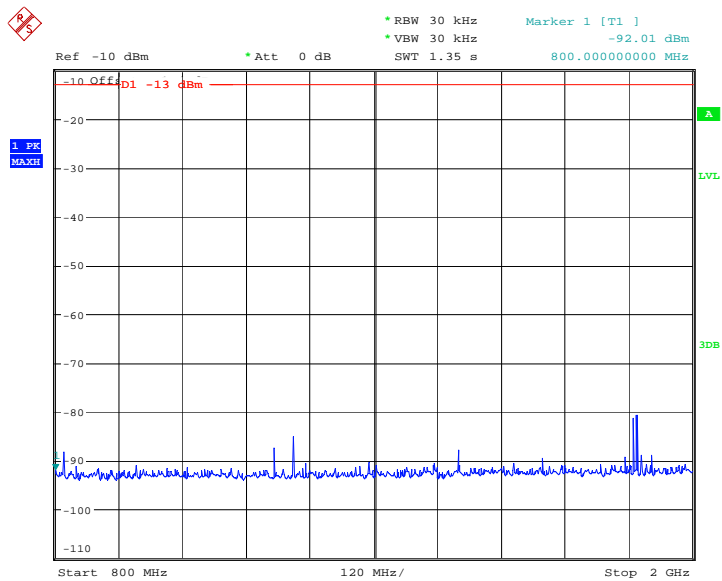
Bottom Channel (156.025 MHz)

9 kHz to 800MHz



Date: 13.MAY.2009 14:40:31

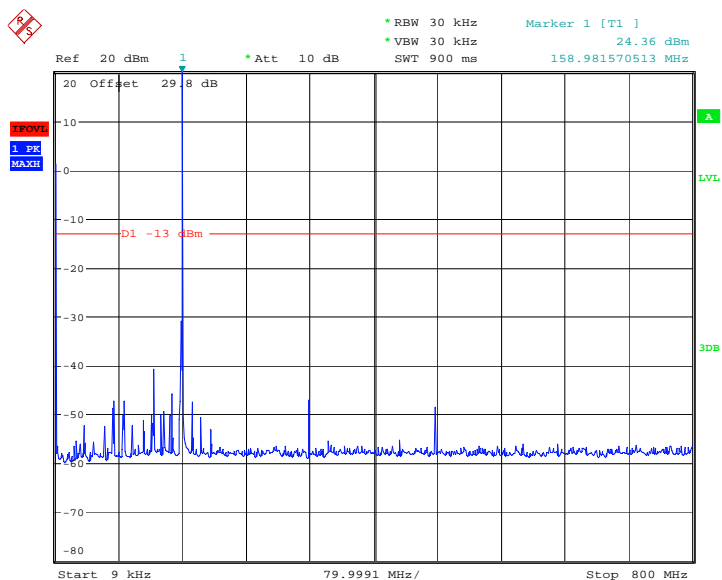
800 MHz to 2GHz



Date: 13.MAY.2009 14:52:16

Middle Channel (159.025 MHz)

