

Spurious Emissions & Emission Mark Report

for the

**SRT Marine Technology Ltd
Neon 403-0001 AIS
Class B Transceiver**





HURSLEY
EMC
SERVICES

EMC TEST REPORT

No. 09R279 CFR

Issue#1: 20th July 2009

EU Notified Body
FCC & VCCI Registered
BSMI Lab ID: SL2-IN-E-3008

Spurious Emissions & Emission Mark Report

for the

SRT Marine Technology Ltd
Neon 403-0001 AIS
Class B Transceiver

Project Engineer: R. P. St John James

Approval Signatory

Approved signatories: S. M. Connolly J. A. Jones I. P. Kenney I. Kyle

The above named are authorised Hursley EMC Services engineers.

Hursley EMC Services Ltd.
Unit 16, Brickfield Lane
Chandlers Ford
Hampshire. UK. SO53 4DP

Tel. +44 (0) 23 8027 1111
Fax. +44 (0) 23 8027 1144
e mail. sales@hursley-emc.co.uk
www.hursley-emc.co.uk

Contents

1.0	DECLARATION	3
1.1	STATEMENT OF COMPLIANCE	3
1.2	EUT MANUFACTURER	3
2.0	EUT DESCRIPTION	4
2.1	IDENTITY	4
2.2	PRODUCT OPERATION	4
2.3	SUPPORT EQUIPMENT	4
2.4	EXERCISER PROGRAM	4
2.5	TEST CONFIGURATION (RADIATED EMISSIONS)	5
3.0	MEASUREMENT PROCEDURE AND INSTRUMENTATION	6
3.1	EMI SITE ADDRESS & TEST DATE	6
3.2	GENERAL OPERATING CONDITIONS	6
3.3	RADIATED EMISSIONS	7
3.4	CONDUCTED EMISSIONS	7
3.5	ENVIRONMENTAL AMBIENT	8
3.6	EMC TEST EQUIPMENT	8
4.0	TEST DATA	9
4.1	RADIATED EMISSIONS	9
4.2	OCCUPIED BANDWIDTH / EMISSION MARK	10
5.0	TEST PLOTS	11
5.1	EMISSION PLOT, 30 TO 1000 MHz	11
5.2	EMISSIONS PLOTS, 1 TO 7.5 GHz	12
5.3	BANDWIDTH PLOT (161.975 MHz)	13
5.4	BANDWIDTH PLOT (162.025 MHz)	14
5.5	BANDWIDTH PLOT (156.025 MHz)	15
6.0	PHOTO LOG	16
7.0	FCC LETTER	17
8.0	INDUSTRY CANADA LETTER	18

1.0 DECLARATION

1.1 Statement of Compliance

The Equipment Under Test (EUT), as described and reported within this document, complies with the Part 15B of the FCC CFR 47 regulations, RSS-GEN Section 6 and RSS 182 Section 4.5.

The occupied bandwidth or emissions mask of the VHF AIS transmitter complies with the part 80.211 and part 2.1051 of the FCC CFR 47 regulations and the Industry Canada RSS 182 section 6.3.1 requirements.

Note 1: The EUT is a DC powered device and therefore only radiated emission measurements were performed in the frequency range 30.0 MHz to 7.5 GHz.

Note 2: The receiver used with the system complies with FCC Part 15B limits for Digital Equipment (unintentional transmitters). The highest operating frequency is a GPS receiver within the product with a 1.5GHz local oscillator.

1.2 EUT Manufacturer

Manufacturer name: SRT Marine Technology Ltd
Wireless House
Westfield Industrial Estate
Midsomer Norton
Bath
BA3 4BS
United Kingdom

Company representative: Mr Neil Peniket
Tel: +44 (0) 1793 852829

2.0 EUT DESCRIPTION

2.1 Identity

EUT:	Neon 403-0001	FP1-10
Sample build:	Prototype	

2.2 Product Operation

The EUT is an AIS Transceiver for maritime use. The AIS Transceiver transmits and receives position, bearing and other key data from surrounding shipping fitted with a similar AIS Transceiver. The AIS Transceiver is also fitted with a GPS receiver to give its own position. The AIS data is transposed into electronic nautical charts to provide key information on surrounding shipping.

