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Report On

FCC and Industry Canada Approval Testing of the
L-3 Communications
PROTEC W 405-0017
In accordance with FCC CFR 47 Part 80
and Industry Canada RSS-182

COMMERCIAL-IN-CONFIDENCE

FCC ID: UYW-405-0002
IC ID: 3494B-4050017A

Document 75910193 Report 02 Issue 1 October 2010

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REPORT ON

FCC and Industry Canada Approval Testing of the
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Document 75910193 Report 02 Issue 1

October 2010

PREPARED FOR

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MANUFACTURER

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100 Cattlemen Road
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PREPARED BY

S Jones
Project Engineer

APPROVED BY

M Jenkins
Authorised Signatory

DATED 04 October 2010

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

Test Engineer(s);

M Russell

UKAS TESTING 0141

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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Approval Testing of the
L-3 Communications
PROTEC W 405-0017
In accordance with FCC CFR 47 Part 80
and Industry Canada RSS-182

1.1 INTRODUCTION

The information contained in this report is intended to show limited verification of the Approval Testing of the L-3 Communications PROTEC W 405-0017 AIS Transceiver to the requirements of FCC CFR 47 Part 80 and Industry Canada RSS-182.

Objective	To perform Radio Approval Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	L-3 Communications
Model Number(s)	PROTEC W 405-0017
Serial Number(s)	29109005: TUV Ref 75910193-TSR0001
Number of Samples Tested	One
Test Specification/Issue/Date	FCC CFR 47 Part 80: 2009 Industry Canada RSS-182: 2003
Order Number Date	POR001538 24 September 2010
Start of Test	28 September 2010
Finish of Test	28 September 2010
Name of Engineer(s)	M Russell G Lawler
Related Documents	ANSI C63.4: 2003

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 80 and Industry Canada RSS-182 is shown below.

Section	Spec Clause		Test Description	Result	Comments
	FCC	IC			
2.1	80.211 (f)(3)	4.4 / 6.3	Emission Limitations – Conducted Transmitter Spurious	Pass	
2.2	80.211 (f)(3)	4.4 / 6.3	Emission Limitations – Radiated Transmitter Spurious	Pass	

Product Service

1.3 DECLARATION OF BUILD STATUS

MAIN EUT			
MANUFACTURING DESCRIPTION	Class A AIS Transceiver to IEC61993-2		
MANUFACTURER	L3 Communications Corporation		
TYPE	Marine Radio Equipment		
PART NUMBER	405-0017		
SERIAL NUMBER	405-0017 #1		
HARDWARE VERSION	V4		
SOFTWARE VERSION	030201.05.XX.XX		
TRANSMITTER OPERATING RANGE	VHF = 156.025-162.025MHz		
RECEIVER OPERATING RANGE	VHF = 156.025-162.025MHz, GPS = 1575.42MHz		
COUNTRY OF ORIGIN	United Kingdom		
INTERMEDIATE FREQUENCIES	12.8MHz, 19.655MHz, 26.055MHz, 36.5MHZ, 51.655MHz		
ITU DESIGNATION OF EMISSION	9K65G3E		
HIGHEST INTERNALLY GENERATED FREQUENCY	213.68MHz		
OUTPUT POWER (W or dBm)	12.5W, 33dBm		
FCC ID	UYW-405-0002		
INDUSTRY CANADA ID	3494B-4050017A		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Marine AIS SOTDMA Class A Transceiver to IEC61993-2		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	Switch mode power supply		
MANUFACTURER	L3 Communication Corporation		
TYPE	Switch mode power supply		
PART NUMBER	N/A as internal		
VOLTAGE	12 to 24V DC, -10% to +30% (10.8 to 31.2V DC		
COUNTRY OF ORIGIN	United Kingdom		
MODULES (if applicable)			
MANUFACTURING DESCRIPTION	N/A		
MANUFACTURER	N/A		
TYPE	N/A		
POWER	N/A		
FCC ID	N/A		
COUNTRY OF ORIGIN	N/A		
INDUSTRY CANADA ID	N/A		
EMISSION DESIGNATOR	N/A		
DHSS/FHSS/COMBINED OR OTHER	N/A		
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION	N/A		
MANUFACTURER	N/A		
TYPE	N/A		
PART NUMBER	N/A		
SERIAL NUMBER	N/A		
COUNTRY OF ORIGIN	N/A		

Signature

1st October 2010 **Date**

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a L-3 Communications PROTEC W 405-0017 AIS transceiver as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.

Equipment Under Test

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 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 have been made to the EUT during testing.

