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Report On

Limited FCC Testing of the
JRC JHS-770S Marine VHF Radio Telephone (Simplex)
In accordance with FCC CFR 47 Part 80: 2006

FCC ID: CKEJHS-770S

Document 75902880 Report 01 Issue 1

August 2008



Product Service

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COMMERCIAL-IN-CONFIDENCE

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Limited FCC Testing of the
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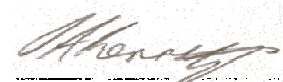
PREPARED FOR

Japan Radio Company
Dean House Farm
Church Gate
Newdigate
RH5 5DL

PREPARED BY


M J Hardy
Senior Engineer

APPROVED BY


S Bennett
Authorised Signatory


J Adams
Authorised Signatory

DATED

14 August 2008

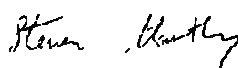
14 August 2008

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

Test Engineers;


B Airs


S Hartley




R A Blagg



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SECTION 1

REPORT SUMMARY

Limited FCC Testing of the
JRC JHS-770S Marine VHF Radio Telephone (Simplex)
In accordance with FCC CFR 47 Part 80: 2006



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Limited FCC Testing of the JRC JHS-770S Marine VHF Radio Telephone (Simplex) to the requirements of FCC CFR 47 Part 80: 2006.

Objective	To perform Radio Approval Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the limited series of tests carried out.
Applicant	Japan Radio Company
Manufacturer	Japan Radio Co., Ltd
Type Number(s)	JHS 770S (Simplex)
Serial Number(s)	BK10268
Number of Samples Tested	One
Test Specification/Issue/Date	FCC CFR 47 Part 80: 2006
Disposal	Held Pending Disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	DX-8422-UD-001
Date	18 January 2008
Start of Test	20 February 2008
Finish of Test	01 August 2008
Name of Engineer(s)	B Airs S Hartley R A Blagg



Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 80: 2006 is shown below.

Configuration 1 - Simplex						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	80.211(c) (f)(3)	Emission Limitations (Conducted Transmitter Spurious)	Tx Top	1	Pass	FCC CFR 47: Part 80: 2006
			Tx Middle	1	Pass	
			Tx Bottom	1	Pass	
			DSC	1	Pass	
2.2	80.211 (f)(3)	Emission Limitations (Radiated Transmitter Spurious)	Tx Top	1	Pass	FCC CFR 47: Part 80: 2006
			Tx Middle	1	Pass	
			Tx Bottom	1	Pass	
			DSC	1	Pass	
2.3	80.215	Transmitter Power	Tx Top	1	Pass	FCC CFR 47: Part 80: 2006
			Tx Middle	1	Pass	
			Tx Bottom	1	Pass	
			DSC	1	Pass	
2.4	80.217(b)	Suppression of Interference Aboard Ships	Tx Top	1	Pass	FCC CFR 47: Part 80: 2006
			Tx Middle	1	Pass	
			Tx Bottom	1	Pass	
			DSC	1	Pass	



1.3 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 :	Japan Radio Company
ADDRESS :	Dean House Farm Church Gate NEWDIGATE RH5 5DL
NAME FOR CONTACT PURPOSES :	Mr. Jim Moon
TELEPHONE NO : +44 (0) 1306 631180	FAX NO : +44 (0) 1306 631180
	E-MAIL : Jrcjimmoon@aol.com

MANUFACTURER'S DETAILS	
COMPANY NAME :	Japan Radio Co., Ltd, Japan
ADDRESS :	Mitaka Plant 1-1 Shimoren jaku 5-Chome Mitaka-SHI Tokyo, 181-8510 Japan
NAME FOR CONTACT PURPOSES :	Mr. Jim Moon
TELEPHONE NO : +44 (0) 1306 631180	FAX NO : +44 (0) 1306 631180
	E-MAIL : Jrcjimmoon@aol.com



TYPE OF EQUIPMENT	
<input type="checkbox"/>	Transmitter
<input checked="" type="checkbox"/>	Transmitter/Receiver
<input type="checkbox"/>	Receiver
<input type="checkbox"/>	Simplex on single-frequency channels
<input type="checkbox"/>	Simplex on two-frequency channels
<input checked="" type="checkbox"/>	Duplex
<input type="checkbox"/>	Separate DSC unit
<input checked="" type="checkbox"/>	Integrated DSC units
<input type="checkbox"/>	Integrated analogue selective calling decoder
Interfaces	
<input type="checkbox"/>	DSC at audio level
<input type="checkbox"/>	DSC at DC level
<input type="checkbox"/>	Printer
<input checked="" type="checkbox"/>	External Speaker / Microphone
<input type="checkbox"/>	DSC watchkeeping receiver antenna output
<input type="checkbox"/>	DSC watchkeeping receiver control



DUPLEX OPERATION		
Is the equipment intended for		
Duplex operation	<input checked="" type="checkbox"/>	Yes
	<input type="checkbox"/>	No
Is the equipment fitted with separate transmitter and receiver antenna sockets		
	<input type="checkbox"/>	Yes
	<input checked="" type="checkbox"/>	No
Is the equipment fitted with a duplex filter as an integral part of the equipment with a single antenna connection socket		
	<input checked="" type="checkbox"/>	Yes
	<input type="checkbox"/>	No
Is the duplex filter externally fitted and connected to the main equipment by co-axial cable(s)		
	<input type="checkbox"/>	Yes
	<input checked="" type="checkbox"/>	No
Type and make of duplex filter		
.....		



Product Service

TRANSMITTER AND RECEIVER CHARACTERISTICS	
NUMBER OF CHANNELS:	
<input checked="" type="checkbox"/>	ITU channels
<input checked="" type="checkbox"/>	USA channels
<input checked="" type="checkbox"/>	PRIVATE channels
<input checked="" type="checkbox"/>	WEATHER channels (Rx Only)
<input type="checkbox"/>	MEMORY channels
DSC CHANNEL(S) (if provided)	
<input checked="" type="checkbox"/>	F2B (G2B)
<input type="checkbox"/>	Other :
CHANNEL SEPARATION :	25 kHz
ITU designation of class of emission(s) :	16K0G3E
ANTENNA IMPEDANCE :	50 ohm



TRANSMITTER TECHNICAL CHARACTERISTICS	
TRANSMITTER FREQUENCY	
Method of frequency generation	
[<input type="checkbox"/>]	CRYSTAL
[<input checked="" type="checkbox"/>]	SYNTHESIZER
[<input type="checkbox"/>]	OTHER
Transmitter frequency bands :	
Channel 60, 156.025MHz to Channel 88, 157.425MHz	
TRANSMITTER MODULATION	
Modulation method : Direct FM	
Occupied bandwidth : 14 kHz	
Maximum frequency deviations : +/- 5 kHz (or less)	
TRANSMITTER MODULATION INPUT CHARACTERISTICS	
Impedance :	
[150Ω]	balanced – Microphone Input Impedence
[<input type="checkbox"/>]	unbalanced

