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Report On

FCC and IC Testing of the
Garmin International Inc
VHF300AIS Fixed Mount Radio

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FCC ID: IPH-GARVHF3
IC ID: 1792A-GARVHF3 D

Document 75906328 Report 06 Issue 3

August 2009



Product Service

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC and IC Testing of the
Garmin International Inc
VHF300AIS Fixed Mount Radio

Document 75906328 Report 06 Issue 3

August 2009

PREPARED FOR

Garmin International Inc
1200 E 151st Street
Olathe
KS 66062
USA

PREPARED BY

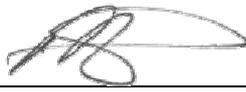


N Bennett
Senior Administrator

APPROVED BY



C Gould
Authorised Signatory



M Jenkins
Authorised Signatory

DATED

20 August 2009

This report has been up-issued to Issue 3 to correct the specification date

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

Test Engineer(s);



A Guy



B Airs





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SECTION 1

REPORT SUMMARY

FCC and IC Testing of the
Garmin International Inc
VHF300AIS Fixed Mount Radio



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Garmin International Inc VHF300AIS Fixed Mount Radio to the requirements of FCC CFR 47 Part 80 and RSS-182.

Objective	To perform FCC and IC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification for the series of tests carried out.
Manufacturer	Garmin International
Model Number(s)	VHF300AIS
Declared Variant	VHF300iAIS, VHF300 and VHF300i
Serial Number(s)	No.1 No.2 No.3
Software Version	2.00
Hardware Version	1.00 or Later
Number of Samples Tested	Three
Test Specification/Issue/Date	FCC CFR 47 Part 80: 2008 RSS-182 Issue 4: 2003
Incoming Release Date	Declaration of Build Status and Application Form 21 April 2009
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	148862 25 March 2009
Start of Test	07 June 2009
Finish of Test	16 July 2009
Name of Engineer(s)	A Guy B Airs
Related Document(s)	ANSI 63.4: 2003



Product Service

1.2 BRIEF SUMMARY OF RESULTS

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

Configuration 1							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	FCC	IC					
2.1	80.211(f)(3)	4.4 / 6.3	Radiated Emissions (Enclosure Port)	Transmit	0	Pass	
				Receive		N/A	
2.2	80.141 (d)	3.7	Time Out Timer	Transmit	0	Pass	
2.5	80.211(f)(1)(2)	6.3.1 / 6.6	Emission Limitations (Emission Mask)	Transmit	0	Pass	
2.6	80.205(a)	3.9 General / 3.4 (e)	Occupied Bandwidth	Transmit	0	Pass	
2.7	80.211(c)(f)(3)	4.4 / 6.3	Emission Limitations (Conducted Transmitter Spurious)	Transmit	0	Pass	
2.10	80.215	4.3 / 6.2 / 3.7	Transmitter Power	Transmit	0	Pass	
2.13	15.109	6.7	Receiver Spurious Emissions	Receive		Pass	

Configuration 2							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	FCC	IC					
2.3	80.209(a)	4.2 / 6.1	Frequency Stability Under Voltage Variations	Transmit	0	Pass	
2.4	80.209(a)	4.2 / 6.1	Frequency Stability Under Temperature Variations	Transmit	0	Pass	
2.10	80.215	4.3 / 6.2 / 3.7	Transmitter Power	Transmit	0	Pass	
2.11	80.217(b)	N/A	Suppression of Interference Aboard Ships	Receive	0	Pass	
2.12	80.215(e)(g)(1)(2)(3)	3.7	Transmitter Carrier Power Reduction	Transmit	0	Pass	



Product Service

Configuration 3							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	FCC	IC					
2.15	80.213(d)	3.4(b)	Transmitter Audio Frequency Response	Transmit	0	Pass	

Configuration 4							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	FCC	IC					
2.8	2.1047, 80.213	-	Modulation Requirements	Transmit	0	Pass	
2.9	80.213	-	Modulation Characteristics	Transmit	0	Pass	
2.14	80.213 (d)	3.4(b)	Transmitter Frequency Deviation (DSC)	Transmit	0	Pass	
2.16	80.225	3.9, 6.4(b)	Frequency Tolerance of B and Y States	Transmit	0	Pass	
2.17	80.225	3.9	Modulation Index (DSC)	Transmit	0	Pass	
2.18	80.225	3.9	Modulation Rate (DSC)	Transmit	0	Pass	

N/A – Not Applicable



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	VHF Radio with or without AIS receiver (AIS version has receiver)
MANUFACTURER	Garmin International
TYPE	VHF300AIS (VHF300iAIS, VHF300 VHF300i as a listed variants)
PART NUMBER	VHF300AIS
SERIAL NUMBER	TBD
HARDWARE VERSION	1.00 or later
SOFTWARE VERSION	2.00
TRANSMITTER OPERATING RANGE	156.025MHz to 157.425 MHz
RECEIVER OPERATING RANGE	156.025MHz to 163.275MHz
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	1 st – 21.6MHz, 2 nd – 450kHz
ITU DESIGNATION OF EMISSION	16K0G3EJN, 16K0G2BJN
HIGHEST INTERNALLY GENERATED FREQUENCY	163MHz
OUTPUT POWER (W or dBm)	1W or 25W
FCC ID	IPH-GARVHF3
INDUSTRY CANADA ID	1792A-GARVHF3
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The VHF300 is a fixed mount Class D DSC VHF marine radio. For use on non SOLAS vessels
BATTERY/POWER SUPPLY (not applicable – vehicle direct wired)	
MODULES (not applicable)	
ANCILLARIES (none - not applicable)	

Signature

Date

21 April 2009

Declaration of Build Status Serial Number
(Serial numbers on products)

75906328/01

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

**1.4 APPLICATION FORM**

APPLICANT'S DETAILS	
CATEGORY OF APPLICANT (please tick relevant box opposite)	(a) <input checked="" type="checkbox"/> MANUFACTURER
	(b) <input type="checkbox"/> IMPORTER
If box (b), (c) or (d) is ticked complete details in box below with respect to the manufacturer	(c) <input type="checkbox"/> DISTRIBUTOR
	(d) <input type="checkbox"/> AGENT
COMPANY NAME :	Garmin International, Inc.
ADDRESS :	1200 E. 151st Street Olathe, KS 66062-3426 USA
NAME FOR CONTACT PURPOSES :	Al Sundoro
TELEPHONE NO : +1 913-440-5463	FAX NO : +1 913 397-8282
	E-MAIL : engelhard.sundoro@garmin.com

MANUFACTURER'S DETAILS	
COMPANY NAME :	Kanematsu Corporation
ADDRESS :	2-1 Seavans N Bldg, Shibaura-1 Chome, Minato-ku, Tokyo, 105-8005, Japan
NAME FOR CONTACT PURPOSES :	Hiroyuki Takeda
TELEPHONE NO : +81-3-5440-8300	FAX NO : +81-3-5440-6515
	E-MAIL : htakeda@kanematsu.co.jp



Product Service

TYPE DESIGNATION (1)	
<p>The type designation may be either a single alphanumeric code <u>or</u> an alphanumeric/code divided into two parts.</p> <p>Please fill in</p>	
<p>TYPE DESIGNATION AS A SINGLE ALPHANUMERIC CODE</p> <p>variant)</p>	<p>For EU/Australia/NZ/International VHF 300i AIS (VHF300i as a listed</p> <p>For USA/Canada: VHF 300 AIS (VHF300 as a listed</p>
<p>variant)</p>	

- (1) This is the manufacturer's numeric or alphanumeric code or name that is specific to a particular equipment. It may contain information in coded form on the characteristics of the equipment e.g. frequency, power. The manufacturer is free to choose the form of the type designation.
- (2) This is the number, code or trade name used by the manufacturer to describe a series or 'family' of equipment of substantially the same mechanical and electrical construction which will include a number of related equipments. This number is often referred to as the "model number".
- (3) This is the manufacturer's identification number given to a specific equipment in the series or 'family' of equipments. It is often referred to as the "identification number".



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TYPE OF EQUIPMENT	
<input type="checkbox"/>	<u>Base Station</u> (Equipment fitted with an antenna socket for use with an external antenna, and intended for use in a fixed location).
<input checked="" type="checkbox"/>	<u>Mobile Station</u> (Mobile equipment fitted with an antenna socket, for use with an external antenna, normally used in a vehicle or as a transportable station).
<input type="checkbox"/>	<u>Handportable</u> (fitted with an antenna socket)
<input type="checkbox"/>	(without an external antenna socket integral antenna equipment, but fitted with a permanent internal or a temporary internal 50 ohm R.F. connector which allows access to the transmitter output and the receiver input)
<input type="checkbox"/>	<u>Other</u>

BASE STATION
Not Applicable
MOBILE STATION
<input type="checkbox"/> Transmitter <input type="checkbox"/> Receiver <input checked="" type="checkbox"/> Transceiver <input type="checkbox"/> Remote Control Head
HANDPORTABLE
Not Applicable



Product Service

TRANSMITTER TECHNICAL CHARACTERISTICS	
TRANSMITTER FREQUENCY	
Method of frequency generation	
<input type="checkbox"/>	CRYSTAL
<input checked="" type="checkbox"/>	SYNTHESIZER
<input type="checkbox"/>	OTHER
TRANSMITTER CHANNEL SWITCHING FREQUENCY RANGE	
156.025 MHz – 157.425 MHz (MHz Range)	
TRANSMITTER FREQUENCY ALIGNMENT RANGE (6)	
Not Applicable	



Product Service

TRANSMITTER RF POWER CHARACTERISTICS	
MAXIMUM RATED TRANSMITTER OUTPUT POWER as stated by manufacturer 25 W AT TRANSMITTER RF OUTPUT CONNECTOR (as declared by manufacturer)	
Is transmitter intended for : Continuous duty <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Intermittent duty <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If intermittent state DUTY CYCLE 5% TX, 5% RX, 90% Idle	
Is transmitter output power variable?	
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
<input type="checkbox"/> continuously variable <input checked="" type="checkbox"/> stepped 25 dB per step 25 maximum RF output power (Watts) 1 minimum RF output power (Watts)	The power can be set for 1W or 25W

TRANSMITTER - MODULATION	
<input checked="" type="checkbox"/>	FREQUENCY (FM 5 kHz)
<input type="checkbox"/>	Phase



Product Service

TRANSMITTER MODULATION INPUT CHARACTERISTICS		
Modulation input signal level for 60% of maximum deviation at at		
Microphone socket	12mV	Impedance 2k Ohms
Accessory socket	12mV	Impedance 2k Ohms
Other (4)	mV	Impedance Ohms
Lowest audio modulation frequency transmitted by the equipment		
Hz		

(4) For use where direct connection is provided for test purposes.

TRANSMITTER MODULATION INPUT CHARACTERISTICS (ETS 300 113 Only)
Not Applicable



Product Service

INTERFACE FOR DATA TRANSMISSION (ETS 300 113 only)

Not Applicable



RECEIVER TECHNICAL CHARACTERISTICS	
RECEIVER - FREQUENCY	
METHOD OF FREQUENCY GENERATION	
<input type="checkbox"/>	CRYSTAL
<input checked="" type="checkbox"/>	SYNTHESIZER
<input type="checkbox"/>	OTHER
INTERMEDIATE FREQUENCIES	
<input checked="" type="checkbox"/>	1st 21.6 MHz
<input checked="" type="checkbox"/>	2nd 450 kHz
<input type="checkbox"/>	3rd Not Applicable
Is local oscillator injection frequency higher or lower than the receiver nominal frequency?	
<input type="checkbox"/>	Higher
<input checked="" type="checkbox"/>	Lower
RECEIVER CHANNEL SWITCHING FREQUENCY RANGE	
156.025 MHz – 163.275 MHz (MHz Range)	
RECEIVER FREQUENCY ALIGNMENT RANGE	
Not Applicable	



Product Service

RECEIVER AUDIO (AF) CHARACTERISTICS			
MAXIMUM RATED AUDIO (AF) FREQUENCY OUTPUT POWER			
INTO LOUDSPEAKER	Watts		
TO LINE	Watts		
INTO EARPIECE	1 Watts		
BALANCED		<input checked="" type="checkbox"/>	NO
UNBALANCED		<input checked="" type="checkbox"/>	YES
Does connection carry DC voltage?		<input checked="" type="checkbox"/>	NO
If yes, state value		Not Applicable	
Normal Audio load impedance			
AT LOUDSPEAKER	4 ohms		
AT EARPIECE	24 ohms		
AT LINE OUTPUT	Not Applicable		
At audio accessory connection or facility socket (if fitted)			
Output	2 Watts		
Impedance	4 ohms		
Max input level at audio accessory socket			
	mV		
Impedance	ohms		



TRANSMITTER AND RECEIVER CHARACTERISTICS	
ITU DESIGNATION OR CLASS OF EMISSION	16K0G3EJN, 16K0G2BJN
CHANNEL SEPARATION	25kHz
State the maximum number of channels over which the equipment can operate	73 Channels

EXTREME TEMPERATURE RANGE over which equipment is to be type tested	
[X]	-15°C to +55°C

CONSTRUCTION OF EQUIPMENT	
[X]	Single unit (5)

(5) Unit means a physically separate item of the equipment.