2.3 Support Equipment

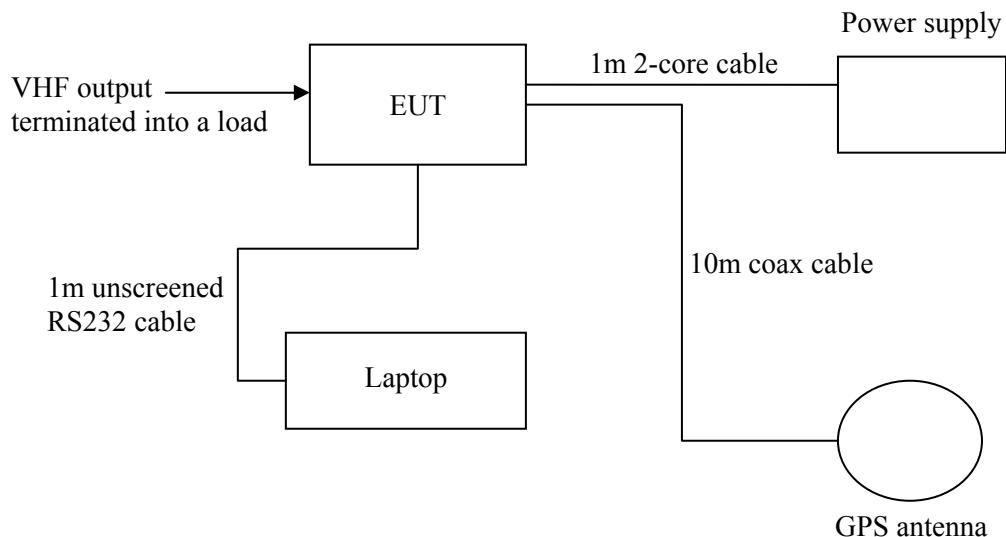
- Raymarine GPS Antenna, Model 260-001, s/n 00002
- Hp Laptop Model WC6120, s/n CNV-5430YCF
- Weir 413D 12V Power Supply, s/n 8972.

2.4 Exerciser Program

For the receiver spurious emission test the transceiver was placed in receive mode.

For the transmitter bandwidth measurement, the Transceiver was placed in transmit mode.

2.5 Test Configuration (radiated emissions)



3.0 MEASUREMENT PROCEDURE AND INSTRUMENTATION

3.1 EMI Site Address & Test Date

EMI Measurement Site Hursley EMC Services Ltd
Hursley Park, Winchester; FCC & Industry Canada Registered

Test Date 7th July 2009

3.2 General Operating Conditions

Testing was performed according to the procedures in ANSI C63.4:2003. Final radiated testing was performed at an EUT to antenna distance of three metres.

Instrumentation, including receiver and spectrum analyser bandwidth, comply with the requirements of ANSI C63.2:1996.

Bandwidth measurements was performed according to the requirements of part 80.211 FCC CFR 47 and Industry Canada RSS 182.

3.3 Radiated Emissions

Initial Scan

A radiated profile scan was taken at a three metre distance on eight azimuths of the system under test in both vertical and horizontal polarities of the antenna in a semi-anechoic chamber. Instrumentation used in the chamber as below:

Computer	Animal Systems PC
Spectrum analyser	Hewlett Packard 8568B, 30 to 1000 MHz range in peak hold mode Hewlett Packard 8593EM, >1.0 GHz, 1.0 MHz bandwidth, average and peak detector
Pre-amplifier	Hewlett Packard 8447D, 30 to 1000 MHz Hewlett Packard 8449B, 1.0 to 26.5 GHz
Antennae	Chase CBL6140 Bilog Schwarzbeck BBHA9120B Horn, 1.0 to 10.0 GHz
Cable	Sucoflex, 18GHz SMA-N

The data obtained from the profile scan was used as a guide for the final Open Area Test Site (OATS) measurements.