TRANSMITTER RF POWER CHARACTERISTICS	
RATED TRANSMITTER OUTPUT POWER (as stated by the manufacturer)	
Maximum output power :	25 W
Reduced output power :	0.5 W
Output power switch :	[<input checked="" type="checkbox"/>] Yes
	[<input type="checkbox"/>] No



Product Service

TRANSMITTER AND RECEIVER POWER SOURCE (1)			
<input type="checkbox"/>	AC MAINS	State voltage: V	<input type="checkbox"/> Single phase
	AC MAINS FREQUENCY		<input type="checkbox"/> Three phase
<input checked="" type="checkbox"/>	DC Voltage	24VDC (21.6VDC - 31.2VDC)	
	DC Maximum Current	8A (25W transmission), 5A (Reception)	
<input type="checkbox"/>	Other:		
BATTERY			
<input type="checkbox"/>	Nickel Cadmium		
<input type="checkbox"/>	Mercury		
<input type="checkbox"/>	Alkaline		
<input type="checkbox"/>	Lead acid (Vehicle regulated)		
<input type="checkbox"/>	Leclanche		
<input type="checkbox"/>	Lithium		
<input checked="" type="checkbox"/>	None		

(1) If a transmitter and receiver use the same power source, this should be declared. In such cases only the box for the transmitter power source should be filled in.

TX and RX same power source used



RECEIVER TECHNICAL CHARACTERISTICS	
RECEIVER FREQUENCY	
Method of frequency generation :	
<input type="checkbox"/>	CRYSTAL
<input checked="" type="checkbox"/>	SYNTHESISER
<input type="checkbox"/>	OTHER :
Intermediate frequencies :	
<input checked="" type="checkbox"/>	1st 21.4 MHz
<input checked="" type="checkbox"/>	2nd 455 kHz
<input type="checkbox"/>	3rd
Receiver frequency channels :	
Lowest Channel 01 156.050MHz, Highest channel 88 162.025MHz	
Is local oscillator injection frequency higher or lower than the receiver nominal frequency?	
<input type="checkbox"/>	Higher
<input checked="" type="checkbox"/>	Lower



RECEIVER MODULATION OUTPUT CHARACTERISTICS	
RATED AUDIO OUTPUT POWER (as stated by the manufacturer)	
Internal Speaker :	2 W @ 4 ohms
Handset Phone :	1 mW @ 150 ohms
RECEIVER MULTIPLE WATCH FACILITIES	
Dual watch facilities :	
	<input checked="" type="checkbox"/> Yes
	<input type="checkbox"/> No
If Yes, then :	
Selection of priority channel possible ? :	
	<input checked="" type="checkbox"/> Yes (=Ch70 156.525MHz)
	<input type="checkbox"/> No
Multiple watch facilities :	
	<input type="checkbox"/> Yes
	<input checked="" type="checkbox"/> No
If Yes, then :	
Selection of priority channel possible ? :	
	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Number of additional channels selectable :	
Scan time programmable ? :	
	<input type="checkbox"/> Yes
	<input checked="" type="checkbox"/> No



Product Service

RECEIVER POWER SOURCE (1)			
<input type="checkbox"/>	AC MAINS	State voltage: V	<input type="checkbox"/> Single phase
	AC MAINS FREQUENCY		<input type="checkbox"/> Three phase
<input checked="" type="checkbox"/>	DC Voltage	24VDC (21.6VDC - 31.2VDC)	
	DC Maximum Current	8A (25W transmission), 5A (Reception)	
<input type="checkbox"/>	Other:		
BATTERY			
<input type="checkbox"/>	Nickel Cadmium		
<input type="checkbox"/>	Mercury		
<input type="checkbox"/>	Alkaline		
<input type="checkbox"/>	Lead acid (Vehicle regulated)		
<input type="checkbox"/>	Leclanche		
<input type="checkbox"/>	Lithium		
<input type="checkbox"/>	None		

TX and RX same power source used

(1) If a transmitter and receiver use the same power source, this should be declared. In such cases only the box for the transmitter power source should be filled in.



CONSTRUCTION OF THE EQUIPMENT	
<input checked="" type="checkbox"/>	Single unit (1)
<input type="checkbox"/>	Multiple units
If multiple units, describe each one clearly :	
TEMPERATURE RANGES over which the equipment is to be tested	
<input type="checkbox"/>	+15°C to +35°C
<input checked="" type="checkbox"/>	-15°C to +55°C
<input type="checkbox"/>	Other

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



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OTHER ITEMS SUPPLIED		
Spare batteries	<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
Test interface box (if applicable)	<input type="checkbox"/>	Yes
	<input checked="" type="checkbox"/>	No
Full documentation on equipment (Handbook and circuit diagrams)	<input checked="" type="checkbox"/>	Yes
	<input type="checkbox"/>	No
Others	<input checked="" type="checkbox"/>	Yes
	<input type="checkbox"/>	No
If Yes, please specify : USER'S MANUAL		



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DECLARATION		
Are the equipments submitted representative production models ?	<input checked="" type="checkbox"/>	Yes
	<input type="checkbox"/>	No
If not are the equipments pre-production models ?	<input type="checkbox"/>	Yes
	<input type="checkbox"/>	No
If pre-production equipments are submitted will the final production equipments be identical in all respects with the equipment tested	<input type="checkbox"/>	Yes
	<input type="checkbox"/>	No
If no supply full details: Submitted samples have marginal ACR. Samples of improved design representing production will follow for testing conformation. TUV test engineer Simon Bennett has been advised.		
Is the Test Report to be used as part of a R&TTE " Opinion"	<input type="checkbox"/>	Yes
	<input checked="" type="checkbox"/>	No
If yes, has the product, any direct engineering predecessor, or variant ever been granted Type Approval in any EEC member country ?	<input type="checkbox"/>	Yes
	<input type="checkbox"/>	No
If yes supply full details :		
Will labelling of the equipment comply with the requirements of ETS 300 338 ?	<input type="checkbox"/>	Yes
	<input type="checkbox"/>	No

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

Signature : Completed electronically
 Name : Mr Jim Moon
 Position held : Radio Validation Manager
 Date : 19 February 2008

TÜV Product Service 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. Product Information



1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a JRC JHS-770S (Simplex) as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.



Equipment Under Test



Product Service

1.4.2 Test Configurations

Configuration 1: Simplex

The EUT was configured in accordance with FCC CFR 47 Part 80: 2006.

1.4.3 Modes of Operation

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

Mode 1 – Channel 60 Tx

Mode 2 – Channel 16 Tx

Mode 3 – Channel 88 Tx

Mode 4 – Channel 70 Tx (DSC)

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



Product Service

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered from either JRC Power Supply (BJ10393) or an external DC Supply.

The EUT has two power settings, maximum power (25 W) and minimum power (1 W). Testing was performed at maximum power unless otherwise shown.