AUTOMATIC EQUIPMENT SWITCH OFF	
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated.	
[]	Applies V Cut-off voltage
[X]	Does not apply



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POWER SOURCE
12 DC Voltage (V)
6 DC Maximum Current (A)
BATTERY
Not Applicable

SIGNALLING (See note (c)) (I-ETS 300 219 only)
Not Applicable



Product Service

DUPLEX OPERATION (BASE STATION ONLY)

Not Applicable

COMMUNAL SITE OPERATION (1)

Not Applicable



ALIGNMENT RANGE	
<p>The definition of the alignment range AR1 and AR2 are given in Sub Clauses 3.1.2 and 3.1.3 of the Standard. The applicant should ensure that the sample equipment(s) submitted are operational on the appropriate channel(s) as given in Sub Clauses 3.1.5 through to 3.1.11 and tick the appropriate box.</p>	
3.1.5	One sample single channel equipment of category AR1 []
or 3.1.6	Three samples of single channel equipments of category AR2 []
or 3.1.7	One sample two channel equipment of category AR1 []
or 3.1.8	Three samples of two channel equipment of category AR2 []
or 3.1.9	One sample multichannel equipment of category AR1 []
or 3.1.10	Three samples of multichannel equipment of category AR2 []
or 3.1.11	One sample of multichannel equipment of category AR2 where the switching range equals the alignment range []
<p>If more than one option of the equipment is being submitted with different Type Designations, one or three samples, as appropriate, of each version shall be submitted.</p>	

CHANNEL IDENTIFICATION			
<p>Each equipment, whether one or more submitted for tests shall carry clear identification (such as a serial number), together with the frequencies associated with the channel identification displayed on the equipment.</p>			
Equipment Identification eg Serial Number	Channel No.	Transmit Nominal Freq MHz	Receive Nominal Freq MHz
Sample 1	60	156,025	160,625
	16	156,800	156,800
	88	157,425	157,425
Sample 2	60	156,025	160,625
	16	156,800	156,800
	88	157,425	157,425



OTHER ITEMS SUPPLIED		
Spare batteries e.g. (portable equipment)	<input type="checkbox"/>]	Yes
	<input checked="" type="checkbox"/>]	No
Battery charging device	<input type="checkbox"/>]	Yes
	<input checked="" type="checkbox"/>]	No
Special tools for dismantling equipment	<input type="checkbox"/>]	Yes
	<input checked="" type="checkbox"/>]	No
Encoder	<input type="checkbox"/>]	Yes
	<input checked="" type="checkbox"/>]	No
Test interface box (if applicable) or where appropriate the RF test fixture	<input checked="" type="checkbox"/>]	Yes
	<input type="checkbox"/>]	No
Full documentation on equipment (Handbook and circuit diagrams)	<input checked="" type="checkbox"/>]	Yes
	<input type="checkbox"/>]	No
Others	<input type="checkbox"/>]	Yes
	<input type="checkbox"/>]	No
If Yes, please specify :		



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DECLARATION		
Are the equipments submitted representative production models?	[]	Yes
	[X]	No
If not are the equipments pre-production models?	[X]	Yes
	[]	No
If pre-production equipments are submitted will the final production equipments be identical in <u>all</u> respects with the equipment tested	[X]	Yes
	[]	No
If no supply full details		
Will labelling of the equipment comply with the Requirements of appropriate standards ?	[X]	Yes
	[]	No
If no supply full details		

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

Signature :

Name : David Heald

Position held : Engineer

Date : 21 April 2009

BABT 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.



1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test (EUT) was a Garmin International Inc VHF300AIS Fixed Mount Radio as shown in the photograph below. A full technical description can be found in the Manufacturers documentation.



Equipment Under Test



1.5.2 Test Configuration

The EUT was configured in accordance with FCC CFR 47 Part 80 and RSS-182.

Configuration 1:

When tested on an audio channel the EUT was modulated by a 2500Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. The input level was established at the frequency of maximum response of the audio modulating circuit. When DSC Modulation was required (channel 70), the EUT was modulated with the customer test mode internal modulation.

Configuration 2:

The EUT operated with no modulation

Configuration 3:

The EUT operated with modulation: 1kHz audio tone with 3kHz deviation

Configuration 4:

The EUT was operated as described on the test page

1.5.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
DC Power Cable	2m	Power Cable	Multicore	No
NMEA Cable & Termination Bar	2m	NMEA	Multicore	No
Handset & Cable	0.6m (un-stretched)	to H/S 1 Port	Multicore	No
Speaker & Cable	2 x 1.3m lengths	to H/S 1 Port	Multicore	No
Extension Cable	10m	to H/S 1 Port	Multicore	No
Handset & Cable	0.6m (un-stretched)	to H/S 2 Port	Multicore	No
Speaker & Cable	2 x 1.3m lengths	to H/S 2 Port	Multicore	No
Extension Cable	10m	to H/S 2 Port	Multicore	No
Handset & Cable	0.6m (un-stretched)	to H/S 3 Port	Multicore	No
Speaker & Cable	2 x 1.3m lengths	to H/S 3 Port	Multicore	No
Extension Cable	10m	to H/S 3 Port	Multicore	No



Product Service

1.5.4 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.

Note: Channel 70 was offset to 156.500 MHz to prevent interference issues to the live service.



Product Service

1.6 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

1.7 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.8 MODIFICATION RECORD

No modifications were made to the EUT during testing.



Product Service

SECTION 2

TEST DETAILS

FCC and IC Testing of the
Garmin International Inc
VHF300AIS Fixed Mount Radio



Product Service

2.1 RADIATED EMISSIONS (ENCLOSURE PORT)

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.2

2.1.3 Date of Test and Modification State

07 June 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 Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI 63.4.

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

Configuration 1 - Mode 1

2.1.6 Environmental Conditions

07 June 2009

Ambient Temperature 19°C

Relative Humidity 38%

Atmospheric Pressure 996mbar



2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 80 and RSS-182 for Radiated Emissions (Enclosure Port).

The test results are shown below.

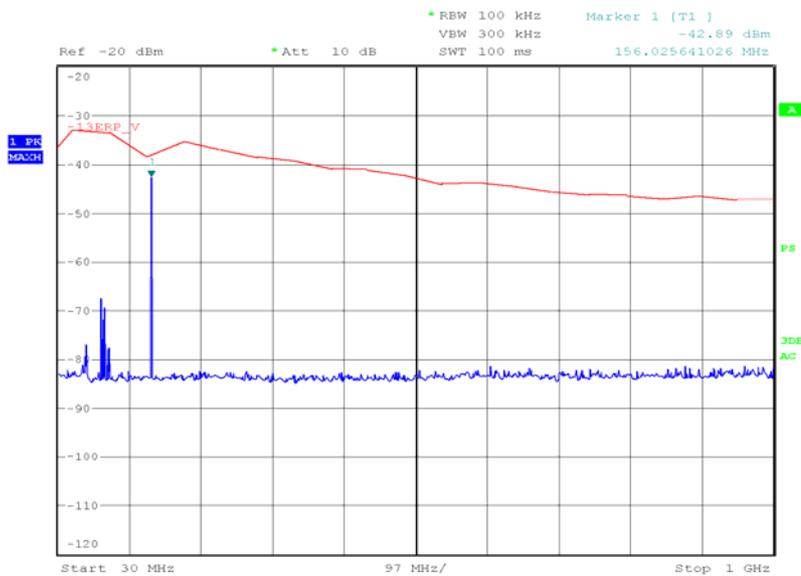
Configuration 1 - Mode 1

Channels 60 (Bottom), 16 (Middle) and 88 (Top) were investigated. No emissions were detected within 30dB of the limit on any of the three channels selected.

Bottom Channel 60 (156.025MHz)

30MHz to 1GHz

Vertical

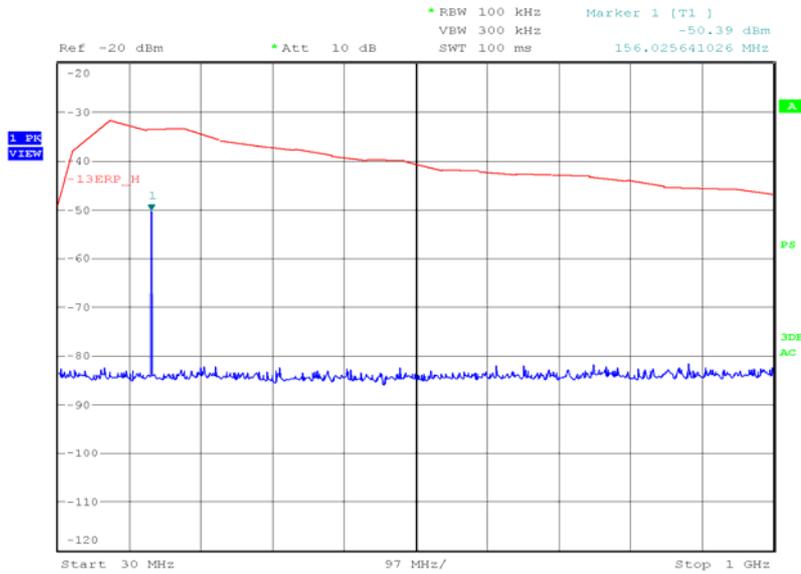


Date: 7.JUN.2009 04:37:07

Plots shows ambients and transmitter only.



Horizontal

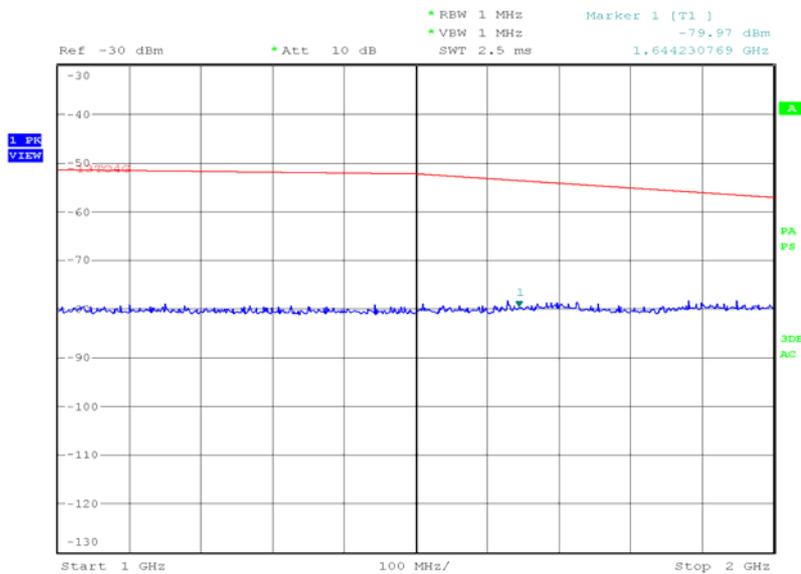


Date: 7.JUN.2009 04:34:46

Plots shows ambients and transmitter only.