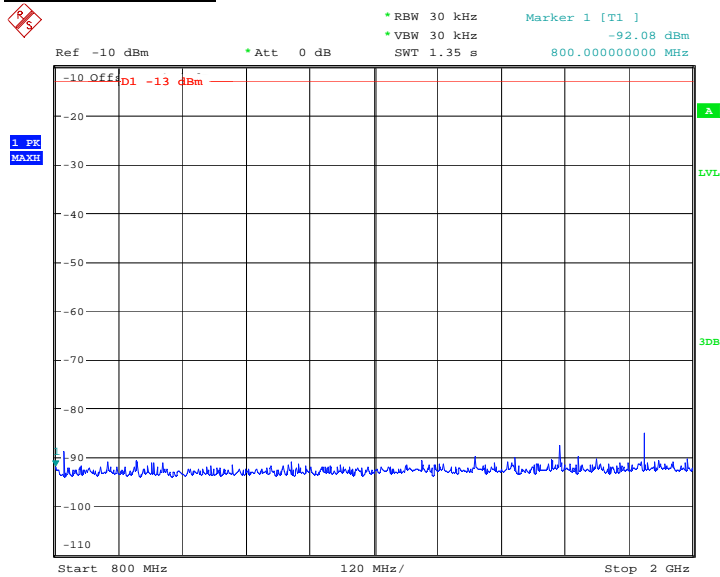
9 kHz to 800 MHz



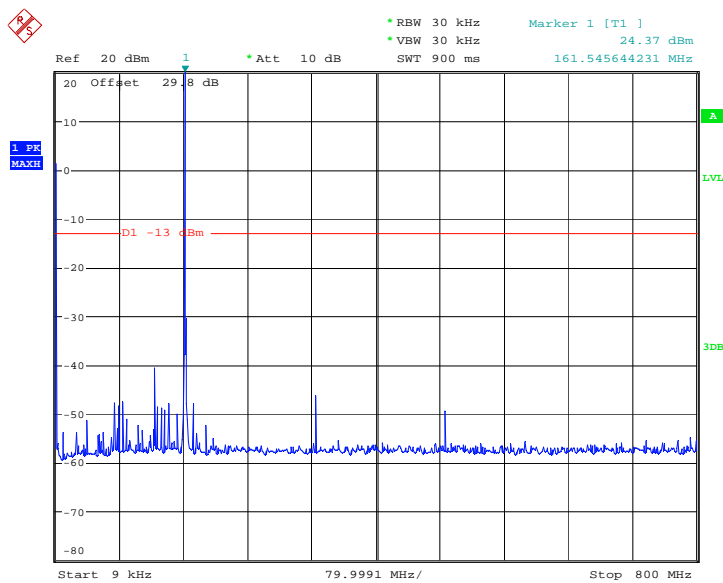
Date: 13.MAY.2009 14:39:34



Product Service

800 MHz to 2GHz

Date: 13.MAY.2009 14:53:13

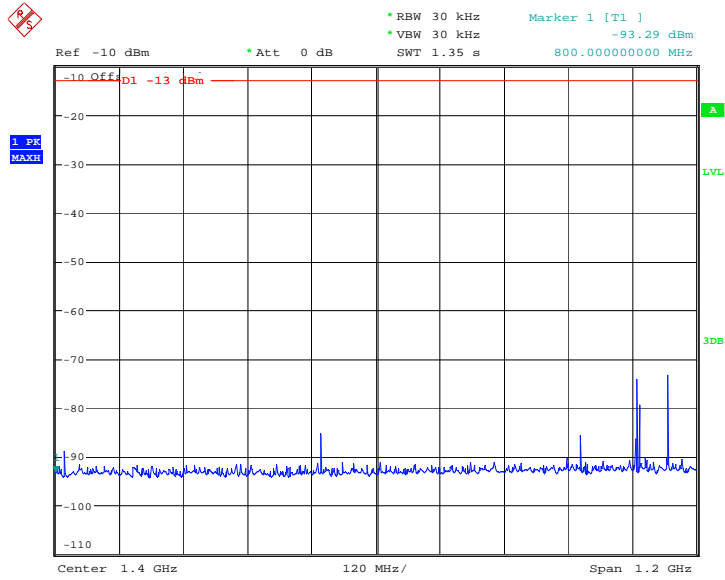
Top Channel (162.025 MHz)9 kHz to 800 MHz

Date: 13.MAY.2009 14:38:41



Product Service

800 MHz to 2 GHz



Date: 13.MAY.2009 14:53:59



Product Service

2.6 RECEIVER SPURIOUS EMISSIONS (CONDUCTED)**2.6.1 Specification Reference**

RSS-182, Clause 4.5(b) / 6.7

2.6.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.6.3 Date of Test and Modification State

13 May 2009 - Modification State 0

2.6.4 Test Equipment Used

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

2.6.5 Test Procedure

The EUT was connected to a Spectrum Analyser via a cable. The path loss between the Spectrum Analyser and the EUT was established within the measurement range and inserted into the Spectrum Analyser as a reference offset level. The limit line as defined in the test clauses above was set and displayed on the Spectrum Analyser. The measurement detector was set to Max Hold.