A test board was supplied to enable the PTT switch and to allow test modulation to be applied.

FCC Accreditation
90987 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

The table below details modifications made to the EUT during the test programme. The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	N/A	N/A
1	Deviation adjustment via software. Instruction provided by Japan Radio Company 03 March 2008.	TUV under Customer instruction	05 March 2008



Product Service

SECTION 2

TEST DETAILS

Limited FCC Testing of the
JRC JHS-770S (Simplex)
In accordance with FCC CFR 47 Part 80: 2006



2.1 EMISSION LIMITATIONS (CONDUCTED TRANSMITTER SPURIOUS)

2.1.1 Specification Reference

FCC CFR 47 Part 80: 2006, Clause 80.211(f)(1)(2) & (3)

2.1.2 Equipment Under Test

JHS-770S (Simplex), S/N: BK10268

2.1.3 Date of Test and Modification State

06 March 2008 - Modification State 1

2.1.4 Test Equipment Used

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

2.1.5 Test Procedure

The EUT transmitting on full power was then connected to a Spectrum Analyser via 50dB of attenuation in the 9kHz - 300MHz frequency range and via a 20dB Attenuator with 300MHz High Pass Filter in the 300MHz - 2GHz frequency range.

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

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

Total Path loss (9kHz - 150MHz) = 50.8dB
 Total Path loss (150MHz - 300MHz) = 51.7dB
 Total Path loss (300MHz - 1.0GHz) = 21.5dB
 Total Path loss (1.0GHz - 2GHz) = 21.83dB