1GHz to 2GHz

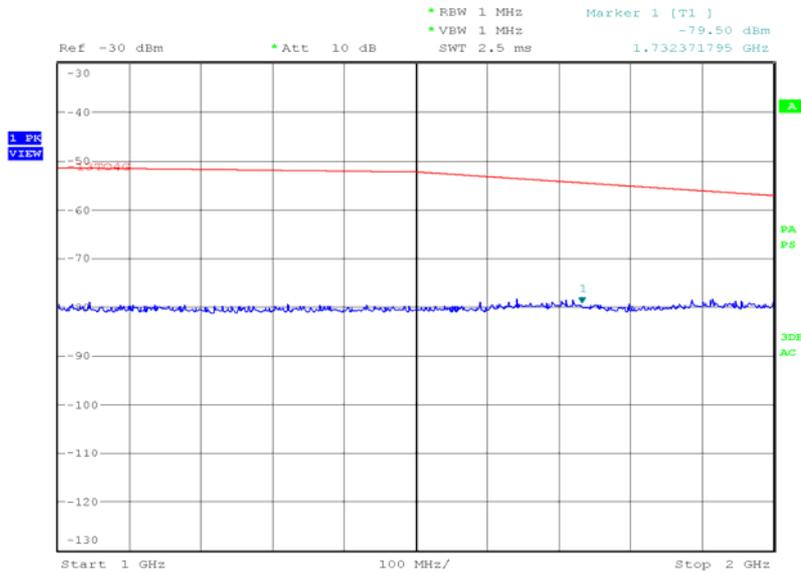
Vertical



Date: 7.JUN.2009 05:19:55



Horizontal

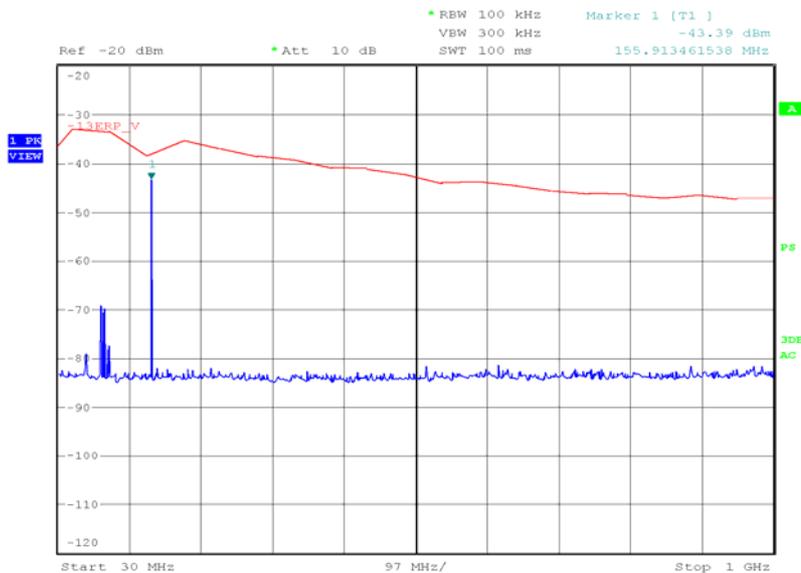


Date: 7.JUN.2009 05:22:46

Middle Channel 16 (156.800MHz)

30MHz to 1GHz

Vertical

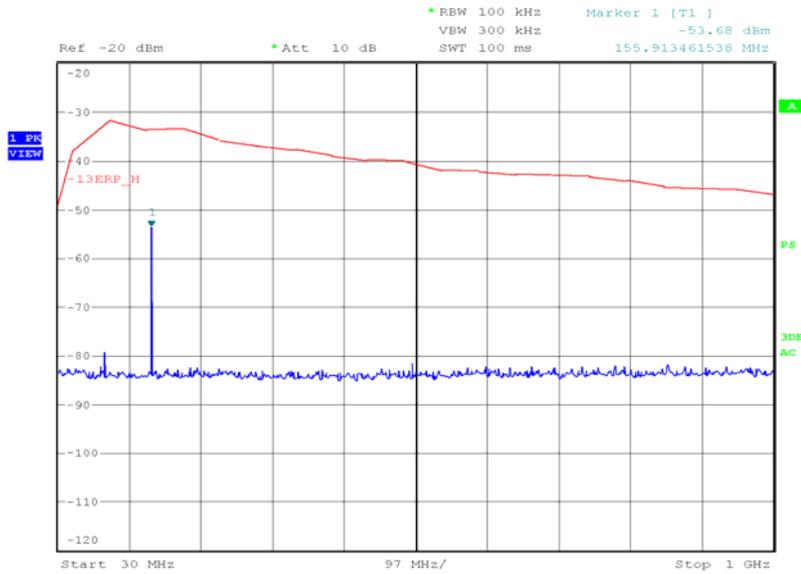


Date: 7.JUN.2009 04:08:02

Plots shows ambients and transmitter only.



Horizontal

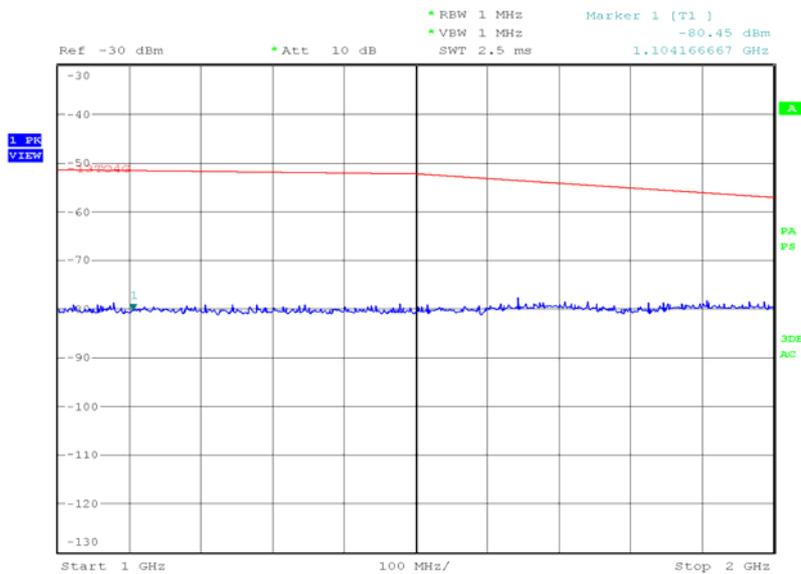


Date: 7.JUN.2009 04:09:46

Plots shows ambients and transmitter only.

1GHz to 2GHz

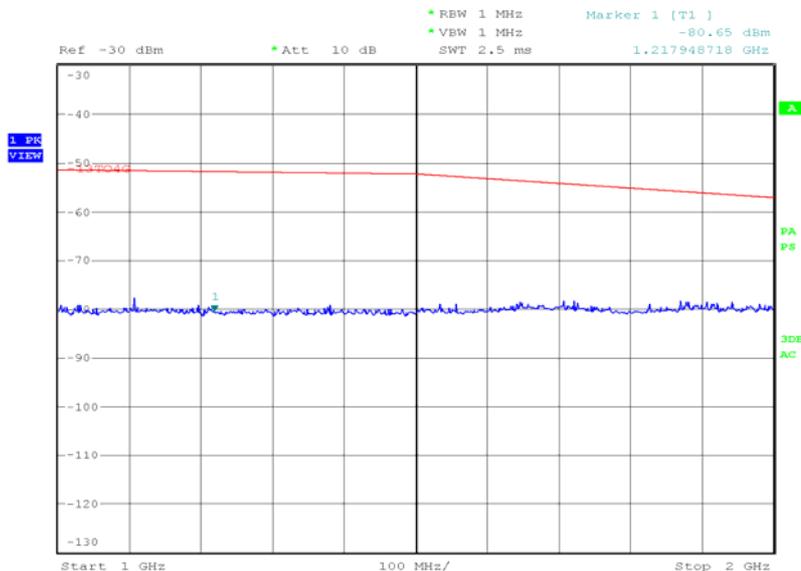
Vertical



Date: 7.JUN.2009 05:29:18



Horizontal

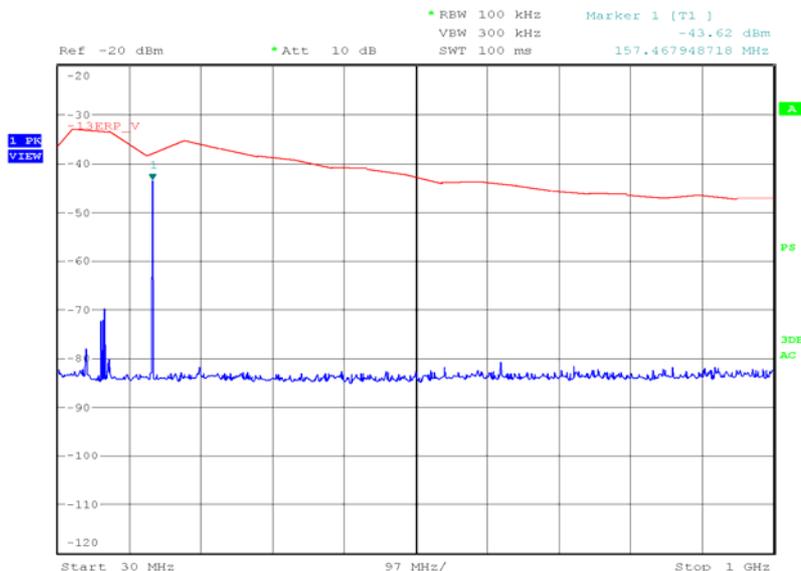


Date: 7.JUN.2009 05:26:25

Top Channel 88 (157.425MHz)

30MHz to 1GHz

Vertical



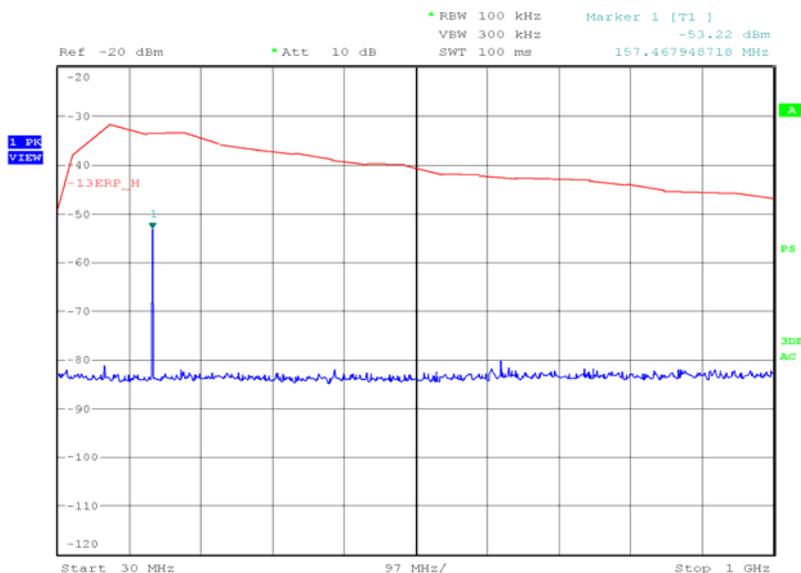
Date: 7.JUN.2009 04:47:23

Plots shows ambients and transmitter only.



Product Service

Horizontal

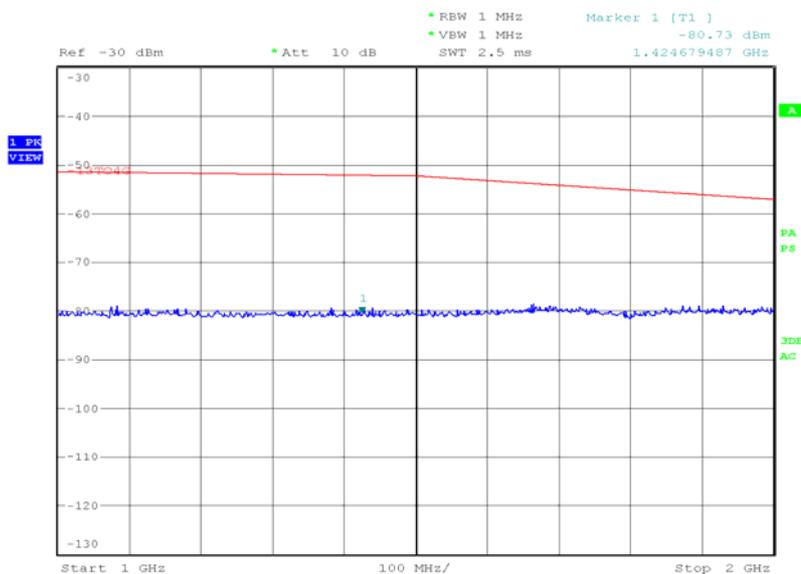


Date: 7.JUN.2009 04:50:07

Plots shows ambients and transmitter only.

1GHz to 2GHz

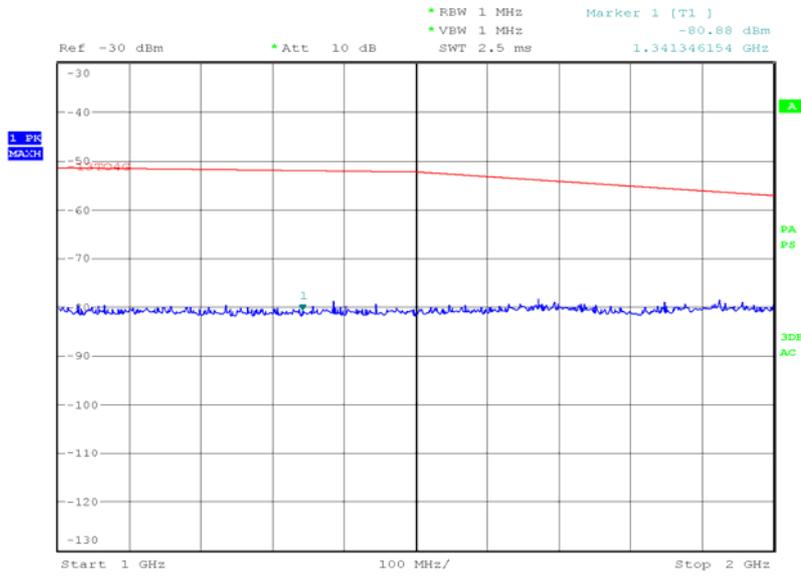
Vertical



Date: 7.JUN.2009 04:59:09



Horizontal



Date: 7.JUN.2009 04:57:13



Product Service

2.2 TIME OUT TIMER

2.2.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.141 (d)
 RSS-182, Clause 3.7

2.2.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.1

2.2.3 Date of Test and Modification State

24 June 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 activated on channel 01 and maintained an output power of +43.43 dBm for a period of 5 minutes. After 5 minutes the EUT stops transmitting and the display shows a timeout warning. The EUT then enters into receive mode.