The measurements were performed on the middle channel.

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.6.6 Environmental Conditions

	13 May 2009
Ambient Temperature	23°C
Relative Humidity	43%



Product Service

2.6.7 Test Results

Limit:
Industry Canada Clause 4.5(b) and 6.7

>250% of authorised bandwidth

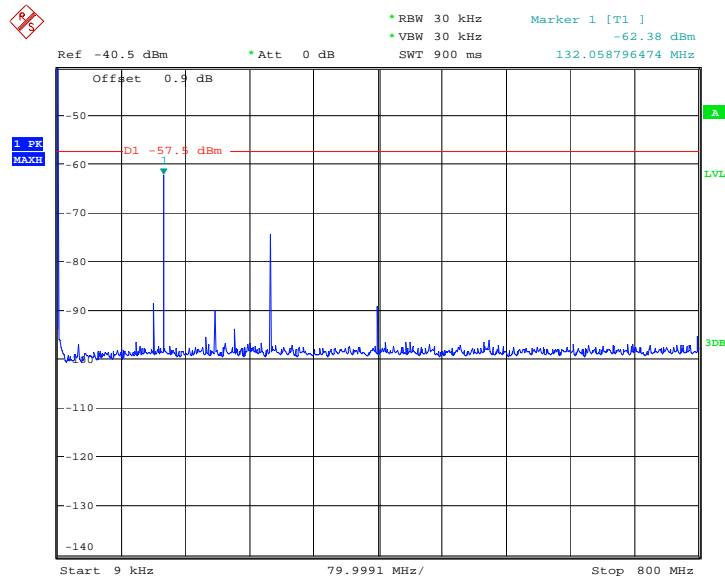
43+10 Log P

The test result plots are presented below.

Transmitting at 2W

Middle Channel (159.025 MHz)

9 kHz to 800 MHz

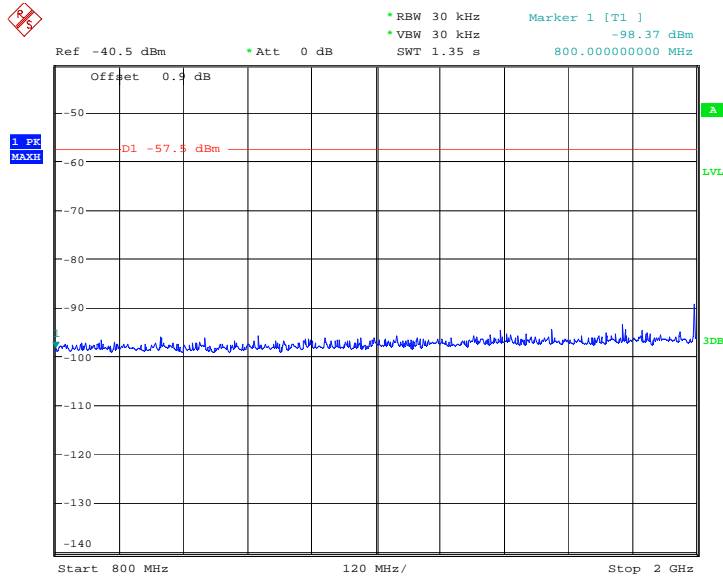


Date: 13.MAY.2009 15:03:10



Product Service

800 MHz to 2 GHz



Date: 13.MAY.2009 15:04:39



Product Service

2.7 MODULATION CHARACTERISTICS

2.7.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.213(d)
FCC CFR 47 Part 2, Clause 2.1055(a)

2.7.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.7.3 Date of Test and Modification State

14 May 2009 - Modification State 0

2.7.4 Test Equipment Used

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

2.7.5 Test Procedure

The EUT was connected to a Spectrum Analyser via a 30dB attenuator. Using the FM demodulation function various test signals were analysed and the peak deviation recorded.