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

Configuration 1 - Mode 1
 - Mode 2
 - Mode 3
 - Mode 4

2.1.6 Environmental Conditions

	06 March 2008
Ambient Temperature	24°C
Relative Humidity	34%

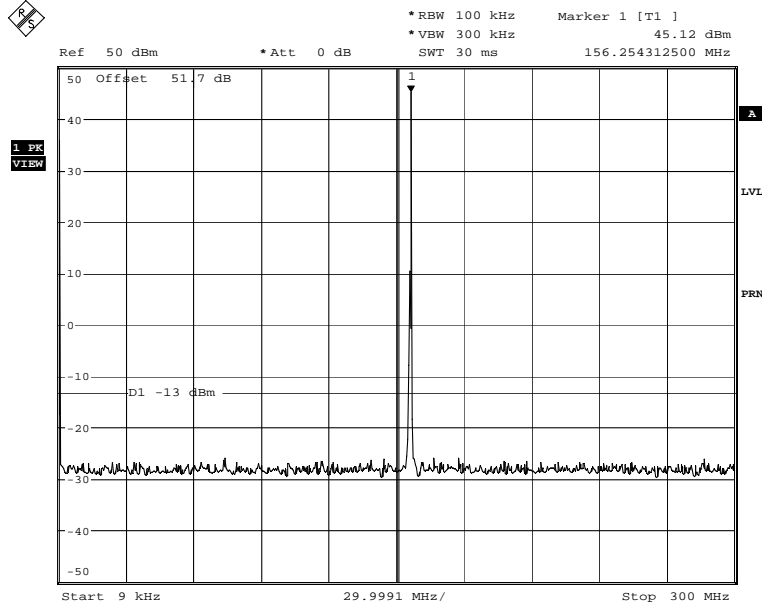


2.1.7 Test Results

Configuration 1 – Mode 1

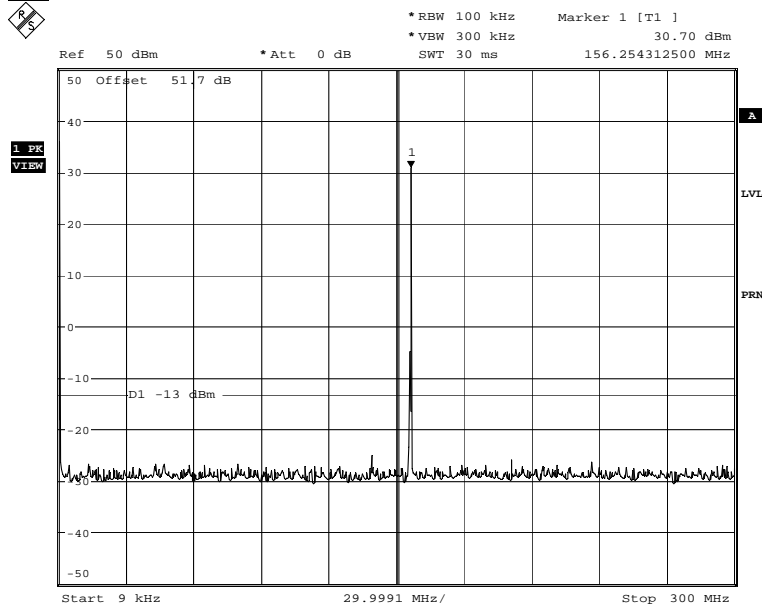
Bottom Channel – 60 – 9kHz to 300MHz

25W



Date: 6.MAR.2008 16:11:24

1W



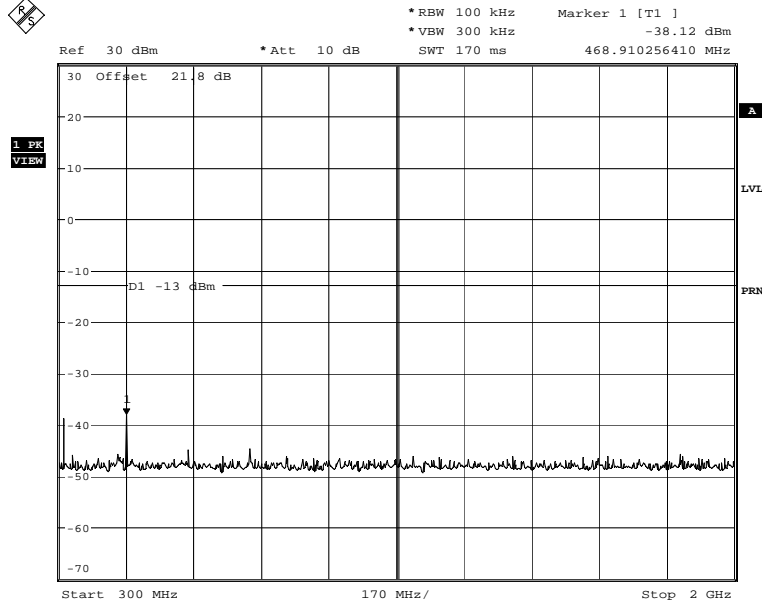
Date: 6.MAR.2008 16:39:01



Product Service

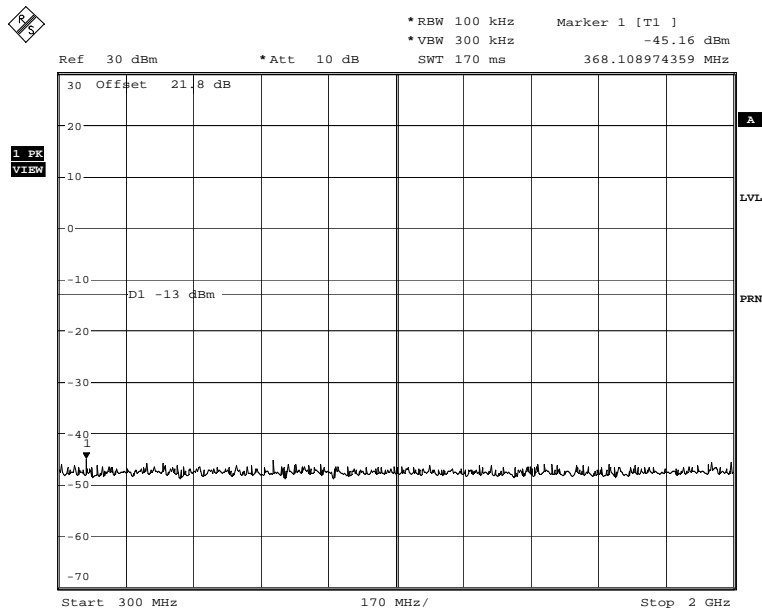
Bottom Channel – 16 – 300 MHz to 2000 MHz

25W



Date: 6.MAR.2008 17:09:04

1W



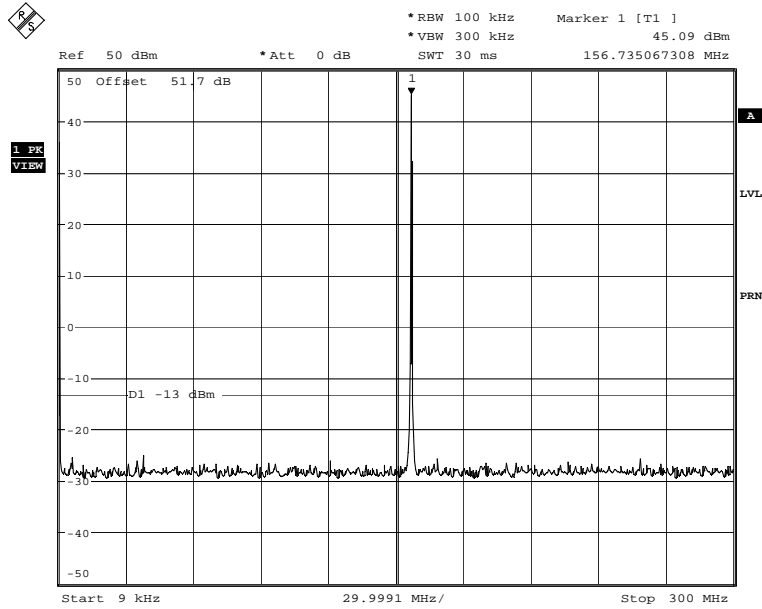
Date: 6.MAR.2008 17:11:09



Configuration 1 – Mode 2

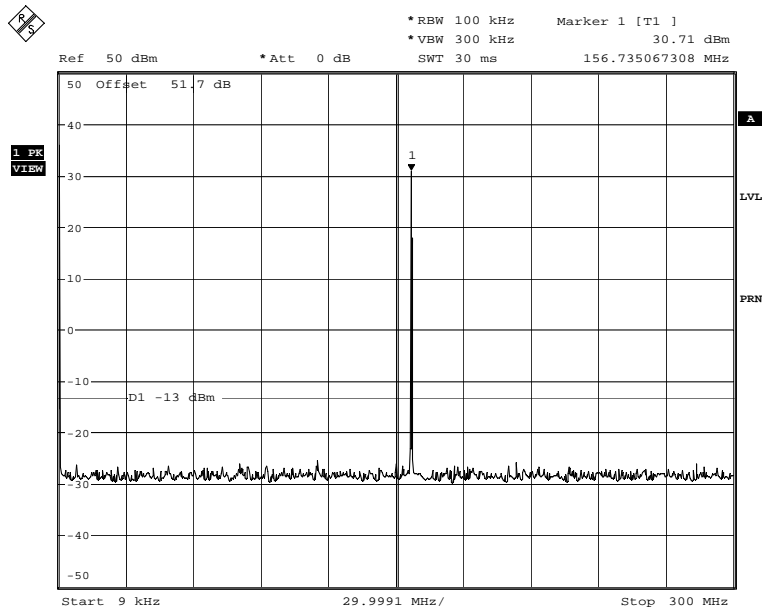
Middle Channel – 16 – 9kHz to 300MHz

25W



Date: 6.MAR.2008 16:40:29

1W

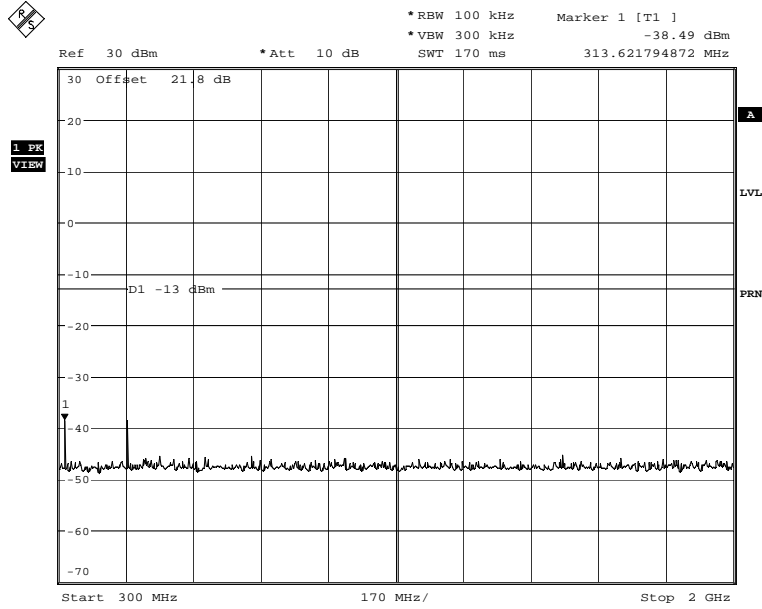


Date: 6.MAR.2008 16:42:16



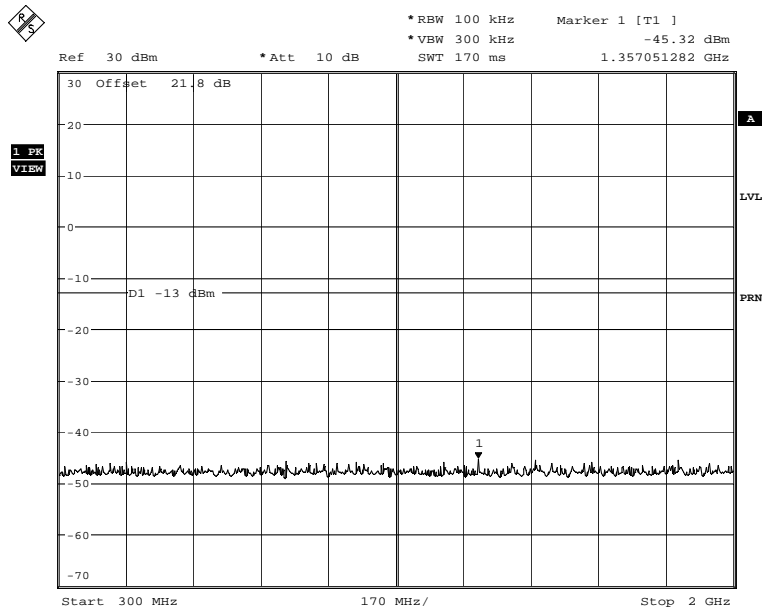
Middle Channel – 60 – 300 MHz to 2000 MHz