Final Measurements

The system under test was transferred to the OATS from the semi-anechoic chamber. The data obtained from the chamber profile-scan was used to guide the test engineer. Each emission from the transmitter was maximised by revolving the system on the turntable and moving the antennae in height and azimuth. The worst-case data is presented in this report. Test instrumentation used in the OAT's measurements was as follows:

Computer	Animal Systems PC
Spectrum analyser	Hewlett Packard 8593EM, >1.0 GHz, 1.0 MHz bandwidth, average & peak detector
Pre-amplifier	Hewlett Packard 8449B, 1.0 to 26.5GHz
Receiver	Rohde & Schwarz Model ESVP 30-1000MHz set to CISPR Quasi-Peak
Antennae	Schwarzbeck VULB 9163, 30 to 1000 MHz Schwarzbeck BBHA9120B Horn, 1.0 to 10.0 GHz
Cable	Sucoflex, 18GHz SMA-N

3.4 Conducted Emissions

Note: The transmitter is battery powered therefore the conducted emissions test does not apply.

3.5 Environmental Ambient

Test Type	Temperature	Humidity	Atmospheric Pressure
Radiated	23 degrees Celsius	55% relative	994 millibars

3.6 EMC Test Equipment

#ID	CP	Manufacturer	Type	Serial №	Description	Calibration due date
008	1	HP	8568B	2517A01791	Spectrum analyser	08/01/2010
026	LAB	Chase	CBL6140	1036	Antenna X-wing (20-2000MHz)	Internal
033	1	HP	8593EM	3726U00203	Spectrum analyser (9kHz-26.5GHz)	23/02/2010
050	1	HP	8447D	1937A02341	Pre-amplifier (30-1000MHz)	10/09/2009
053	1	HP	8449B	3008A01394	Pre-amplifier (1.0-26.5GHz)	03/02/2010
109	1	Schwarzbeck	VULB 9163	9163-321	Trilog antenna (30-3000MHz)	05/12/2009
127	1	Schwarzbeck	BBHA9120B	391	Horn antenna (1-10GHz)	05/12/2009
240	1	Sucoflex	106	52427/6	Cable SMA (18GHz)	21/01/2010
241	1	Rohde Schwarz	ESVP	879962/049	Test receiver (30-1300MHz)	18/02/2010

CP = Interval period [year] prescribed for external calibrations

Note: 'Calibration due date' means that the instrument is certified with a UKAS or traceable calibration certificate.
 'Internal' means internally calibrated using HEMCS procedures

4.0 TEST DATA

4.1 Radiated Emissions

A search was made of the frequency spectrum from 30.0 MHz to 7.5 GHz and the measurements reported are the highest emissions relative to the FCC CFR 47 Section 15B limits at a measuring distance of three metres.

Frequency MHz	Actual Quasi-peak value @ 3m	Specified average limit @ 3m	
	dB μ V/m	dB μ V/m	μ V/m
135.970	33.8	43.5	150
271.940	42.9 #	46.0	200
407.910	35.5	46.0	200
479.229	35.3	46.0	200
543.880	43.1 #	46.0	200
679.850	44.0 #	46.0	200
815.820	36.1	46.0	200
951.850	32.8	46.0	200

The measured result is below the specification limit by a margin less than the measurement uncertainty; it is not therefore possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a higher probability that the EUT tested complies with the specification limit.

Procedure: In accordance with ANSI C63.4:2003.

Measurements below 1.0 GHz performed with a quasi-peak detector. Measurements above 1.0 GHz performed with an average and peak detector. Measurements above 1.0 GHz were 15dB or more below the limit (see plots).