Testing was performed on the bottom channel.

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.7.6 Environmental Conditions

	14 May 2009
Ambient Temperature	24.6°C
Relative Humidity	43.9%



Product Service

2.7.7 Test Results

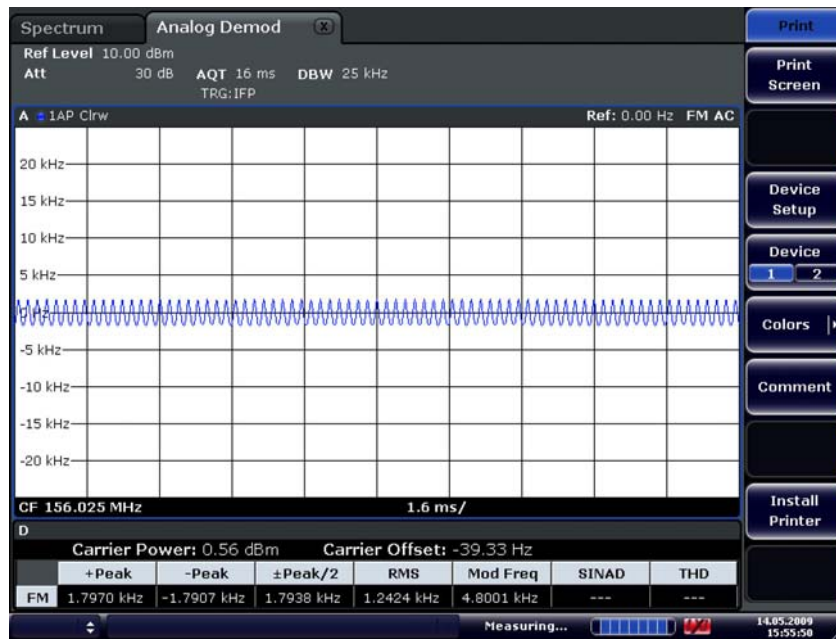
Configuration 1 – Mode 1

Test Signal	Peak Frequency (kHz)
	Bottom Channel (156.025 MHz)
10101010	1.7940
11110000	2.4691
Pseudo Random	2.8265