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

Configuration 1 - Mode 1

2.2.6 Environmental Conditions

24 June 2009
 Ambient Temperature 24°C
 Relative Humidity 47%

2.2.7 Test Results

The TOT circuitry shall be enabled when utilising a manually operated press-to-talk (PTT) switch.

Test Condition	Transmission Time (min)
	156.800 MHz
Transmission Period (min)	4 minutes 59.6 seconds
Measurement Uncertainty (s)	±0.5

Limit Clause
 Industry Canada 3.7
 FCC 80.141(d)

The TOT shall activate within 5 minutes of constant transmit ±10%



Product Service

2.3 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.3.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.209(a)
RSS-182, Clause 4.2, 6.1 and 3.9

2.3.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.3.3 Date of Test and Modification State

09 July 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 set to transmit an unmodulated carrier on channels 01, 16, 70 and 88 at maximum power. Using a frequency counter, the frequency error was measured and the result recorded. For test purposes channel 70 was offset to 156.500MHz.

The voltage to the EUT was varied as shown in the table of results at a temperature of 20°C.

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

Configuration 2 - Mode 1

2.3.6 Environmental Conditions

	09 July 2009
Ambient Temperature	20.2°C
Relative Humidity	42.1%



Product Service

2.3.7 Test Results

Channel: 16 Frequency: 156.800 MHz

DC Voltage (V)	Test Frequency (MHz)	Error (kHz)	Limit (kHz)
10.8	156.800	+0.414	± 1.5680
12.0	156.800	+0.423	± 1.5680
13.2	156.800	+0.407	± 1.5680

Channel: 1 Frequency: 156.050 MHz

DC Voltage (V)	Test Frequency (MHz)	Error (kHz)	Limit (kHz)
10.8	156.025	+0.415	±1.56050
12.0	156.025	+0.422	±1.56050
13.2	156.025	+0.410	±1.56050

Channel: 70 Frequency: 156.500 MHz

DC Voltage (V)	Test Frequency (MHz)	Error (kHz)	Limit (kHz)
10.8	157.425	+0.092	±1.56500
12.0	157.425	+0.087	±1.56500
13.2	157.425	+0.089	±1.56500

Channel: 88 Frequency: 156.725 MHz

DC Voltage (V)	Test Frequency (MHz)	Error (kHz)	Limit (kHz)
10.8	157.425	+0.416	±1.57425
12.0	157.425	+0.426	±1.57425
13.2	157.425	+0.409	±1.57425

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

±1.56025 kHz / ± 1.57425 kHz or 10ppm



Product Service

2.4 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.4.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.209(a)
RSS-182, Clause 6.2, 6.1 and 3.9

2.4.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.4.3 Date of Test and Modification State

09 July 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

The EUT was set to transmit an unmodulated carrier on channels 01, 16, 70 and 88 at maximum power. Using a frequency counter, the frequency error was measured and the result recorded. The temperature was adjusted between -20° and +55° in 10° steps.

For test purposes channel 70 was offset to 156.500MHz

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

Configuration 2 - Mode 1

2.4.6 Environmental Conditions

	09 July 2009
Ambient Temperature	20.4°C
Relative Humidity	38.1%



Product Service

2.4.7 Test Results

Configuration 1 – Mode 1

Transmitting at 25W

Channel: 16 Frequency: 156.800 MHz

Temperature Interval °C	Test Frequency (MHz)	Deviation (kHz)	Error (ppm)
-20	156.800	+0.855	±1.57
-15	156.800	+0.793	±1.57
-10	156.800	+0.911	±1.57
0	156.800	+0.908	±1.57
+10	156.800	+0.773	±1.57
+20	156.800	+0.617	±1.57
+30	156.800	+0.357	±1.57
+40	156.800	+0.199	±1.57
+50	156.800	+0.196	±1.57
+55	156.800	+0.356	±1.57

Channel: 1 Frequency: 156.050 MHz

Temperature Interval °C	Test Frequency (MHz)	Deviation (kHz)	Error (ppm)
-20	156.025	+0.866	±1.57
-15	156.025	+0.773	±1.57
-10	156.025	+0.907	±1.57
0	156.025	+0.903	±1.57
+10	156.025	+0.770	±1.57
+20	156.025	+0.612	±1.57
+30	156.025	+0.357	±1.57
+40	156.025	+0.197	±1.57
+50	156.025	+0.194	±1.57
+55	156.025	+0.352	±1.57



Product Service

Channel: 70 Frequency: 156.500 MHz

Temperature Interval °C	Test Frequency (MHz)	Deviation (kHz)	Error (ppm)
-20	156.525	+0.703	±1.57
-15	156.525	+0.804	±1.57
-10	156.525	+0.908	±1.57
0	156.525	+0.905	±1.57
+10	156.525	+0.769	±1.57
+20	156.525	+0.624	±1.57
+30	156.525	+0.349	±1.57
+40	156.525	+0.200	±1.57
+50	156.525	+0.201	±1.57
+55	156.525	+0.343	±1.57

Channel: 88 Frequency: 157.425 MHz

Temperature Interval °C	Test Frequency (MHz)	Deviation (kHz)	Error (ppm)
-20	157.425	+0.863	±1.57
-15	157.425	+0.792	±1.57
-10	157.425	+0.914	±1.57
0	157.425	+0.911	±1.57
+10	157.425	+0.774	±1.57
+20	157.425	+0.623	±1.57
+30	157.425	+0.355	±1.57
+40	157.425	+0.201	±1.57
+50	157.425	+0.199	±1.57
+55	157.425	+0.351	±1.57

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

± 1.56025kHz / ± 1.57425kHz or 10ppm



Product Service

2.5 EMISSION LIMITATIONS (EMISSION MASK)

2.5.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.211(f)(1)(2)
RSS-182, Clause 6.3.1 and 6.6

2.5.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.5.3 Date of Test and Modification State

15 July 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 initially connected to a Modulation Analyser and the EUT set to transmit. Using an Audio Analyser, an audio frequency was swept between 100Hz to 5kHz to find the frequency which produced the highest deviation.

The amplitude at this frequency was then increased to give a deviation of 2.5kHz.

Then at a frequency of 2.5kHz the amplitude recorded above was increased by 16dB to provide the Final Modulated level.

The EUT transmitting on full power was then connected to a Spectrum Analyser via a 40dB of attenuation. The modulated carrier was checked (for the bottom, middle and top channels and channel 70 of the EUT) against the emission mask. For channel 70 the EUT was configured to transmit B, Y states and dotting pattern.

The Path Loss was recorded and the worst case loss was entered as a Reference Level Offset

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

Configuration 1 - Mode 1

2.5.6 Environmental Conditions

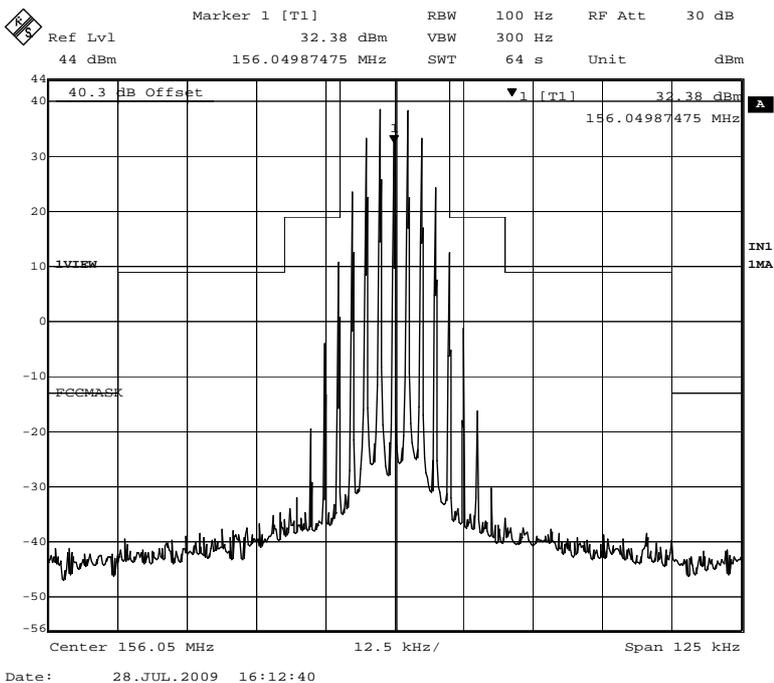
	15 July 2009
Ambient Temperature	24°C
Relative Humidity	50%