25W



Date: 6.MAR.2008 17:15:16

1W



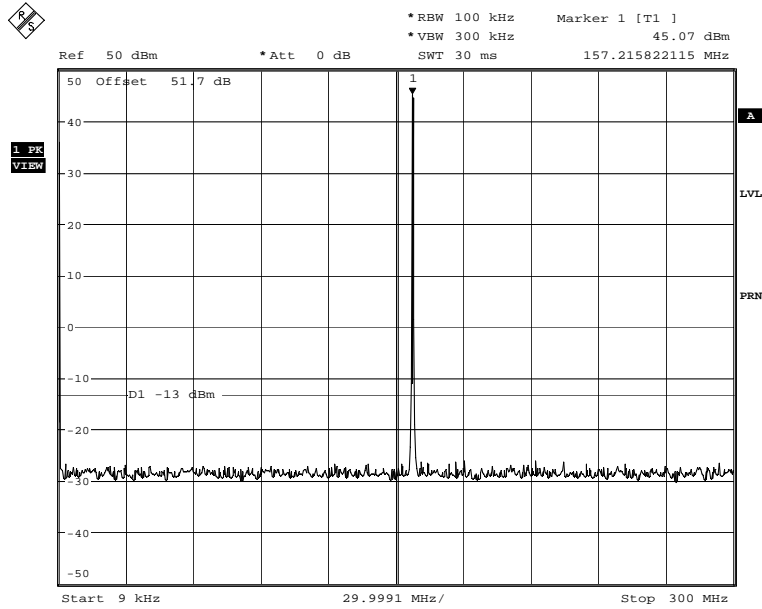
Date: 6.MAR.2008 17:16:09



Configuration 1 – Mode 3

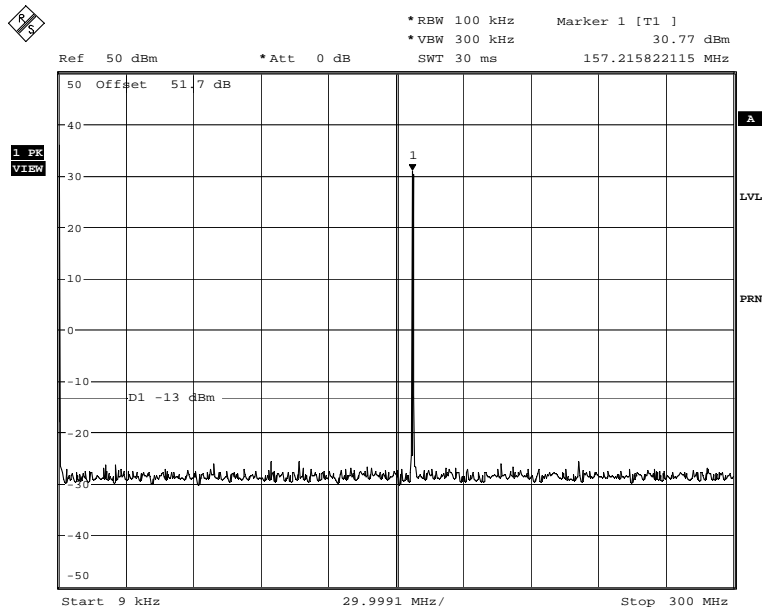
Top Channel – 88 – 9kHz to 300MHz

25W



Date: 6.MAR.2008 16:43:55

1W

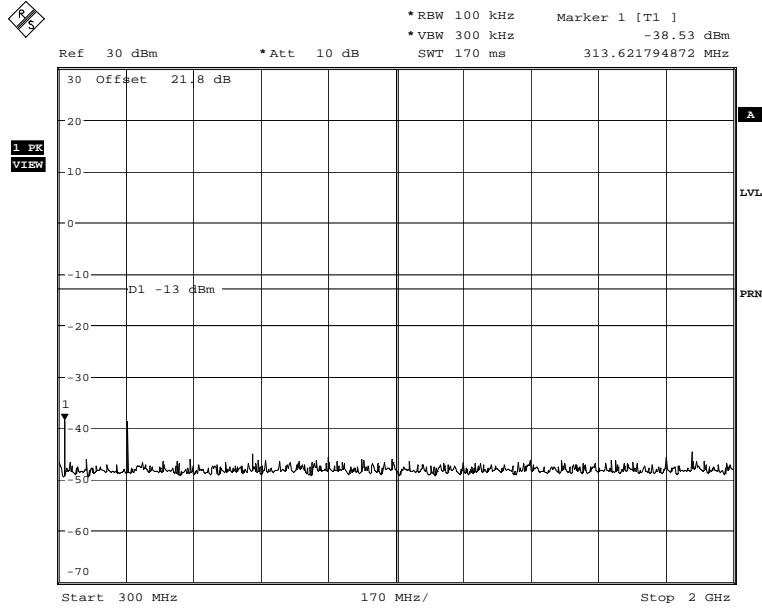


Date: 6.MAR.2008 16:44:40



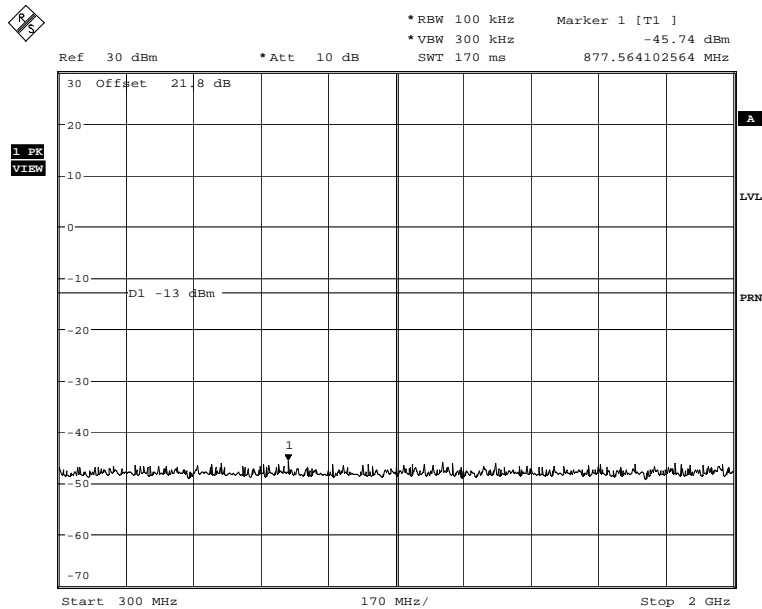
Top Channel – 88 – 300 MHz to 2000 MHz

25W



Date: 6.MAR.2008 17:17:12

1W



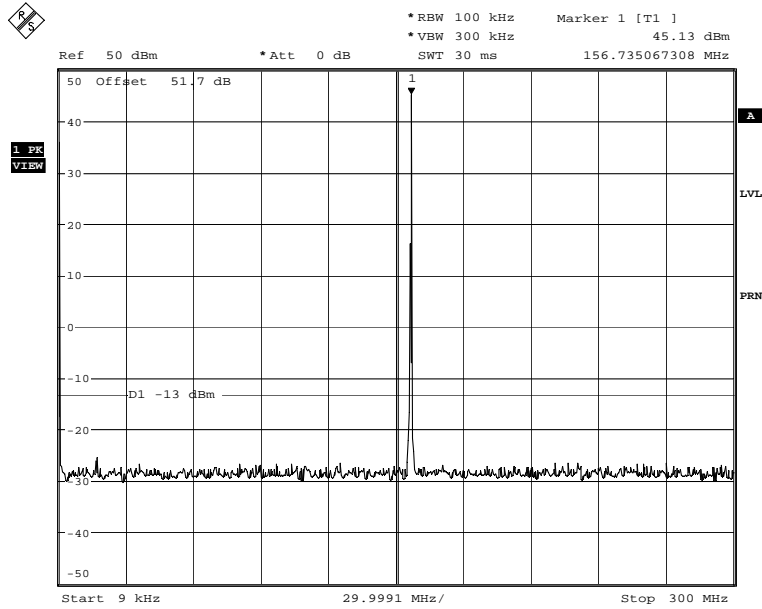
Date: 6.MAR.2008 17:19:15



Configuration 1 – Mode 4

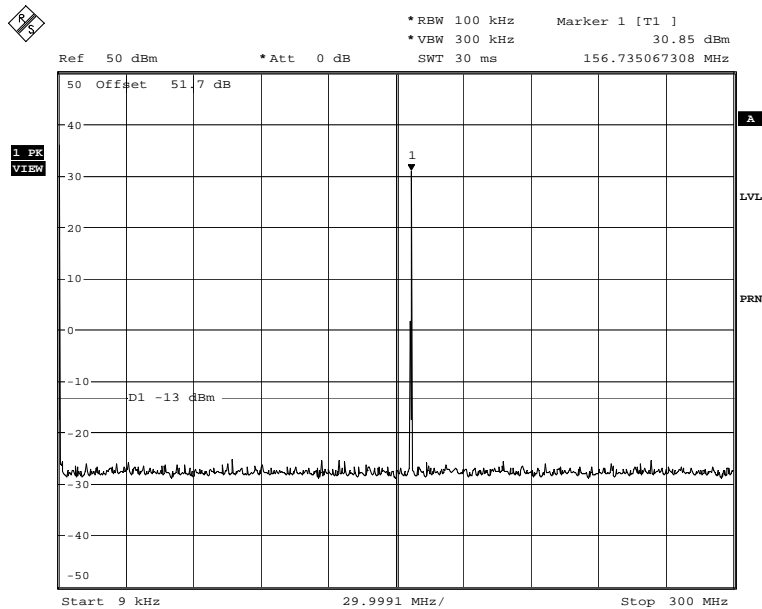
DSC Channel – 70 – 9kHz to 300MHz

25W



Date: 6.MAR.2008 16:46:07