Limit

< 5kHz

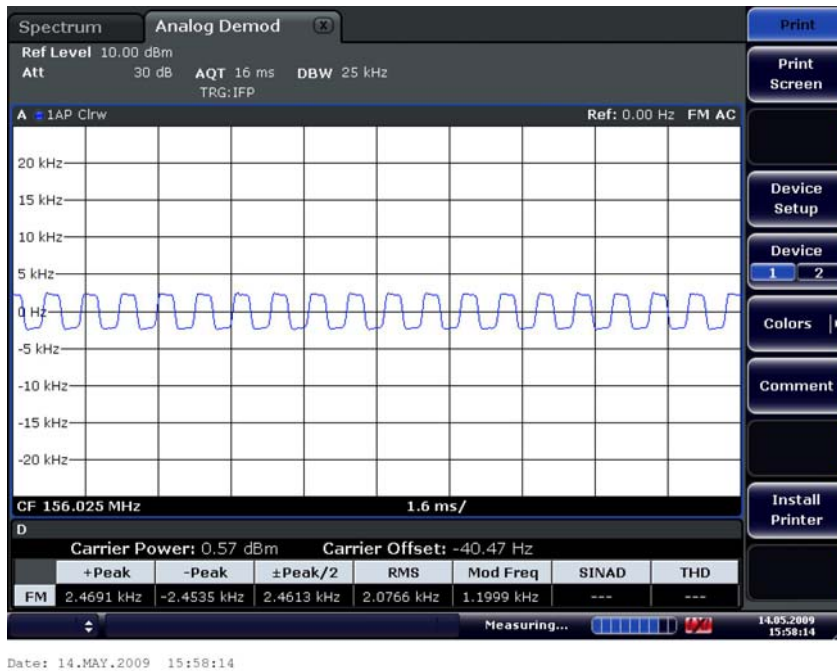
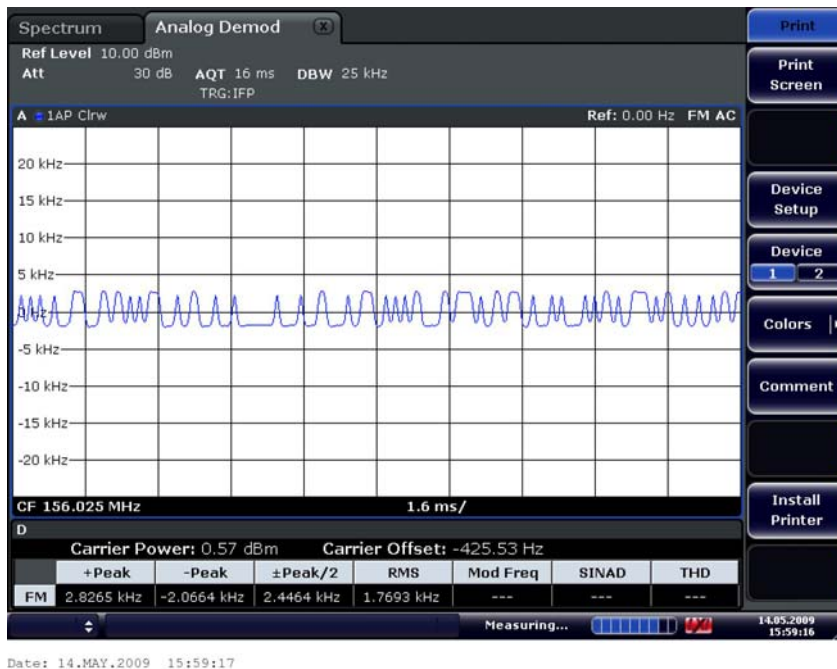
10101010



Date: 14.MAY.2009 15:55:50



Product Service

11110000Pseudo Random



Product Service

2.8 TRANSMITTER POWER

2.8.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.215
RSS-182, Clause 4.3 and 6.2

2.8.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.8.3 Date of Test and Modification State

13 May 2009 - Modification State 0

2.8.4 Test Equipment Used

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

2.8.5 Test Procedure

The EUT was connected via 10dB and 20dB attenuators to a power meter and sensor. The path loss between the EUT and the power sensor was measured and recorded. The power meter reading was adjusted by the path loss value.

The emissions designator for the EUT is declared as G3E. The measurement of G3E designations is defined as being Carrier Power. The Carrier Power was measured in a modulated state for FCC and Unmodulated for IC. DSC power was measured for B, Y and dotting modulations.

The carrier power was measured on the top, middle and bottom channels of the operating frequency band and channel 70 at maximum and minimum power levels.

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.8.6 Environmental Conditions

	13 May 2009
Ambient Temperature	23.1°C
Relative Humidity	42.7%



Product Service

2.8.7 Test ResultsConfiguration 1 – Mode 1Maximum Power - 2W

Frequency (MHz)	Output Power (uncorrected) (dBm)	Path Loss (dB)	Result (dBm) Unmodulated	Result (W)
156.025	+3.0	29.8	32.8	1.91
159.025	+3.4	29.8	33.2	2.09
162.025	+3.0	29.8	32.8	1.91

Limit:
FCC Clause 80.215(e.1)

$\leq 25\text{ W}$

Industry Canada RSS182 Clause 3.1.2

$\leq 25\text{W}$



Product Service

2.9 SUPPRESSION OF INTERFERENCE ABOARD SHIPS

2.9.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.217 (b)

2.9.2 Equipment Under Test

Neon 403-0001 AIS Class B Transceiver, S/N: EP1-09

2.9.3 Date of Test and Modification State

13 May 2009 - Modification State 0

2.9.4 Test Equipment Used

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

2.9.5 Test Procedure

The EUT was connected to a spectrum Analyser via an RF cable. No external attenuation was inserted as there is no carrier present in this mode of operation. The EUT was set to its receive mode. The emissions were measured over the frequency range .9kHz to 2GHz

The manufacturer declares a maximum gain of the antenna to be 3dBi. Thus in accordance with 80.217(b), the 3dBi gain has been accounted for in the limit line and the deviation of the limits are shown in the table below.