2.5.7 Test Results

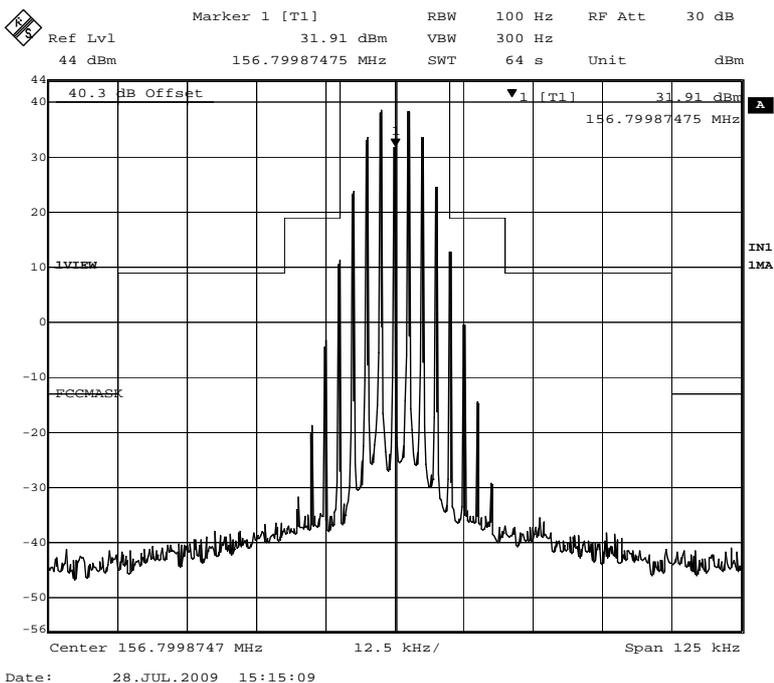
Channel 1: Frequency 156.050 MHz

Transmitting at 25W



Channel 16: Frequency 156.800 MHz

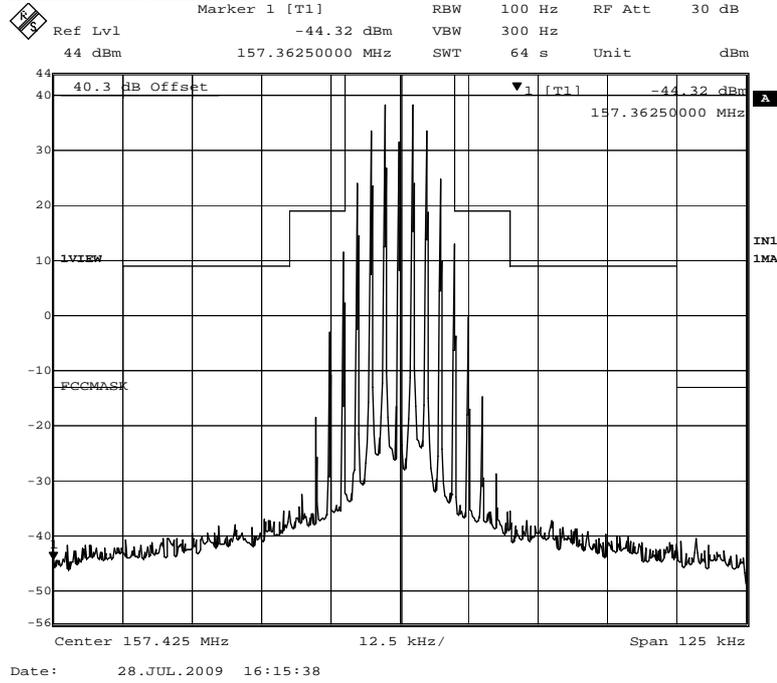
Transmitting at 25W





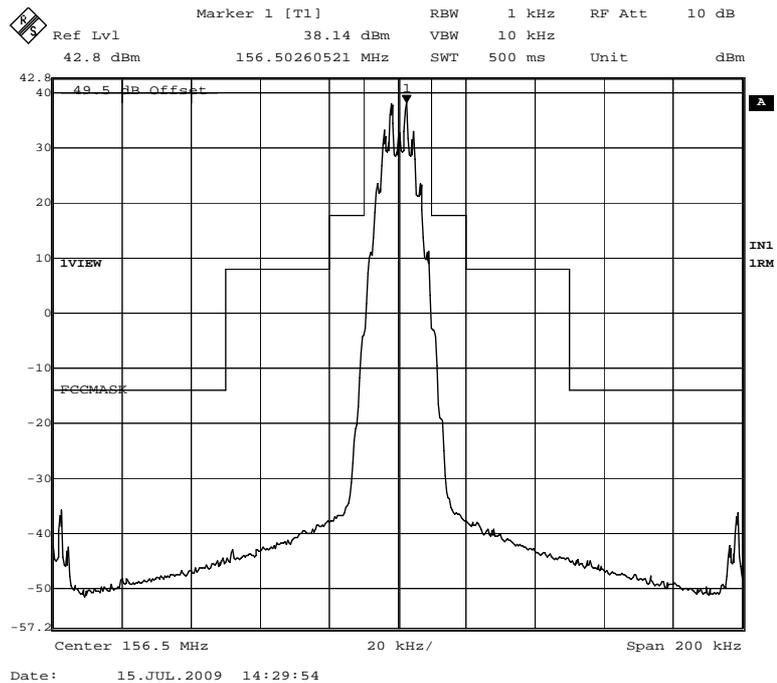
Channel 88: Frequency 157.425 MHz

Transmitting at 25W



DSC Channel 70: Frequency 156.525 MHz

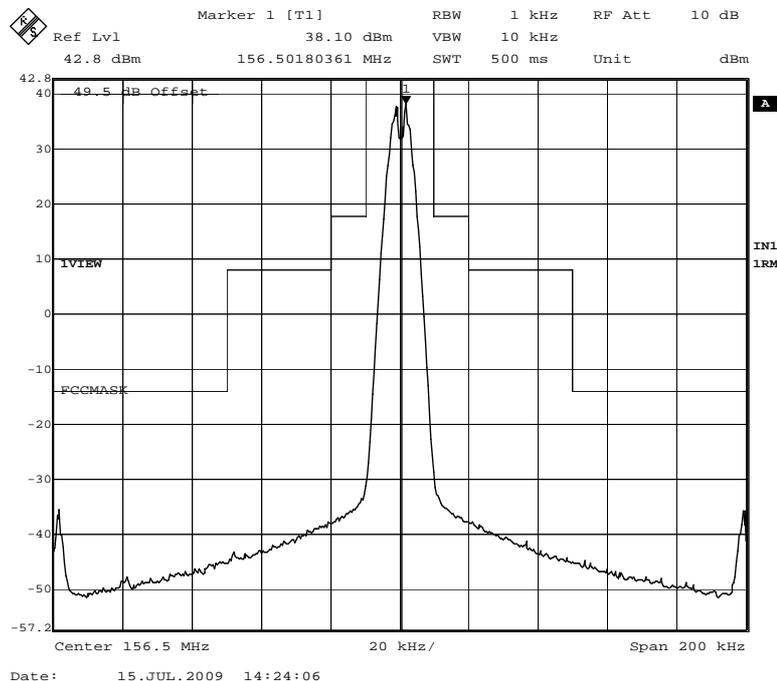
Y-State 1300Hz



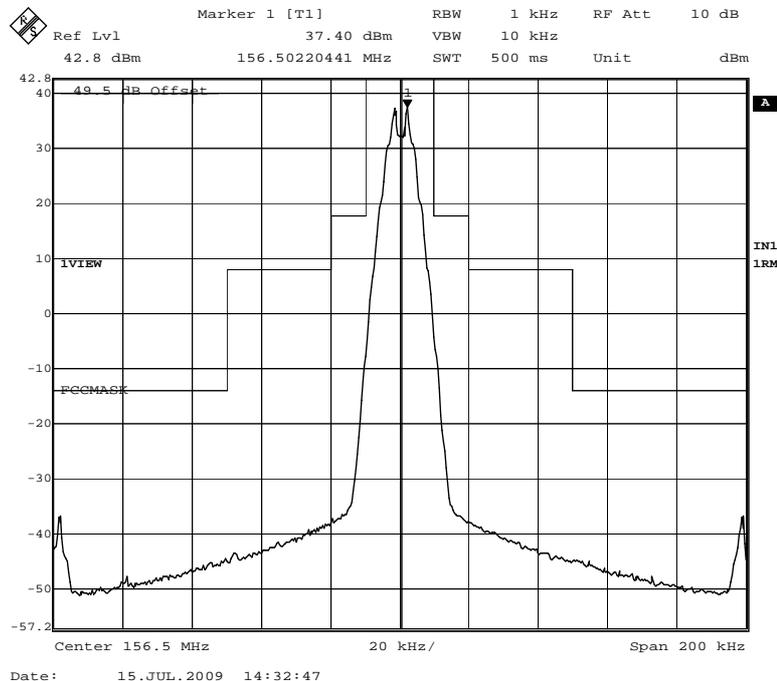


Product Service

B-State 2100Hz



Dotting Pattern





Product Service

2.6 OCCUPIED BANDWIDTH

2.6.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.205(a)
RSS-182, Clause 3.4(d) and (e), 3.9

2.6.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.6.3 Date of Test and Modification State

14 July 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 is declared as having an emission designator of: 16K0G3E.
For voice applications this equates to an Authorised Bandwidth of: G3E (16kHz).
For data applications this equates to an Authorised Bandwidth of: G2B (16kHz).

Initially, the EUT was connected via a 40dB Attenuator to a Modulation Analyser, which was set to measure the Deviation. The audio frequency level was set at a fixed value and the audio frequency which produced the largest deviation was 2.9 kHz. At 2.9 kHz the audio input level was increased until a deviation of 2.5 kHz was achieved. The level was then increased by 16dB. The audio frequency was then adjusted to 2.5 kHz.

The Modulation Analyser was then replaced with a Spectrum Analyser and the 99% Bandwidth was measured. The measurements were performed on Channel 16, bottom and top channels and channel 70 on maximum power levels.

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

Configuration 1 - Mode 1

2.6.6 Environmental Conditions

	14 July 2009
Ambient Temperature	24°C
Relative Humidity	47%



Product Service

2.6.7 Test Results

Configuration 1 - Mode 1

Channel Number/Frequency	Power Level (W)	Result (kHz)	Authorised Bandwidth (kHz)
01 / 156.050MHz	25	15.09268	20
16 / 156.800MHz	25	15.03000	20
88 / 157.425MHz	25	15.09268	20
70 / 156.525MHz (B-State)	25	8.026	20
70 / 156.525MHz (Y-State)	25	12.745	20
70 / 156.525MHz (Dotting)	25	11.062	20

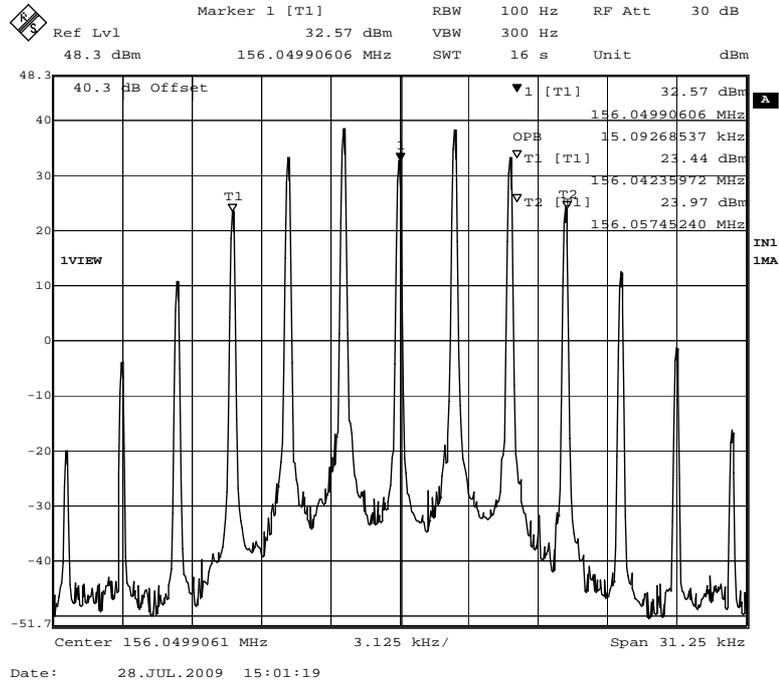
Limit:
 Industry Canada Clause 3.4(d)(e)
 FCC Clause 80.205(d)