1W

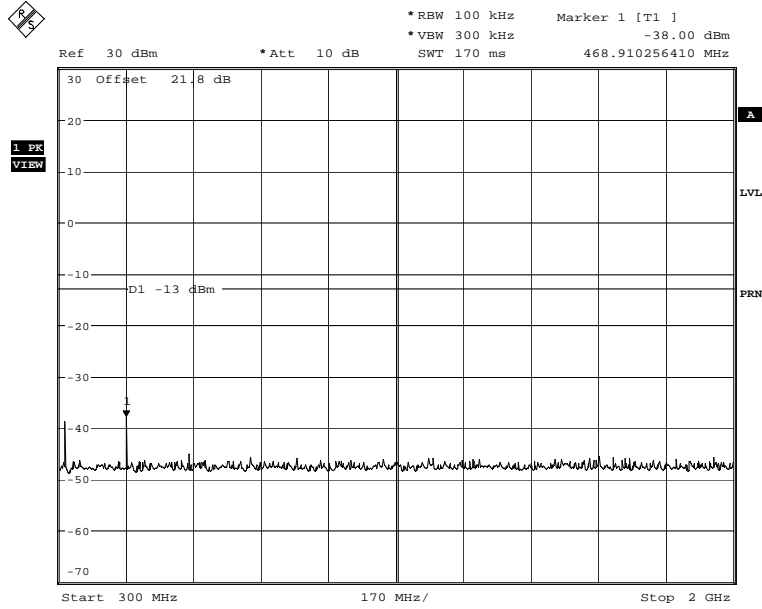


Date: 6.MAR.2008 16:48:51



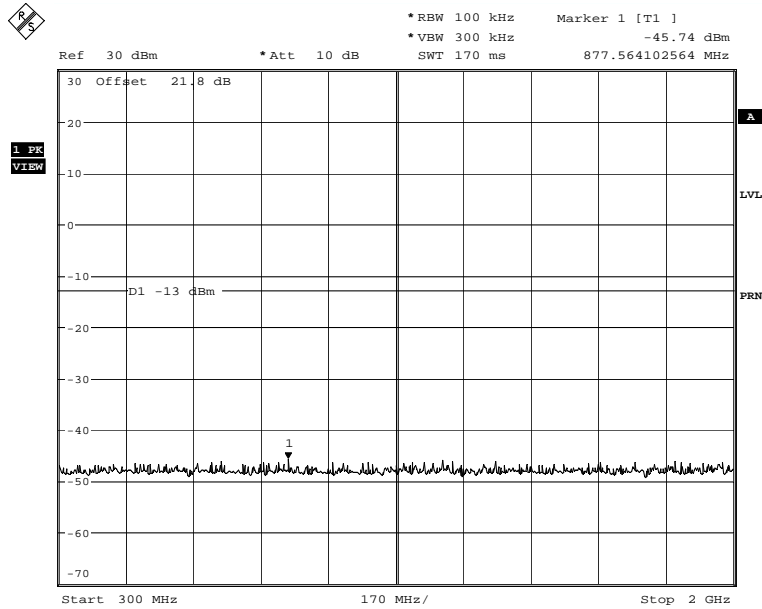
DSC Channel – 70 – 300 MHz to 2000 MHz

25W



Date: 6.MAR.2008 17:07:18

1W



Date: 6.MAR.2008 17:19:15



Product Service

2.2 EMISSION LIMITATIONS (RADIATED TRANSMITTER SPURIOUS)

2.2.1 Specification Reference

FCC CFR 47 Part 80: 2006, Clause 80.211(f)(3)

2.2.2 Equipment Under Test

JHS-770S (Simplex), S/N: BK10268

2.2.3 Date of Test and Modification State

07 April 2008 - Modification State 1

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

Test Performed in accordance with ANSI C63.4.