TEST ENGINEER: Rob St John James

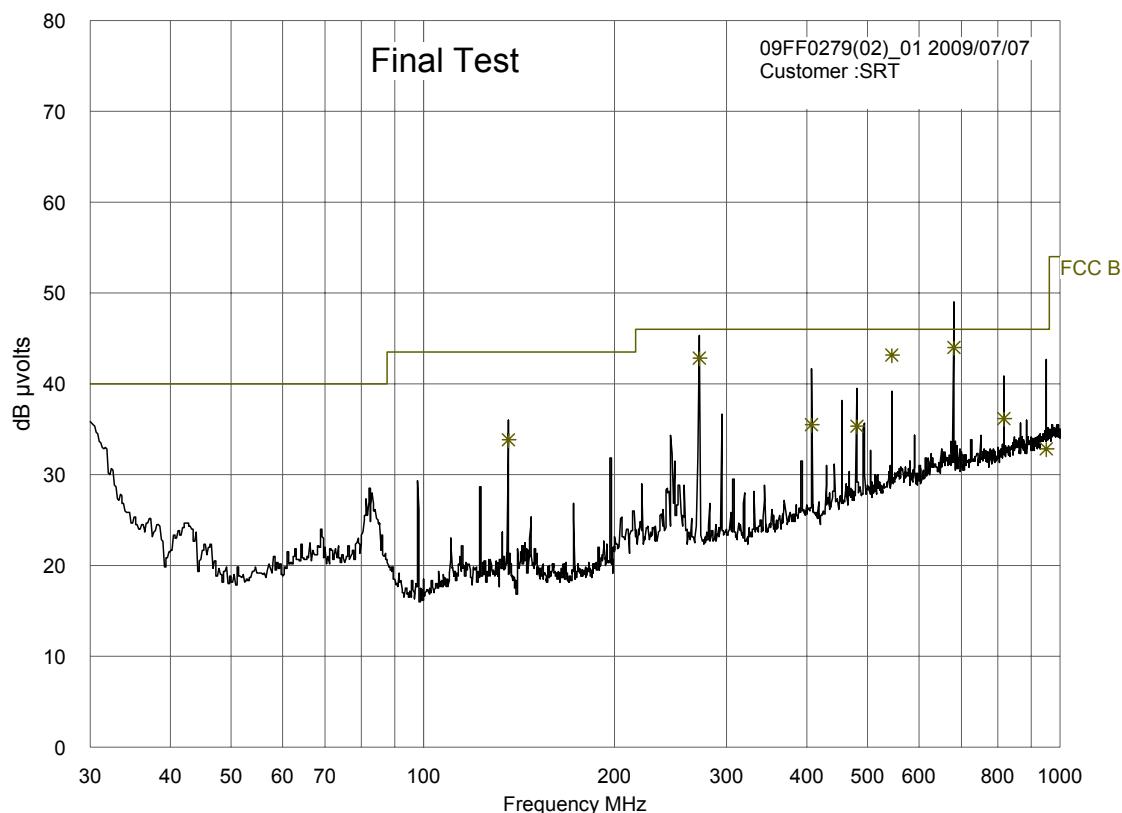
4.2 Occupied Bandwidth / Emission Mark

FCC CFR 47 80.211 (and Industry Canada RSS-182 6.3.1)