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



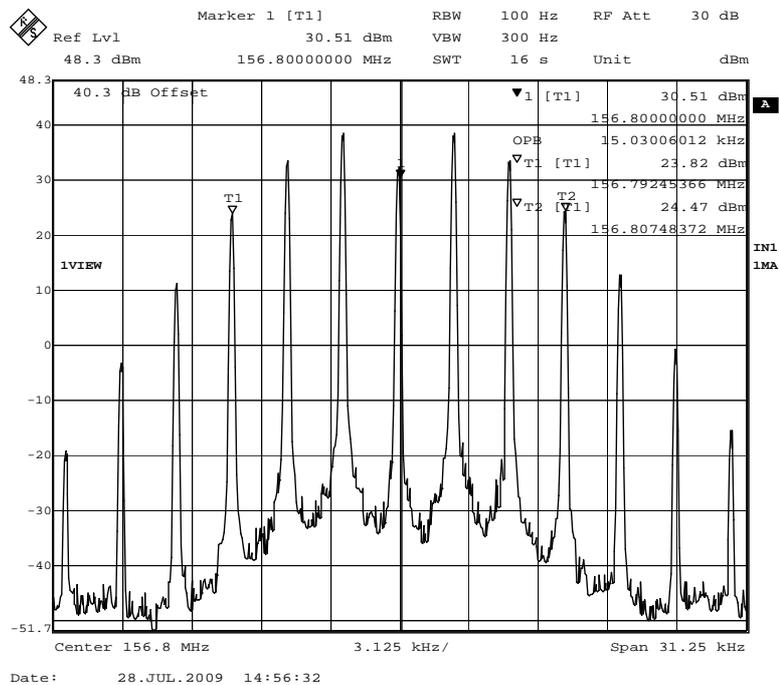
Channel 1: Frequency 156.050 MHz

Transmitting at 25W



Channel 16: Frequency 156.800 MHz

Transmitting at 25W

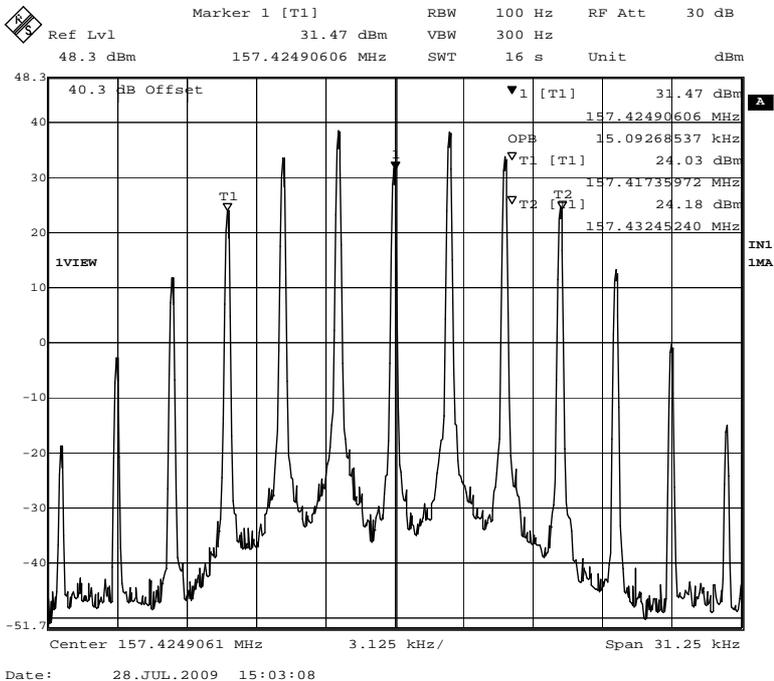




Product Service

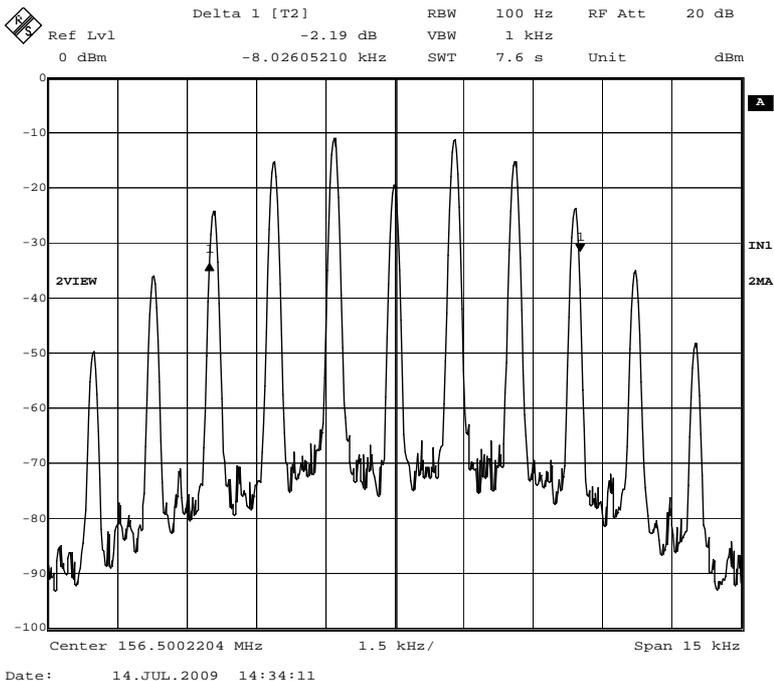
Channel 88: Frequency 157.425 MHz

Transmitting at 25W



DSC Channel 70: Frequency 156.525 MHz

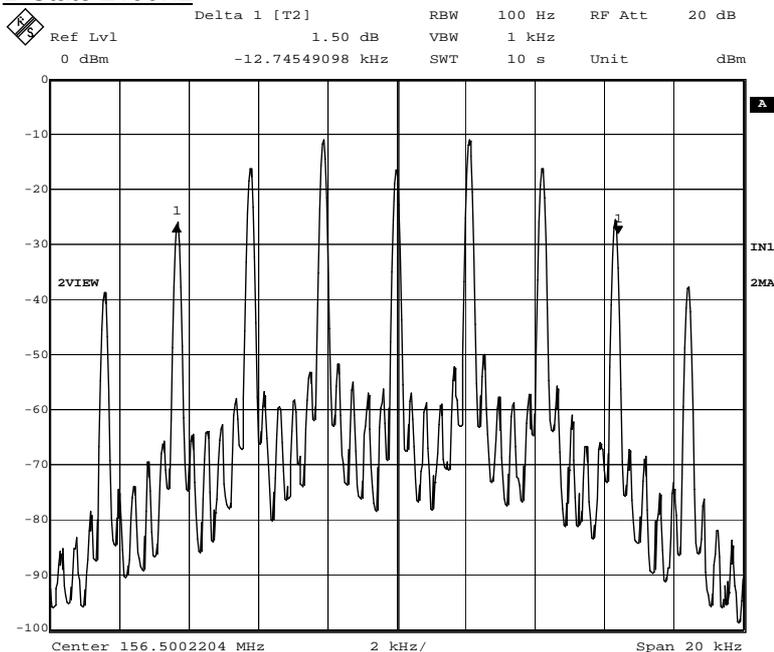
Y-State 1300Hz





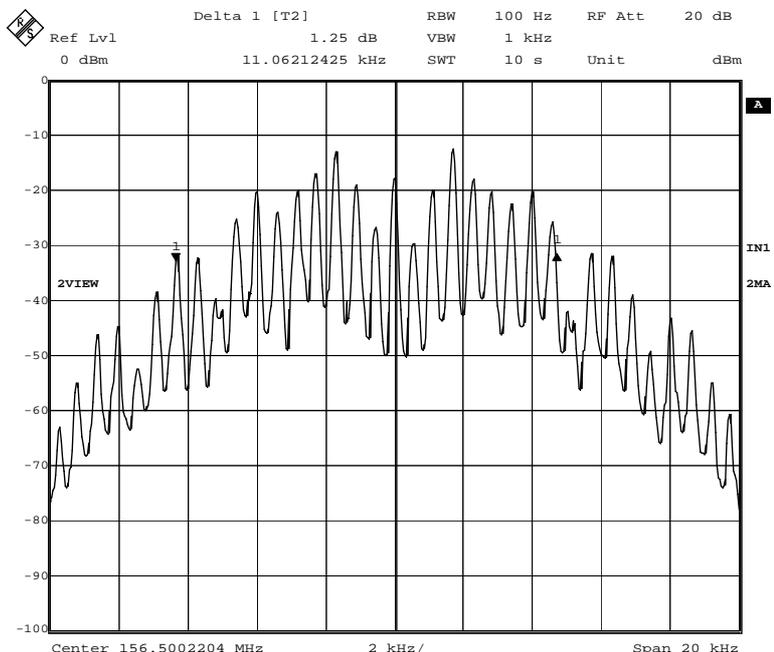
Product Service

B-State 2100Hz



Date: 14.JUL.2009 14:42:15

Dotting Pattern



Date: 14.JUL.2009 14:56:24



Product Service

2.7 EMISSION LIMITATIONS (CONDUCTED TRANSMITTER SPURIOUS)

2.7.1 Specification Reference

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

2.7.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.7.3 Date of Test and Modification State

15 July 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 transmitting on full power, was connected to a Spectrum Analyser via 50dB of attenuation in the 9kHz – 300MHz frequency range and via a 30dB attenuator with 300MHz High Pass Filter in the 300MHz – 2GHz frequency range.

The EUT was checked (for bottom, middle, top channels and channel 70 of the EUT) against the specification limit for all emissions >250% removed from the assigned frequency, between 9kHz – 2GHz frequency range.

The Path Loss for each frequency range was recorded and the worst case loss was entered as a Reference Level Offset.

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

Configuration 1 - Mode 1

2.7.6 Environmental Conditions

	15 July 2009
Ambient Temperature	24°C
Relative Humidity	48%



Product Service

2.7.7 Test Results

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

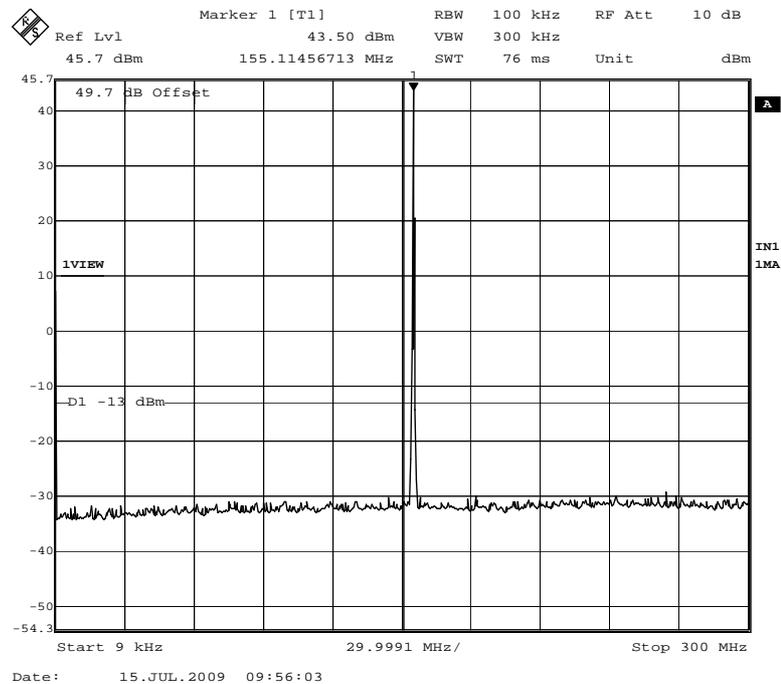
>250% of authorised bandwidth	43+10 Log P
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The test result plots are presented below.