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 Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

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

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

Emissions identified within the range 1GHz – 2GHz were then formally measured using Peak and Average Detectors, as appropriate.

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

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

- Configuration 1 - Mode 1
- Mode 2
- Mode 3
- Mode 4



2.2.6 Environmental Conditions

	07 April 2008
Ambient Temperature	18.7°C
Relative Humidity	27%
Atmospheric Pressure	1001mbar

2.2.7 Test Results

Configuration 1 – Mode 1

Bottom Channel – 60 (Transmitting on Full Power/Modulated) – 30MHz to 1.6GHz

Frequency MHz	Antenna Polarisation	Antenna Height	Antenna Azimuth	Result (dBm)	Limit (dBm)	Margin (dBm)
624.33	Vertical	100	200	-28.47	-13.0	-15.47

All other emissions measured were greater than 20dB below the specification limit.

Configuration 1 – Mode 2

Middle Channel – 16 (Transmitting on Full Power/Modulated) – 30MHz to 1.6GHz

Frequency MHz	Antenna Polarisation	Antenna Height	Antenna Azimuth	Result (dBm)	Limit (dBm)	Margin (dBm)
626.11	Vertical	100	320	-28.54	-13.0	-15.54

All other emissions measured were greater than 20dB below the specification limit.

Configuration 1 – Mode 3

Top Channel – 88 (Transmitting on Full Power/Modulated) – 30MHz to 1.6GHz

Frequency MHz	Antenna Polarisation	Antenna Height	Antenna Azimuth	Result ERP (dBm)	Limit ERP (dBm)	Margin (dBm)
629.70	Vertical	100	91	-27.51	-13.0	-14.51

All other emissions measured were greater than 20dB below the specification limit.

Configuration 1 – Mode 4

DSC – 70 (Transmitting on Full Power) – 30MHz to 1.6GHz

Frequency MHz	Antenna Polarisation	Antenna Height	Antenna Azimuth	Result ERP (dBm)	Limit ERP (dBm)	Margin (dBm)
626.11	Vertical	100	53	-26.31	-13.0	-13.31

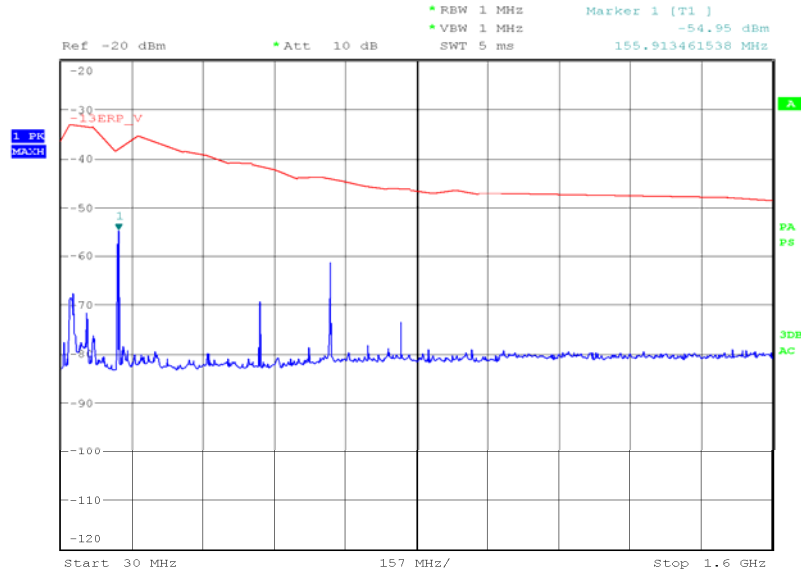
All other emissions measured were greater than 20dB below the specification limit.