Product Service

SECTION 2

TEST RESULTS

FCC and Industry Canada Approval Testing of the
L-3 Communications PROTEC W 405-0017
In accordance with FCC CFR 47 Part 80
and Industry Canada RSS-182

2.1 EMISSION LIMITATION – CONDUCTED TRANSMITTER SPURIOUS

2.1.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.211 (f)(3)
Industry Canada RSS-182, Clause 4.4 and 6.3

2.1.2 Equipment Under Test

AIS Transceiver, S/N: 29109005 (TUV ref: 75910193-TSR0001)

2.1.3 Date of Test and Modification State

28 September 2010 - 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

Using a spectrum analyser, the emissions were measured between the range 9 kHz and 2 GHz. The path loss between the EUT and the spectrum analyser was measured and the highest value of attenuation across the range was entered as a reference level offset. The resolution bandwidth and video bandwidth were set to 30 kHz and 100 kHz respectively. Due to the burst nature of the signal, the spectrum analyser was set to measure only during the burst.
The trace was set to max hold and a peak detector was sued for the worst case. The traces were recorded as shown below.

2.1.6 Environmental Conditions

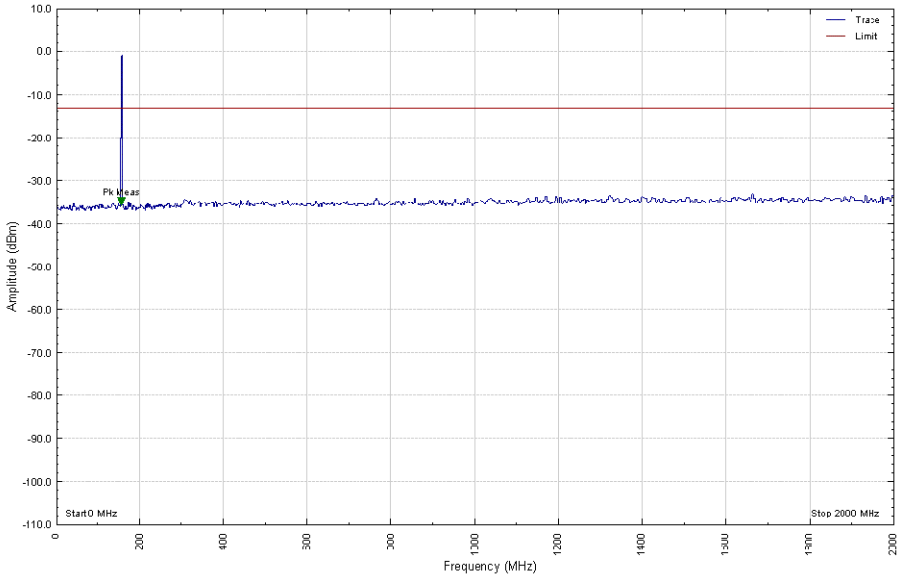
	28 September 2010
Ambient Temperature	22.7°C
Relative Humidity	55.6%

2.1.7 Test Results

12V DC Supply

156.025 MHz

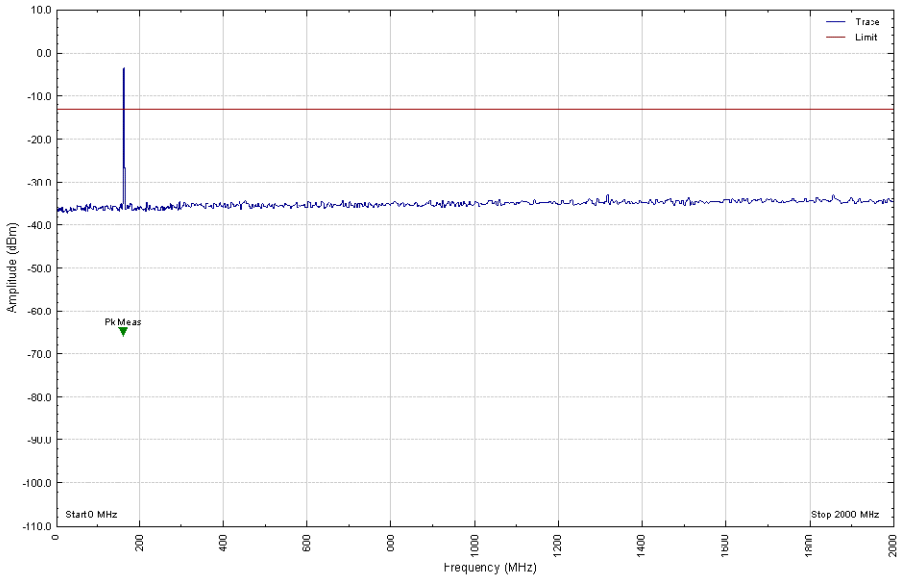
9 kHz to 2 GHz



Product Service

162.025 MHz

9 kHz to 2 GHz



Limit Clause

>250% of authorised bandwidth 43+10 Log P **OR** -13dBm.