Transmitting at 25W

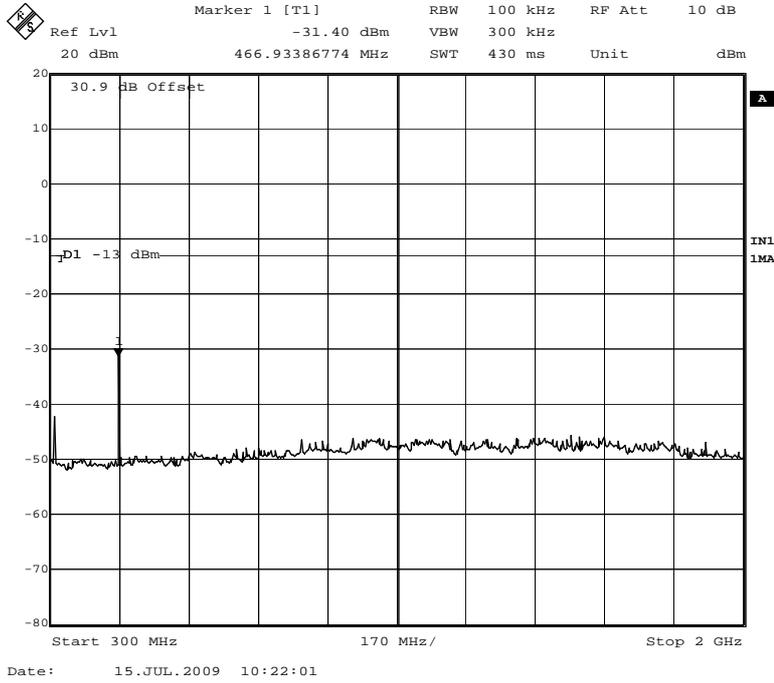
Channel 1: Frequency 156.050 MHz

9 kHz to 300MHz



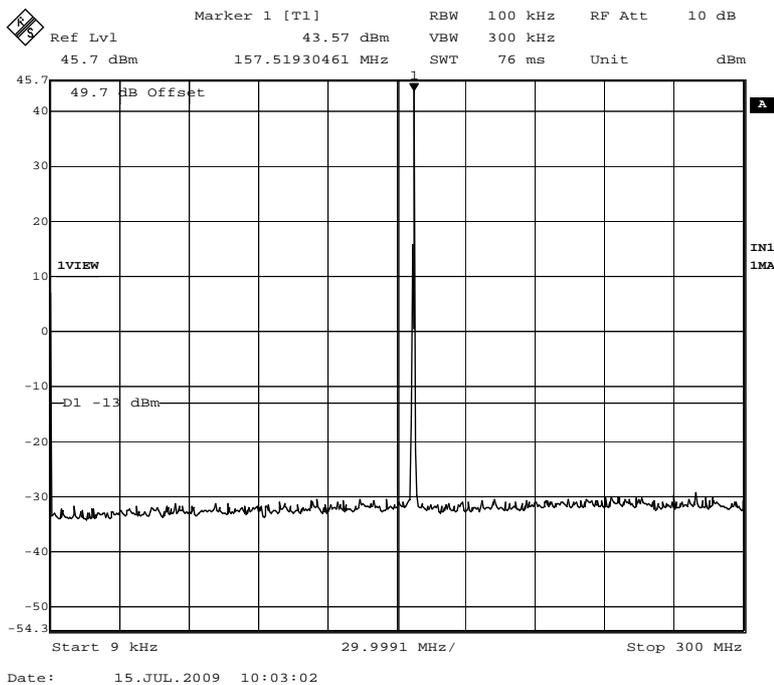


300 MHz to 2 GHz



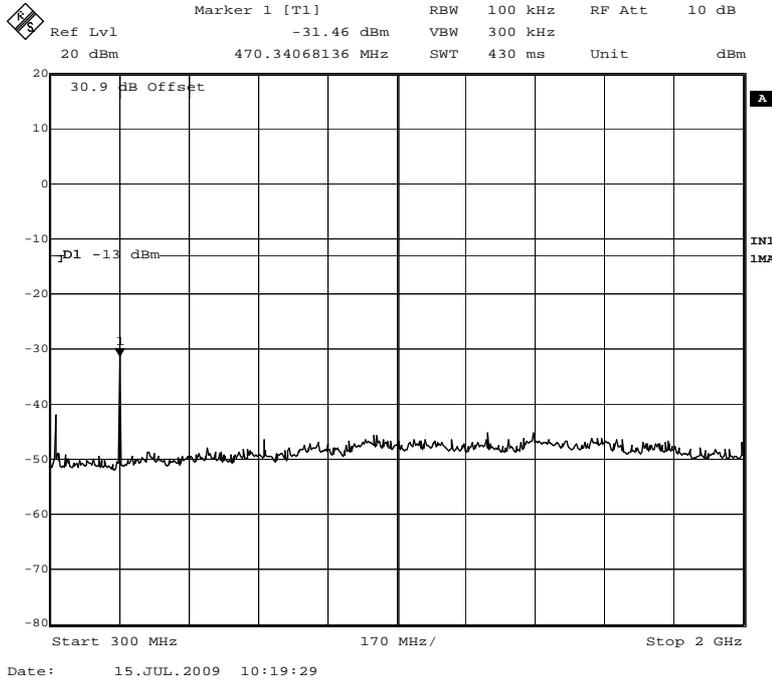
Channel 88: Frequency 157.425 MHz

9 kHz to 300 MHz



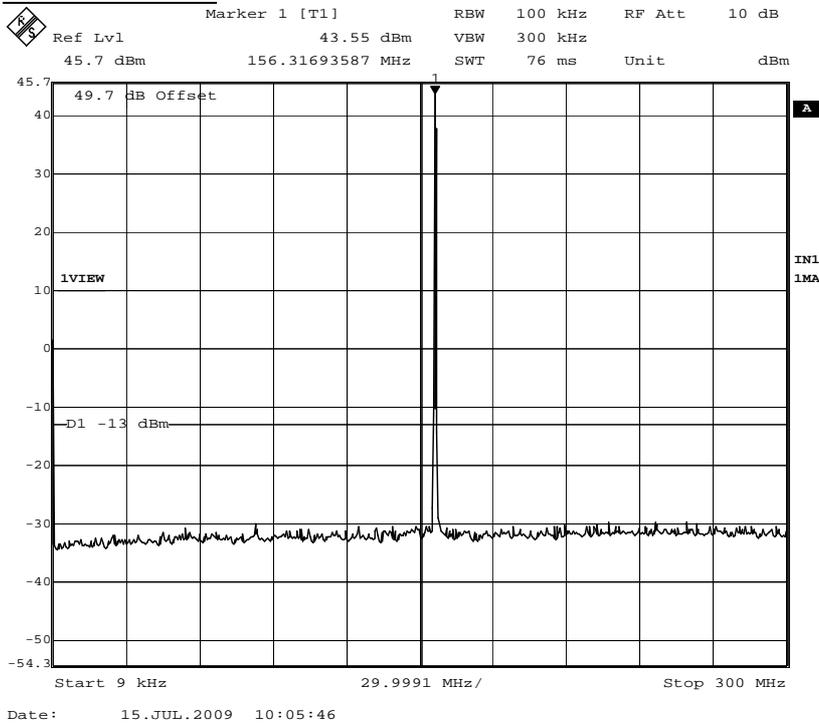


300 MHz to 2 GHz



DSC Channel 70: Frequency 156.500 MHz

9 kHz to 300 MHz





Product Service

2.8 MODULATION REQUIREMENTS

2.8.1 Specification Reference

FCC CFR 47 Part 80, Clause 2.1047(a), 80.213

2.8.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.1

2.8.3 Date of Test and Modification State

10 July 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

A curve has been produced displaying the frequency response of the audio modulating circuit over a range of 100Hz to 5kHz. The plot shows the data for all of the circuitry installed between the microphone input and the modulated stage.

The EUT was connected to a Modulation Analyser via a 40dB Attenuator. An Audio Analyser was connected to the microphone input at a set voltage level and the frequency varied between 100Hz and 5kHz. The demodulated audio was measured and plotted as a graph, which is shown overleaf.

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

Configuration 4 - Mode 1

2.8.6 Environmental Conditions

	10 July 2009
Ambient Temperature	22°C
Relative Humidity	43%

2.8.7 Test Results

Configuration 1 – Mode 1

Deviation versus input voltage/frequency – 25W

The input voltage and frequency were varied across the range shown in the following table. This demonstrates the point at which the deviation limits for a given input voltage and frequency.



Channel 1: Frequency 156.050 MHz

Audio Input Level to EUT (mV)	Peak Frequency Deviation (kHz)					Maximum Deviation Limit (kHz)
	100 Hz	500 Hz	1000 Hz	3000 Hz	5000 Hz	
1	0.210	0.262	0.336	0.596	0.260	5.0
2	0.223	0.342	0.502	1.008	0.318	5.0
4	0.246	0.493	0.823	1.848	0.446	5.0
8	0.304	0.802	1.478	3.507	0.665	5.0
10	0.330	0.967	1.800	3.901	0.699	5.0
14	0.381	1.278	2.463	4.110	0.712	5.0
20	0.475	1.753	3.445	4.220	0.722	5.0
30	0.618	2.539	4.046	4.276	0.728	5.0
40	0.768	3.345	4.361	4.297	0.732	5.0
50	0.914	3.664	4.545	4.305	0.733	5.0
80	1.420	3.992	4.763	4.308	0.733	5.0
100	1.728	4.192	4.810	4.310	0.735	5.0
150	2.330	4.800	4.826	4.297	0.732	5.0
200	3.380	4.753	4.838	4.291	0.728	5.0
300	4.059	4.000	4.168	4.290	0.731	5.0
400	3.923	3.992	4.019	4.290	0.732	5.0
Measurement uncertainty (Hz)				± 88.5		



Channel 88: Frequency 157.425 MHz

Audio Input Level to EUT (mV)	Peak Frequency Deviation (kHz)					Maximum Deviation Limit (kHz)
	100 Hz	500 Hz	1000 Hz	3000 Hz	5000 Hz	
1	0.157	0.213	0.298	0.562	0.200	5.0
2	0.162	0.290	0.469	0.994	0.272	5.0
4	0.192	0.450	0.796	1.861	0.398	5.0
8	0.245	0.770	1.462	3.581	0.636	5.0
10	0.268	0.928	1.800	3.949	0.662	5.0
14	0.322	1.250	2.472	4.165	0.689	5.0
20	0.409	1.734	3.461	4.275	0.698	5.0
30	0.548	2.540	4.080	4.326	0.699	5.0
40	0.696	3.358	4.414	4.350	0.701	5.0
50	0.828	3.661	4.594	4.353	0.700	5.0
80	1.243	3.953	4.790	4.368	0.702	5.0
100	1.522	4.156	4.839	4.361	0.701	5.0
150	2.201	4.608	4.882	4.358	0.701	5.0
200	2.893	4.654	4.869	4.349	0.699	5.0
300	3.994	3.989	4.233	4.346	0.701	5.0
400	3.879	4.002	4.091	4.350	0.696	5.0
Measurement uncertainty (Hz)				± 88.5		



Product Service

Maximum permissible frequency deviation – 25W

The EUT was connected as described in the tests above. Initially, an audio signal of 1kHz was applied to the input and the amplitude varied to give a deviation of 3kHz, which in this case was 17.3mV. This level was then increased by 20dB to a level of 173mW. The maximum peak deviation was then measured across the frequency range 100Hz to 10kHz.

Channel 1: Frequency 156.050 MHz

Modulating Frequency (kHz)	Peak Frequency Deviation (kHz)	Maximum Deviation Limit (kHz)
0.1	3.220	5.0
0.2	4.140	5.0
0.4	4.410	5.0
0.6	4.820	5.0
0.8	4.815	5.0
1.0	4.843	5.0
1.2	4.783	5.0
1.4	4.641	5.0
1.6	4.613	5.0
1.8	4.643	5.0
2.0	4.690	5.0
2.5	4.691	5.0
3.0	4.292	5.0
3.5	3.098	5.0
4.0	1.876	5.0
4.5	1.120	5.0
5.0	0.721	5.0
6.0	0.400	5.0
7.0	0.284	5.0
8.0	0.238	5.0
9.0	0.218	5.0
10.0	0.209	5.0
Measurement uncertainty (Hz)	± 88.5	



Channel 88: Frequency 157.425 MHz

Modulating Frequency (kHz)	Peak Frequency Deviation (kHz)	Maximum Deviation Limit (kHz)
0.1	2.682	5.0
0.2	4.237	5.0
0.4	4.506	5.0
0.6	4.917	5.0
0.8	4.901	5.0
1.0	4.934	5.0
1.2	4.846	5.0
1.4	4.706	5.0
1.6	4.665	5.0
1.8	4.705	5.0
2.0	4.778	5.0
2.5	4.812	5.0
3.0	4.365	5.0
3.5	3.125	5.0
4.0	1.874	5.0
4.5	1.102	5.0
5.0	0.695	5.0
6.0	0.357	5.0
7.0	0.230	5.0
8.0	0.180	5.0
9.0	0.168	5.0
10.0	0.153	5.0
Measurement uncertainty (Hz)	± 88.5	

Limit

Limit	≤ 5 kHz
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Product Service

2.9 MODULATION CHARACTERISTICS

2.9.1 Specification Reference

FCC CFR 47 Part 80, Clause 2.1047(a), 80.213

2.9.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.1

2.9.3 Date of Test and Modification State

13 July 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

A curve has been produced displaying the frequency response of the audio modulating circuit over a range of 100Hz to 5kHz. The plot shows the data for all of the circuitry installed between the microphone input and the modulated stage.

The EUT was connected to a Modulation Analyser via a 40dB Attenuator. An Audio Analyser was connected to the microphone input at a set voltage level and the frequency varied between 100Hz and 5kHz. The demodulated audio was measured and plotted as a graph, which is shown overleaf.

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

Configuration 4 - Mode 1

2.9.6 Environmental Conditions

	13 July 2009
Ambient Temperature	24°C
Relative Humidity	41%

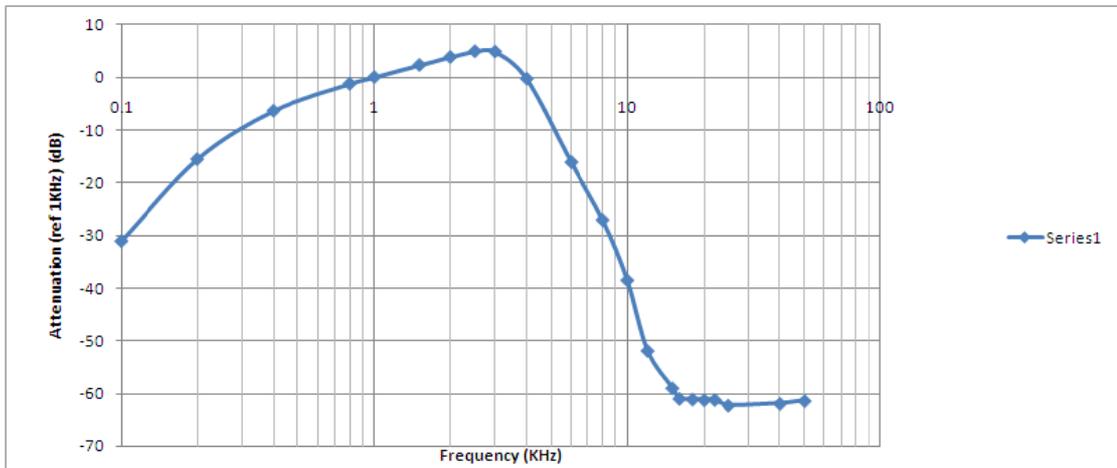
2.9.7 Test Results

Configuration 1 – Mode 1



Product Service

MODULATION FREQUENCY (Hz)	MAXIMUM DEVIATION (kHz)
	156.800 MHz
Lowest frequency	-
100	-31.07
200	-15.53
400	-6.38
1000	-1.27
1500	0.00
2000	+2.29
2500	+3.80
3000	+4.88
4000	+4.83
5000	-0.30
6000	-16.10
8000	-27.08
10000	-38.48
12000	-51.84
15000	-58.92
16000	-60.92
18000	-61.05
20000	-61.18
22000	-61.12
25000	-62.21
40000	-61.86
50000	-61.34
Measurement uncertainty (Hz)	± 85





Product Service

2.10 TRANSMITTER POWER

2.10.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.215
RSS-182, Clause 3.7, 3.9, 4.3 and 6.2

2.10.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.10.3 Date of Test and Modification State

16 July 2009 - Modification State 0

2.10.4 Test Equipment Used

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

2.10.5 Test Procedure

The EUT was connected via a 30dB attenuator to a modulation analyser. 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 and the highest power recorded.

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

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

Configuration 1 - Mode 1

Configuration 2 - Mode 1

2.10.6 Environmental Conditions

	16 July 2009
Ambient Temperature	24°C
Relative Humidity	48%



Product Service

2.10.7 Test Results

Configuration 1 – Mode 1

Maximum Power – 25W

Frequency (MHz)	Result (dBm) Unmodulated	Result (W) Modulated	Result (dBm) Modulated	Result (W) Unmodulated
01 / 156.050	43.72	23.55	43.81	24.04
16 / 156.800	43.95	24.83	43.97	24.95
88 / 157.425	43.88	24.43	43.78	23.88
70 / 156.525	-	-	43.67	23.28

Limit:
FCC Clause 80.215(g)

≥ 8 and 25 W

Industry Canada

43.98dBm ± 1dB



Product Service

2.11 SUPPRESSION OF INTERFERENCE ABOARD SHIPS

2.11.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.217 (b)

2.11.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.11.3 Date of Test and Modification State

15 July 2009 - Modification State 0

2.11.4 Test Equipment Used

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

2.11.5 Test Procedure

The EUT was connected to a spectrum Analyser via a cable.