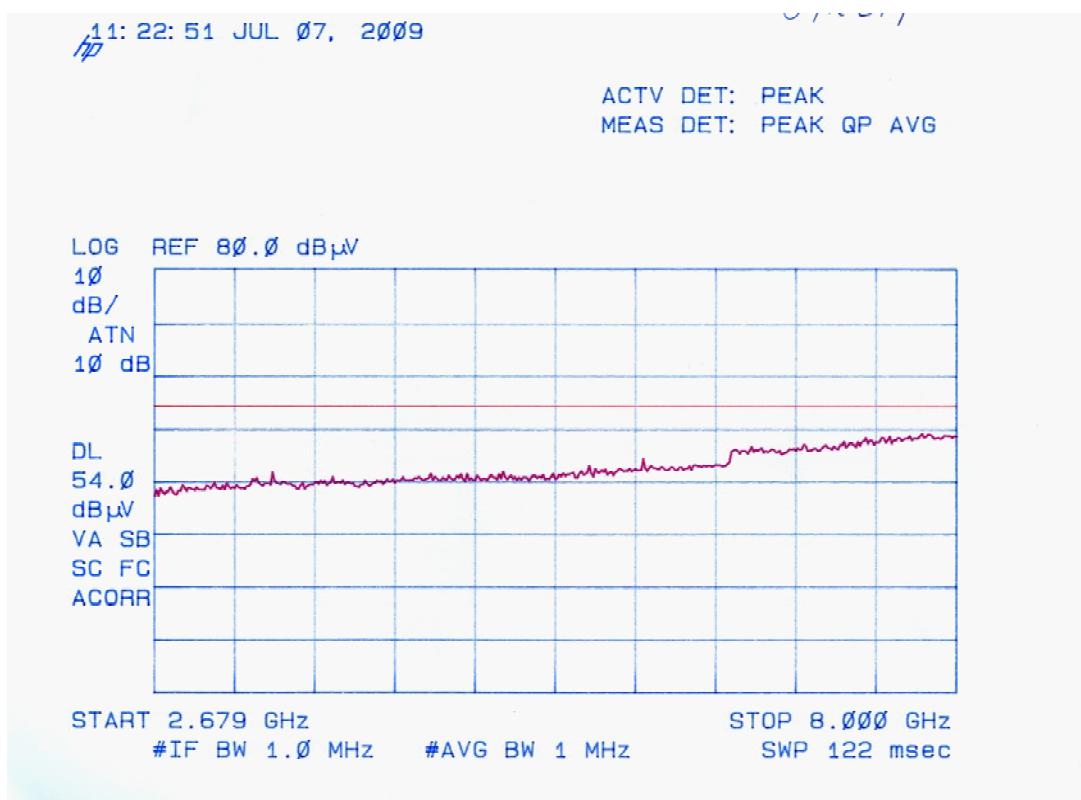
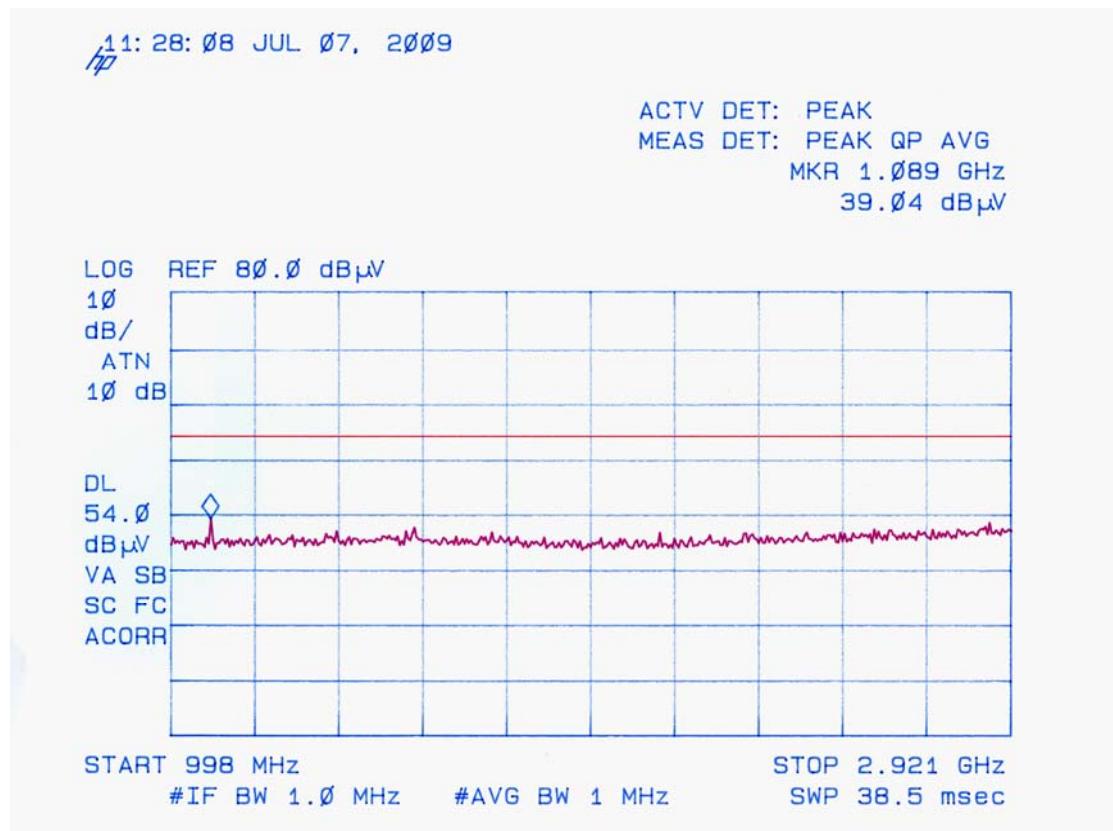
The output from the EUT VHF transmitter was fed via a 30dB attenuator into the input of a spectrum analyser. The transmitter output was measured at its normal upper and lower transmit frequencies of 161.975 and 162.025 MHz as well as the lowest possible transmit frequency of 156.025 MHz. The transmitter meets the emission mask requirements (see plots).