2.2 EMISSION LIMITATION – RADIATED TRANSMITTER SPURIOUS

2.2.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.211 (f)(3)
Industry Canada RSS-182, Clause 4.4 and 6.3

2.2.2 Equipment Under Test

AIS Transceiver, S/N: 29109005 (TUV ref: 75910193-TSR0001)

2.2.3 Date of Test and Modification State

28 September 2010 - 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 test was performed in accordance with ANSI C63.4, FCC Part 80 and RSS-182.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the measuring antenna in both horizontal and vertical polarisations. The profiling produced a list of worst case emissions from the EUT.

Using the information from the preliminary profiling of the EUT, the list of emissions were then confirmed or updated under the alternative open site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions recorded in the procedure described above over the range 30 MHz to 2 GHz were then formally measured using a peak detector. This was deemed the worst case and where emissions exceeded the limit, the measurement procedure was carried out in accordance with ANSI C63.4.

< 1 GHz – Quasi Peak Detector
> 1 GHz – Average Detector

The EUT was operated at its maximum power level on the bottom and top channels with PRBS modulation.

The measurements were performed at a 3m measurement distance unless otherwise stated.

2.2.6 Environmental Conditions

	28 September 2010
Ambient Temperature	22.7°C
Relative Humidity	55.6%

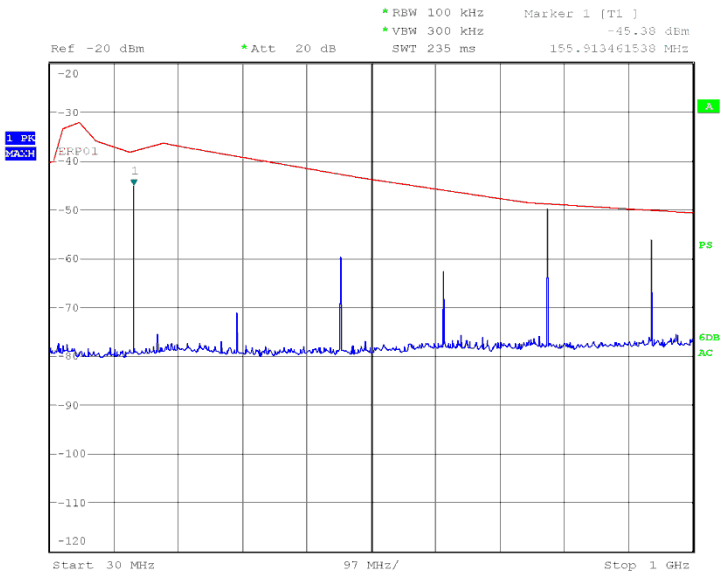
2.2.7 Test Results

12 V DC Supply

Frequency of Channel	Emission Frequency (MHz)	Polarisation	Height (cm)	Azimuth (degrees)	Emission Level Peak (dBm)
156.025 MHz	468.099	Vertical	100	182	-34.1
	780.065	Vertical	100	359	-18.1
	936.141	Vertical	112	301	-24.7
	1092.175	Vertical	100	360	-28.8
	1404.201	Vertical	109	125	-23.7
	1716.219	Horizontal	132	104	-38.9
162.025 MHz	324.057	Horizontal	100	81	-44.1
	486.063	Vertical	100	187	-32.9
	810.111	Vertical	148	359	-28.7
	1134.107	Vertical	100	160	-32.4
	1296.177	Vertical	104	255	-26.1
	1458.257	Vertical	100	181	-30.1