No external attenuation was inserted as there is no carrier present in this mode of operation. The emissions were measured from 9kHz to 2GHz. Both the DSC and Voice receivers were active during the test.

The manufacturer declares a maximum antenna gain of 9dBi to be used with the EUT. Thus, in accordance with 80.217(b), the 9dBi 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	-13
30 – 100	4000	6	-3
100 – 300	40000	16	+7
300 - 2000	400000	26	+17

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

Configuration 2 - Mode 2

2.11.6 Environmental Conditions

15 July 2009
 Ambient Temperature 24°C
 Relative Humidity 49%



Product Service

2.12 TRANSMITTER CARRIER POWER REDUCTION

2.12.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.215 (e)(g)(1)(2)(3)
RSS-182, Clause 3.7

2.12.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.12.3 Date of Test and Modification State

16 July 2009 - Modification State 0

2.12.4 Test Equipment Used

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

2.12.5 Test Procedure

The EUT was connected via a 30dB attenuator to a spectrum analyser. The path loss between the EUT and the spectrum analyser was measured and recorded. The analyser reading was adjusted by the path loss value.

The carrier power was measured on the following channels and the carrier power reduction was assessed.

156.375 MHz, 156.650 MHz, 156.775 MHz and 156.825 MHz.

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

Configuration 2 - Mode 1

2.12.6 Environmental Conditions

	16 July 2009
Ambient Temperature	24°C
Relative Humidity	48%



Product Service

2.12.7 Test Results

Configuration 1 – Mode 1

Channel Number / Frequency (MHz)	Default Power (W)	Manual Override to 25 W Possible (Yes or No)
13 / 156.375	0.995	Yes
67 / 156.650	0.998	Yes
75 / 156.775	1.000	No
76 / 156.825	0.991	No

Limit

All transmit and remote control units must be capable of reducing the carrier power to 1 W or less.
All transmitters must automatically reduce the carrier power to 1W or less when transmitting on to 156.375 MHz or 156.650 MHz, and must be provided with a manual override switch which when held by an operator will permit full carrier power operation on 156.375 MHz and 156.650 MHz.
All transmitters must be capable of tuning to 156.775 MHz and 156.825 MHz and must automatically reduce the carrier power to 1W or less, with no manual override capability, when the transmitter is tuned to either 156.775 MHz or 156.825 MHz.



Product Service

2.13 RECEIVER SPURIOUS EMISSIONS**2.13.1 Specification Reference**

FCC CFR 47 Part 80, Clause 15.109
RSS-182, Clause 6.7

2.13.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.13.3 Date of Test and Modification State

15 July 2009 - Modification State 0

2.13.4 Test Equipment Used

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

2.13.5 Test Procedure

The test was applied in accordance with the test method requirements of ANSI 63.4.

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

Configuration 1 - Mode 1

2.13.6 Environmental Conditions

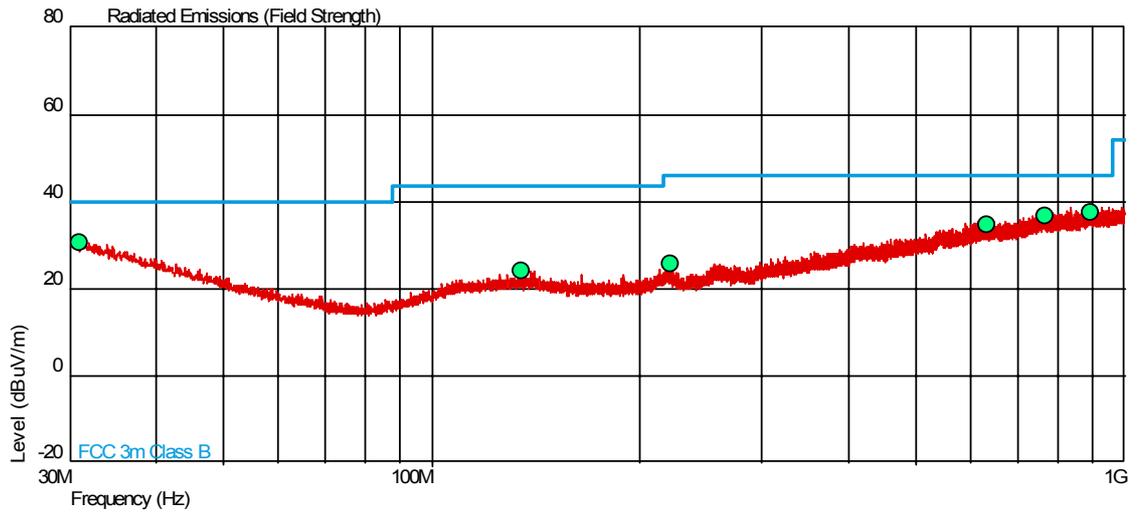
	15 July 2009
Ambient Temperature	24°C
Relative Humidity	49%



2.13.7 Test Results

Configuration 1 – Mode 1

12.0 V supply



Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.973	30.7	40.0	-9.3	290	1.00	Vertical
134.979	24.0	43.5	-19.5	223	1.00	Vertical
221.013	25.6	46.0	-20.4	129	1.00	Vertical
634.445	34.5	46.0	-11.5	357	1.00	Horizontal
766.946	36.8	46.0	-9.2	194	1.00	Vertical
896.271	37.6	46.0	-8.4	255	2.01	Vertical



Product Service

2.14 TRANSMITTER FREQUENCY DEVIATION (DSC)

2.14.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.213 (d)
 RSS-182, Clause 3.4(b)

2.14.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.14.3 Date of Test and Modification State

13 July 2009 - Modification State 0

2.14.4 Test Equipment Used

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

2.14.5 Test Procedure

The EUT was connected to a modulation analyser via a 30 dB attenuator and a power sensor. The EUT was set to transmit and modulated with the following DSC tones:

Space (B), Mark (Y) and dotting pattern.

The modulation for each tone was measured.

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

Configuration 4 - Mode 1

2.14.6 Environmental Conditions

13 July 2009
 Ambient Temperature 24°C
 Relative Humidity 41%

2.14.7 Test Results

Configuration 1 – Mode 1

Test Condition	Frequency Deviation (kHz)
	156.500
Space (B)	4.07
Mark (Y)	2.77
Dotting Pattern	4.10

Limit

Maximum Permissible Deviation	± 5 KHz.
-------------------------------	----------



Product Service

2.15 TRANSMITTER AUDIO FREQUENCY RESPONSE

2.15.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.213 (d)
RSS-182, Clause 3.4(b)

2.15.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.1

2.15.3 Date of Test and Modification State

11 June 2009 - Modification State 0

2.15.4 Test Equipment Used

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

2.15.5 Test Procedure

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

Configuration 3 - Mode 1

2.15.6 Environmental Conditions

	11 June 2009
Ambient Temperature	25°C
Relative Humidity	34%

2.15.7 Test Results

Modulation Frequency (Hz)	Frequency Response (dB relative to 1 kHz)
	156.800 MHz
300	-10.70
400	-8.23
500	-6.21
600	-4.66
800	-2.07
1000	0 (ref)
1500	+3.77
2000	+6.33
2500	+7.87
3000	+8.19
Measurement Uncertainty	± 27.2

Remarks

The table on the previous page shows the pre-emphasis characteristics of the EUT.



Product Service

2.16 FREQUENCY TOLERANCE OF B AND Y STATES (DSC)

2.16.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.225
 RSS-182, Clause 3.9, 6.4 (b)

2.16.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.16.3 Date of Test and Modification State

13 July 2009 - Modification State 0

2.16.4 Test Equipment Used

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

2.16.5 Test Procedure

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

Configuration 4 - Mode 1

2.16.6 Environmental Conditions

13 July 2009
 Ambient Temperature 24°C
 Relative Humidity 44%

2.16.7 Test Results

Configuration 4 – Mode 1

Power level at which the measurement was carried out: 25W.

Test Conditions		Demodulated Signal Frequency (Hz)	
		B State	Y State
T _{nom} (24°C)	V _{nom} (12.0 V)	2102.478	1301.224

Limit

The measured frequency from the demodulator at any time for the B state shall be within 2100 Hz ± 10 Hz and for the Y State within 1300 Hz ± 10Hz.



Product Service

2.17 MODULATION INDEX (DSC)

2.17.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.225
RSS-182, Clause 3.9

2.17.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.17.3 Date of Test and Modification State

13 July 2009 - Modification State 0

2.17.4 Test Equipment Used

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

2.17.5 Test Procedure

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

Configuration 4 - Mode 1

2.17.6 Environmental Conditions

	13 July 2009
Ambient Temperature	24°C
Relative Humidity	41%

2.17.7 Test Results

Configuration 4 – Mode 1

Power level at which the measurement was carried out: 25W.

Test Conditions		Modulation Index	
		B State	Y State
T _{nom} (24°C)	V _{nom} (12.0 V)	1.936	2.219

Limit

The modulation index shall be 2.0 ± 10 %
--



Product Service

2.18 MODULATION RATE (DSC)

2.18.1 Specification Reference

FCC CFR 47 Part 80, Clause 80.225
RSS-182, Clause 3.9

2.18.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No.3

2.18.3 Date of Test and Modification State

13 July 2009 - Modification State 0

2.18.4 Test Equipment Used

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

2.18.5 Test Procedure

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

Configuration 4 - Mode 1

2.18.6 Environmental Conditions

	13 July 2009
Ambient Temperature	24°C
Relative Humidity	42%

2.18.7 Test Results

Configuration 4 – Mode 1

Power level at which the measurement was carried out: 25W.

Test Conditions		Modulation Index		
		Hz	Bit/s	Error (PPM)
T _{nom} (24°C)	V _{nom} (12 V)	600.001	1200.002	1.667

Limit

The frequency shall be 600 Hz ± 30 ppm corresponding to a modulation rate of 1200 bauds (bits/s)
--



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 and 2.13 EMC - Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	6-Sep-2009
Attenuator (30dB, 200W)	Bird	8322	562	12	15-Jan-2010
Audio Analyser	Hewlett Packard	8903B	576	12	27-May-2010
Modulation Analyser	Hewlett Packard	8901B	773	12	18-May-2010
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable/Mast Controller	EMCO	2090	1607	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	20-Aug-2009
Section 2.2 Radio (Tx) - Time Out Timer					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Sports Timer	Maplin Electronics	Stopwatch	2910	12	12-Dec-2009
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.3 Radio (Tx) - Frequency Characteristics					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	22-Jul-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.4 Radio (Tx) - Frequency Tolerance under Temperature Variations					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	22-Jul-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Digital Temperature Indicator	Fluke	51	1385	12	29-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 and 2.7 Radio (Tx) - Conducted Spurious Emissions					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	18-Jun-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
High Pass Filter	Mini-Circuits	NHP-300	1640	12	12-Aug-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Filter (Hi Pass)	Mini-Circuits	NHP-800	2835	12	12-Nov-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	21-Apr-2010
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	9-Jun-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-May-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.6 Radio (Tx) - Occupied Bandwidth					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	21-Apr-2010
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	9-Jun-2010
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Section 2.8 and 2.9 Radio (Tx) - Modulation Characteristics					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Modulation Analyser	Rohde & Schwarz	FMAV	3338	12	13-Aug-2009
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-May-2010



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.10 Radio (Tx) - Power Characteristics					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Peak Power Analyser	Hewlett Packard	8990A	107	12	2-Feb-2010
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Power Sensor	Hewlett Packard	84812A	2743	-	TU
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	9-Jun-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.11 Radio (Rx) - Suppression of Interference Aboard Ships					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	21-Apr-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.12 Radio (Tx) - Reduction in Output Power					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	9-Jun-2010
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.15 Radio (Tx) - Audio Frequency Response					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Sensor Module	Hewlett Packard	11722A	1333	12	11-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Modulation Analyser	Hewlett Packard	8901B	3292	12	21-Nov-2009
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.14 and 2.17 Radio (Tx) - DSC - Modulation Index					
Modulation Analyser	Hewlett Packard	8901B	45	12	9-Jul-2010
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.16 Radio (Tx) - DSC - Frequency Error					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.18 Radio (Tx) - DSC - Modulation Rate					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010

TU – Traceability Unscheduled



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



4.1 TEST SET UP PHOTOGRAPHS



Radiated Emissions (Enclosure Port)



Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

5.1 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
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