5.0 TEST PLOTS

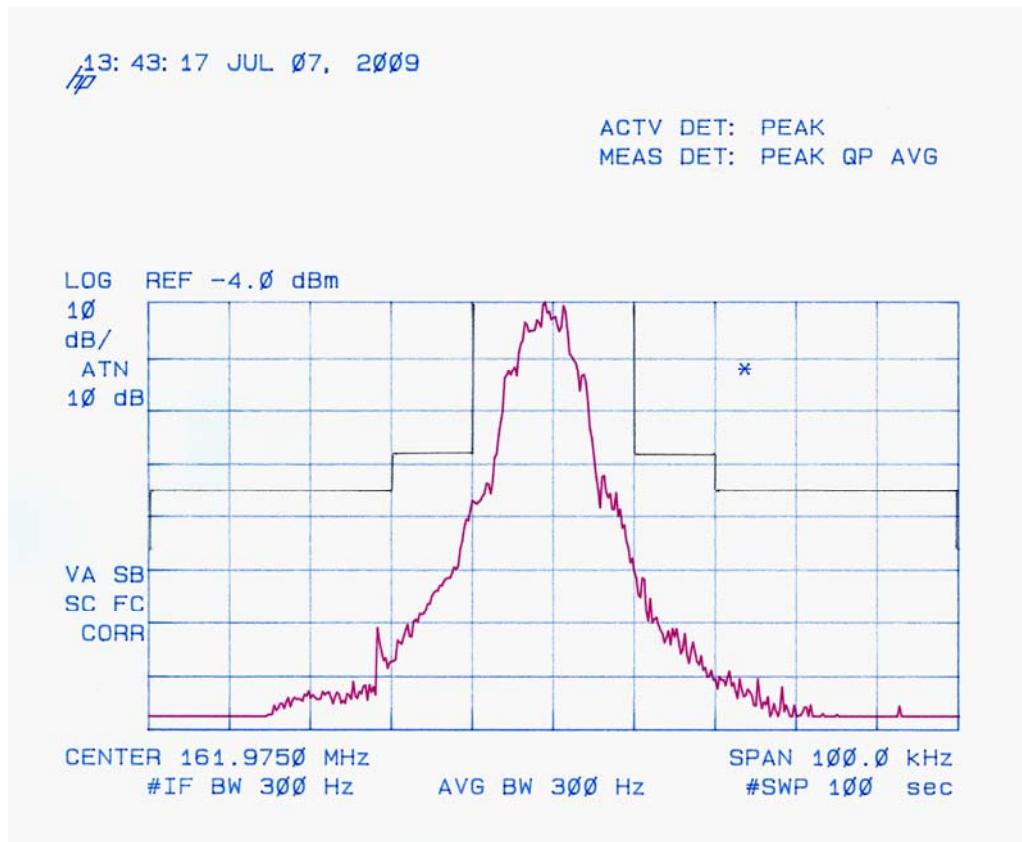
5.1 Emission Plot, 30 to 1000 MHz



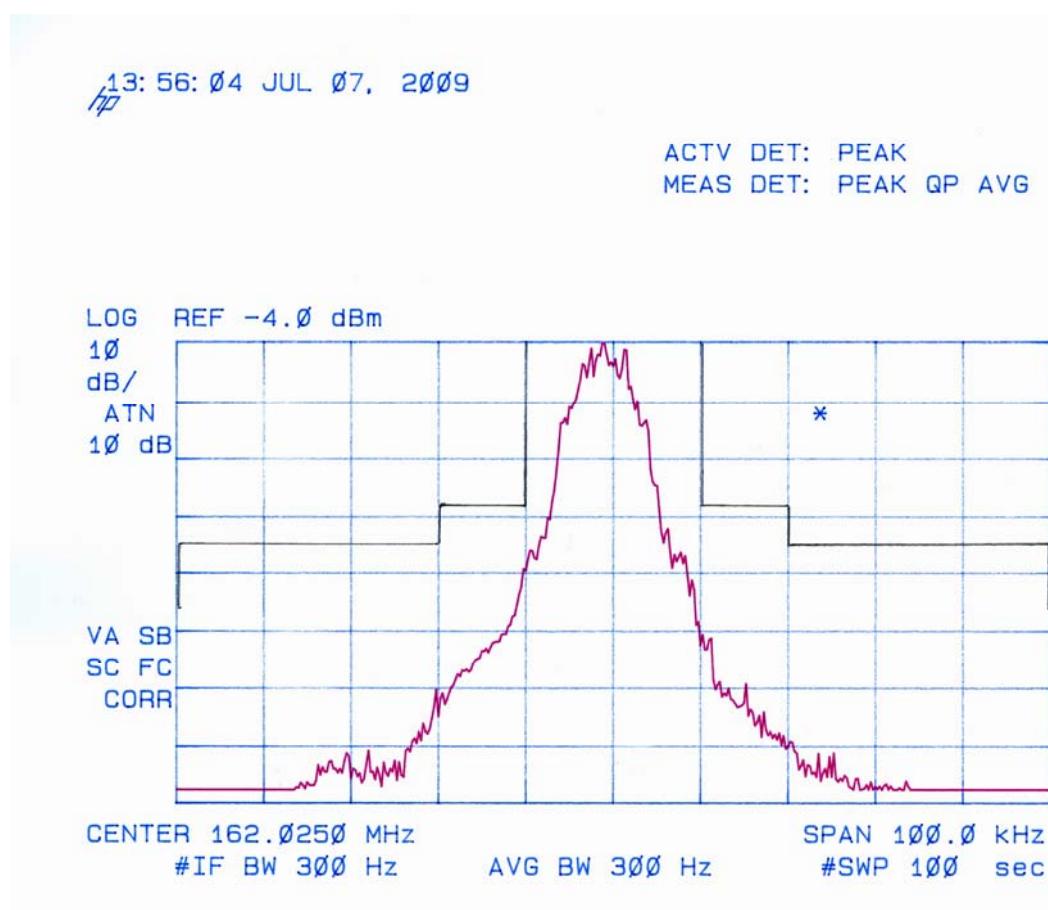