156.025 MHz

30 MHz to 1 GHz



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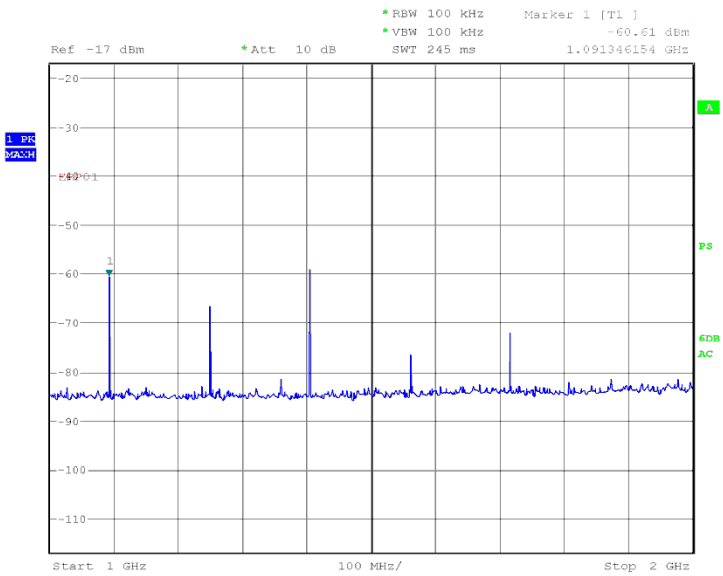
1 GHz to 2 GHz



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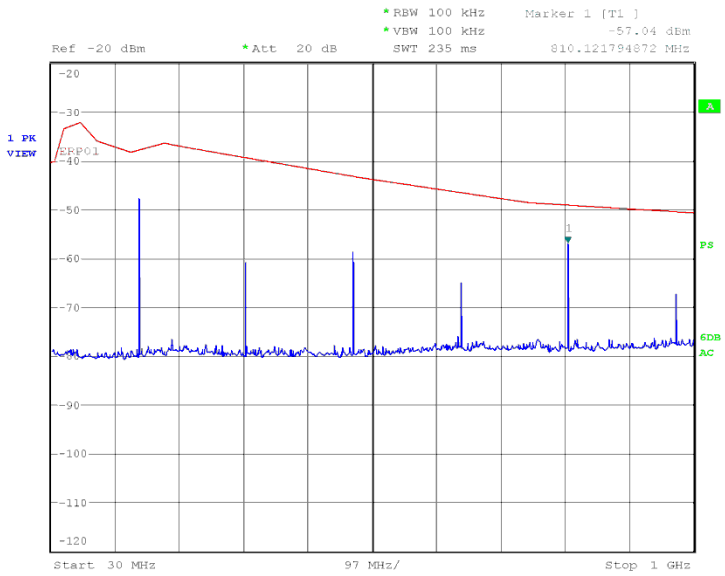
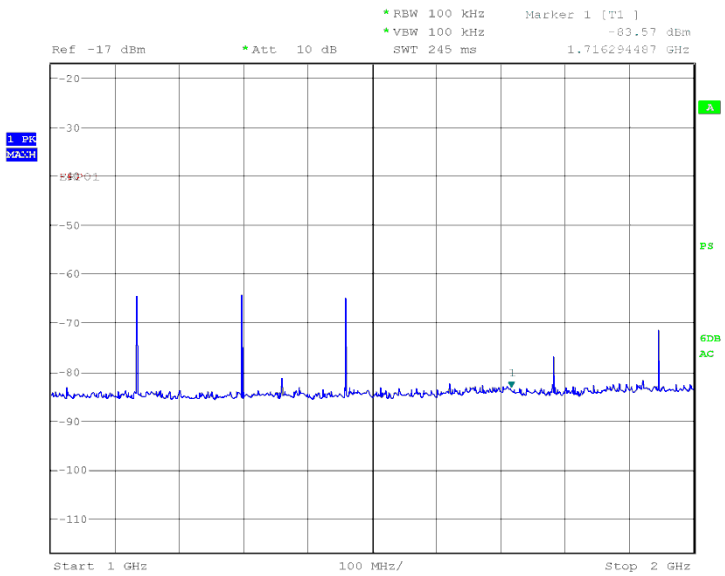
Product Service

162.025 MHz

30 MHz to 1 GHz



1 GHz to 2 GHz



Limit Clause

>250% of authorised bandwidth 43+10 Log P **OR** -13 dBm.

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 – Emission Limitations - Conducted Transmitter Spurious					
Multimeter	White Gold	WG022	190	12	26-Oct-2010
High Pass Filter	Mini-Circuits	NHP-300	1640	12	12-Aug-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Switching Unit	Rohde & Schwarz	SSCU-GW04	3145	-	TU
Attenuator (20dB, 150W)	Narda	769-20	3367	12	24-May-2011
Section 2.2 - Emission Limitations - Radiated Transmitter Spurious					
Antenna (Bilog)	Schaffner	CBL6143	287	24	19-Jan-2012
DC Power Supply Unit	Hewlett Packard	6267B	294	-	O/P Mon
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable/Mast Controller	EMCO	2090	1610	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	4-Dec-2011
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	10-Jun-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011

TU – Traceability Unscheduled
O/P Mon – Output monitored using calibrated equipment

Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).