Frequency of Interfering Emissions (MHz)	Power to Artificial Antenna (μ W)	Power to Artificial Antenna (dBm)	Power to Artificial Antenna including Maximum Declared Antenna Gain (dB)
<30	400	-4	-7
30 – 100	4000	6	3
100 – 300	40000	16	13
300 - 2000	400000	26	23

The test performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.9.6 Environmental Conditions

	13 May 2009
Ambient Temperature	23.2°C
Relative Humidity	42.3%

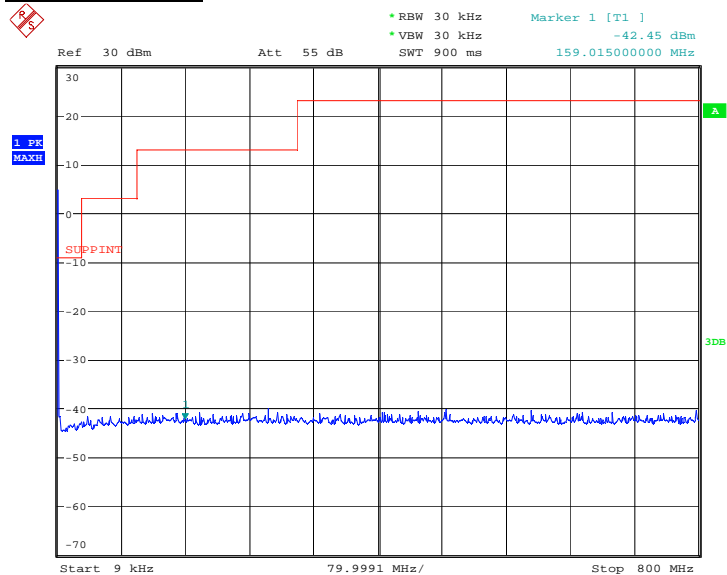


Product Service

2.9.7 Test Results

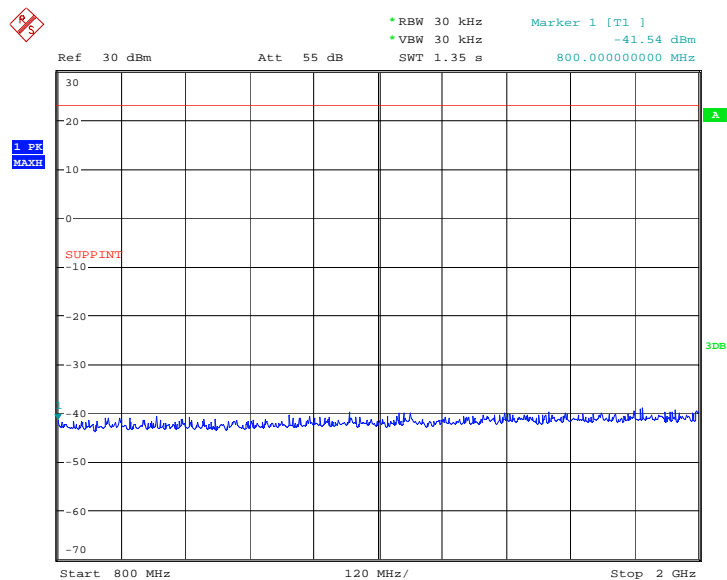
Configuration 1 – Mode 1

9kHz to 800MHz



Date: 13.MAY.2009 15:39:23

800MHz to 2GHz



Date: 13.MAY.2009 15:40:52



Product Service

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, 2.3, 2.4 and 2.8- Frequency Stability Under Voltage Variations, Emission Limitations (Emission Mask), Occupied Bandwidth and Transmitter Power					
Multimeter	Fluke	77 Series II	3067	12	15-May-2009
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.2 - Frequency Stability Under Temperature Variations					
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Multimeter	Fluke	77 Series II	3067	12	15-May-2009
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Thermocouple Thermometer	Fluke	51	3174	12	26-Jun-2009
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.5 - Emission Limitations (Conducted Transmitter Spurious)					