5.2 Emissions Plots, 1 to 7.5 GHz



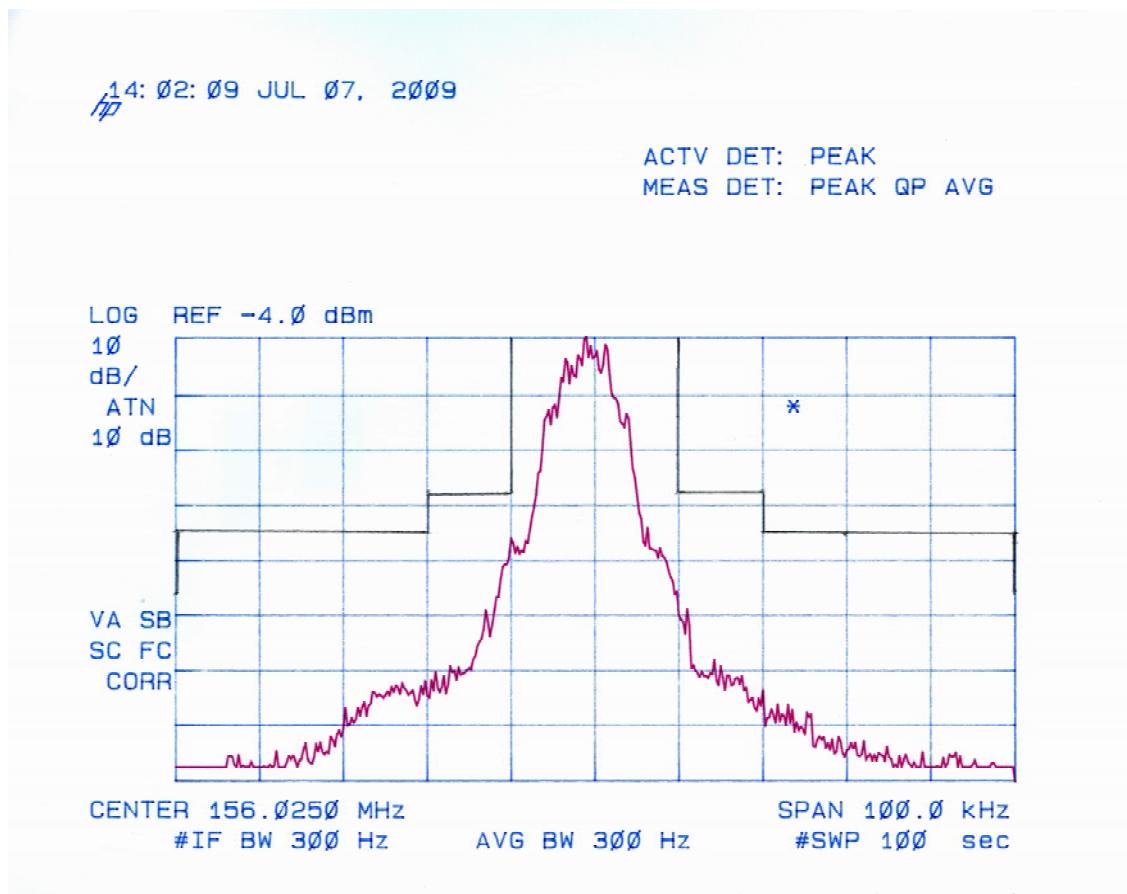
5.3 Bandwidth Plot (161.975 MHz)