Filter (Hi Pass)	Mini-Circuits	NHP-800	2842	12	29-Oct-2009
Multimeter	Fluke	77 Series II	3067	12	15-May-2009
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.6 and 2.8 - Receiver Spurious Emissions (Conducted) and Suppression of Interference Aboard Ships					
Multimeter	Fluke	77 Series II	3067	12	15-May-2009
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.7- Modulation Characteristics					
Multimeter	Fluke	77 Series II	3067	12	15-May-2009
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
Signal Generator	Hewlett Packard	ESG4000A	38	12	11-May-2010
Signal Analyser	Rohde & Schwarz	FSV 7	Hired S/N: 101613	-	19-Jun-2009

TU – Traceability Unscheduled

OP MON – Output Monitored with Calibrated Equipment



3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	26MHz to 2.5GHz Test Amplitude	1.4dB†
Conducted Susceptibility	100kHz to 250MHz Amplitude	1.8dB†
DC Input Ripple Immunity	Current Voltage	0.45% 0.91%
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°

Worst case error for both Time and Frequency measurement 12 parts in 10⁶.

* In accordance with CISPR 16-4

† In accordance with UKAS Lab 34



Product Service

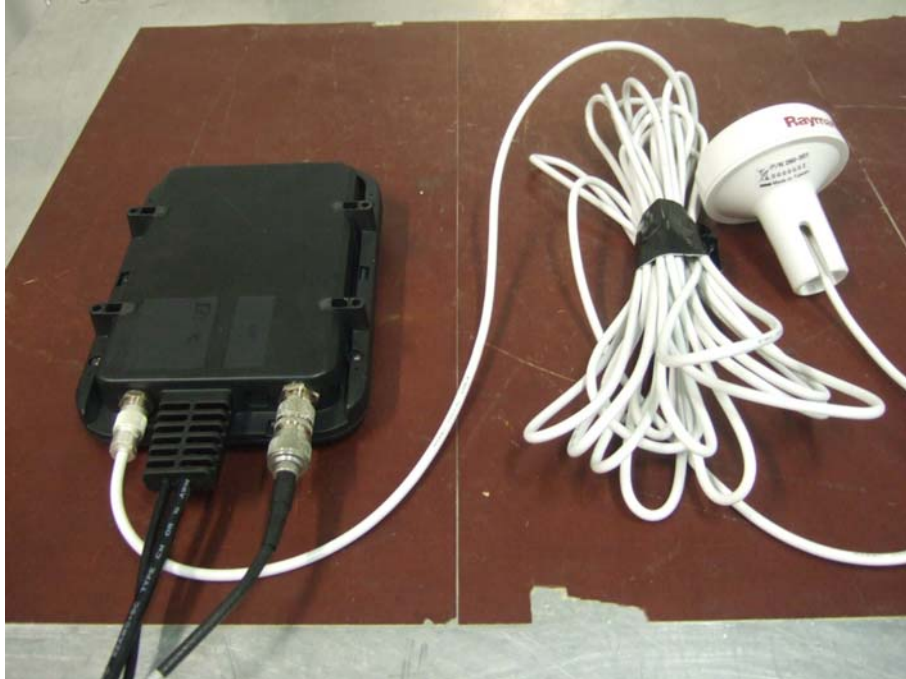
SECTION 4

PHOTOGRAPHS



Product Service

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Front View



Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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