5.4 Bandwidth Plot (162.025 MHz)



5.5 Bandwidth Plot (156.025 MHz)



6.0 PHOTO LOG

Open area test site measurements with Trilog Antenna



7.0 FCC LETTER

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

February 13, 2006

Hursley EMC Services Ltd.
Unit 16
Brickfield Lane
Chandlers Ford - Hampshire, SO53 4DB
United Kingdom
Attention: R P St John James

Re: Accreditation of Hursley EMC Services Ltd.
Designation Number: UK0006

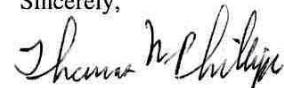
Dear Sir or Madam:

We have been notified by Department of Trade and Industry (DTI) that Hursley EMC Services Ltd. has been accredited as a Conformity Assessment Body (CAB).

At this time your organization is hereby designated to perform compliance testing on equipment subject to Declaration Of Conformity (DOC) and Certification under Parts 15 and 18 of the Commission's Rules.

This designation will expire upon expiration of the accreditation or notification of withdrawal of designation.

Sincerely,



Thomas Phillips
Electronics Engineer

8.0 INDUSTRY CANADA LETTER



June 20th, 2008

OUR FILE: 46405-7104
Submission No: 126749

Hursley EMC Services Ltd.
Unit 16, Brickfield Lane, Eastleigh
Hampshire SO53 4DP
United Kingdom

Attention: Rob St. John James

Dear Sir/Madame:

The Bureau has received your application for the registration / renewal of a 3m/10m open area test site. Be advised that the information received was satisfactory to Industry Canada. The following number(s) is now associated to the site(s) for which registration / renewal was sought (7104A-1). Please reference the appropriate site number in the body of test reports containing measurements performed on the site. In addition, please keep for your records the following information;

- Your primary code is: 7104
- The company number associated to the site(s) located at the above address is: 7104A

Furthermore, to obtain or renew a unique site number, the applicant shall demonstrate that the site has been accredited to ANSI C63.4-2003 or later. A scope of accreditation indicating the accreditation by a recognized accreditation body to ANSI C63.4-2003 shall be accepted. Please indicate in a letter the previous assigned site number if applicable and the type of site (example: 3 meter OATS or 3 meter chamber). If the test facility is not accredited to ANSI C63.4-2003 or later, the test facility shall submit test data demonstrating full compliance with the ANSI standard. The Bureau will evaluate the filing to determine if recognition shall be granted.

The frequency for re-validation of the test site and the information that is required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization. However, in all cases, test site re-validation shall occur on an interval not to exceed two years. There is no fee or form associated with an OATS filing. OATS submissions are encouraged to be submitted electronically to the Bureau using the following URL;
http://strategis.ic.gc.ca/epic/internet/inceb-bhst.nsf/en/h_tt00052e.html.

If you have any questions, you may contact the Bureau by e-mail at certification.bureau@ic.gc.ca Please reference our file and submission number above for all correspondence.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Stephane Proulx".

Stephane Proulx
Acting Wireless Laboratory Manager
Certification and Engineering Bureau
Industry Canada
3701 Carling Ave., Building 94
Ottawa, Ontario K2H 8S2
Canada

The logo for the Government of Canada, featuring the word "Canada" in a serif font with a red maple leaf icon integrated into the letter "a".