Configuration 1 – Mode 1

Bottom Channel – 60 (Transmitting on Full Power)– 30MHz to 1.6GHz

Combined Vertical and Horizontal

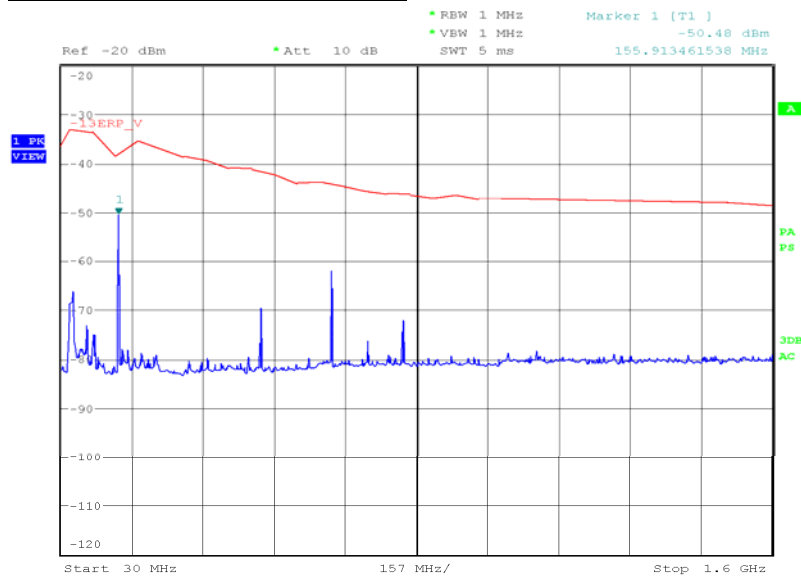


Date: 7.APR.2008 15:38:45

Configuration 1 – Mode 2

Middle Channel – 16 (Transmitting on Full Power)– 30MHz to 1.6GHz

Combined Vertical and Horizontal



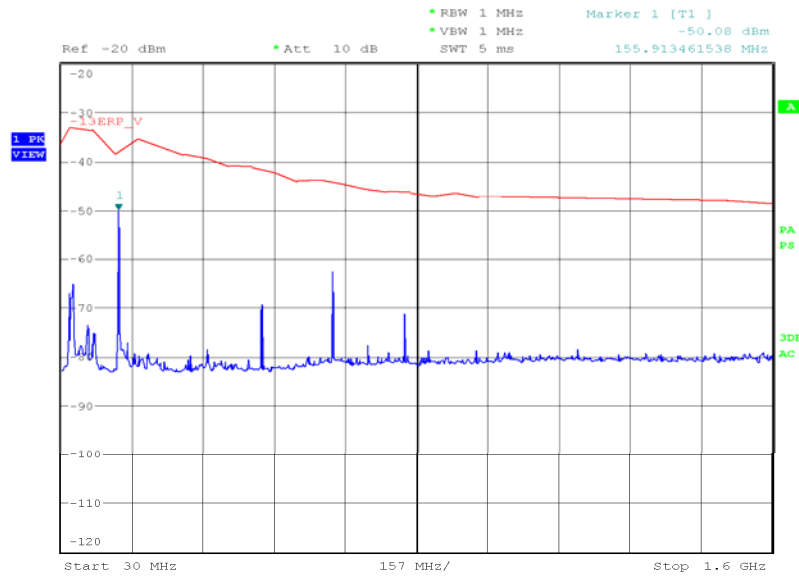
Date: 7.APR.2008 15:43:40



Configuration 1 – Mode 3

Top Channel – 88 (Transmitting on Full Power) – 30MHz to 1.6GHz

Combined Vertical and Horizontal

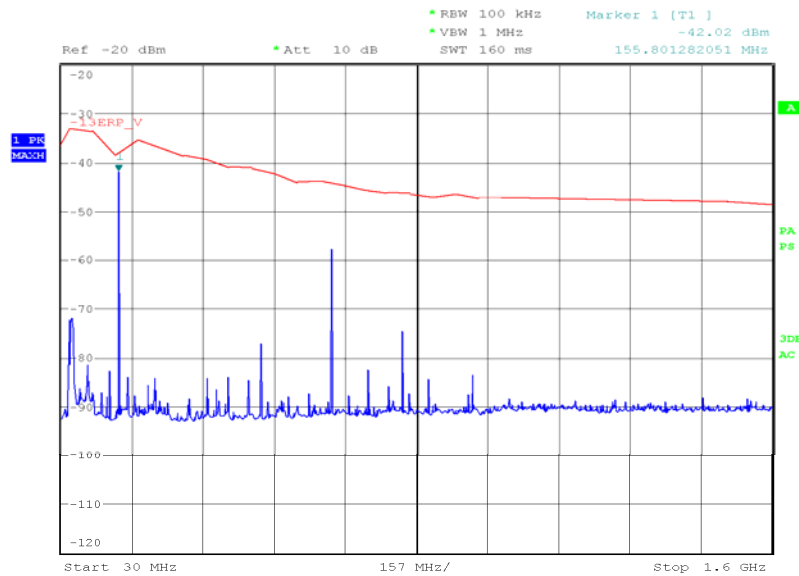


Date: 7.APR.2008 15:34:00

Configuration 1 – Mode 4

DSC – 70 (Transmitting on Full Power) – 30MHz to 1.6GHz

Combined Vertical and Horizontal



Date: 7.APR.2008 18:08:49



Product Service

2.3 TRANSMITTER POWER

2.3.1 Specification Reference

FCC FR 47 Part 80: 2006, Clause 80.215

2.3.2 Equipment Under Test

JHS-770S (Simplex), S/N: BK10268

2.3.3 Date of Test and Modification State

06 March 2008 - Modification State 1

2.3.4 Test Equipment Used

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

2.3.5 Test Procedure

The EUT was connected via 30dB and 10dB attenuators to a power meter and sensor. The path loss between the EUT and the power sensor was measured and recorded. The power meter reading and 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 unmodulated.

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

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

Configuration 1 - Mode 1
 - Mode 2
 - Mode 3
 - Mode 4

2.3.6 Environmental Conditions

	06 March 2008
Ambient Temperature	22°C
Relative Humidity	32%



Product Service

2.3.7 Test Results

Configuration 1 – Modes 1, 2, 3 and 4

Maximum Power – 25W Unmodulated

Channel Number/Frequency	Result (dBm)	Result (W)
60 / 156.025MHz	43.82	24.10
16 / 156.800MHz	43.78	23.88
88 / 157.425MHz	43.76	23.77
70 / 156.525MHz	43.81	24.04

Minimum Power - 1W Unmodulated

Channel Number/Frequency	Result (dBm)	Result (W)
60 / 156.025MHz	29.34	0.859
16 / 156.800MHz	29.30	0.851
88 / 157.425MHz	29.21	0.834
70 / 156.525MHz	29.30	0.851

Limit

$\leq 25W$ or $\leq +43.98$ dBm



Product Service

2.4 SUPPRESSION OF INTERFERENCE ABOARD SHIPS

2.4.1 Specification Reference

FCC CFR 47 Part 80: 2006, Clause 80.217 (b)

2.4.2 Equipment Under Test

JHS-770S (Simplex), S/N: BK10268

2.4.3 Date of Test and Modification State

06 March 2008 - Modification State 1

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 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.

The manufacturer declares a maximum antenna gain of 2.15dBi to be used with the EUT. Thus, in accordance with 80.217(B), the 2.15dbi 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 (dBm)
<30	400	-4	-6.15
30 – 100	4000	6	+3.85
100 – 300	40000	16	+13.85
300 - 2000	400000	26	+23.85

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

Configuration 1 - Mode 2

2.4.6 Environmental Conditions

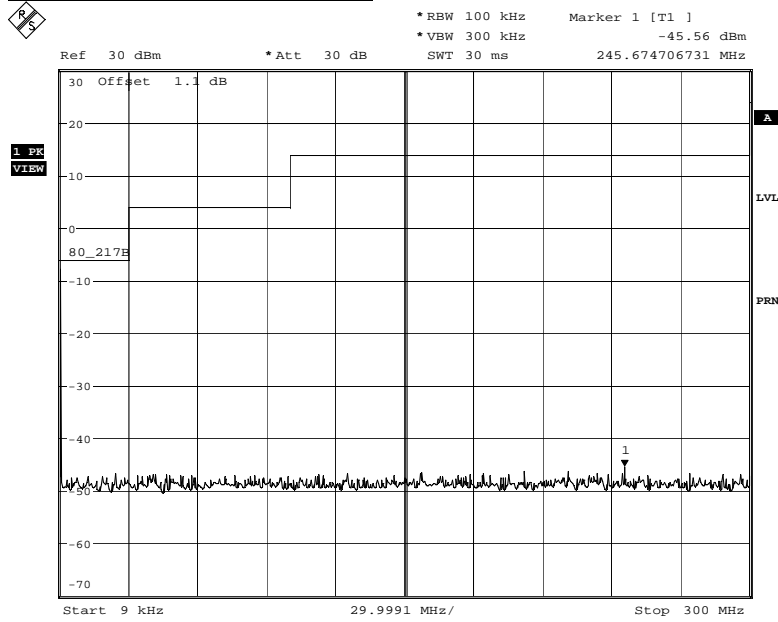
	06 March 2008
Ambient Temperature	22°C
Relative Humidity	38%



2.4.7 Test Results

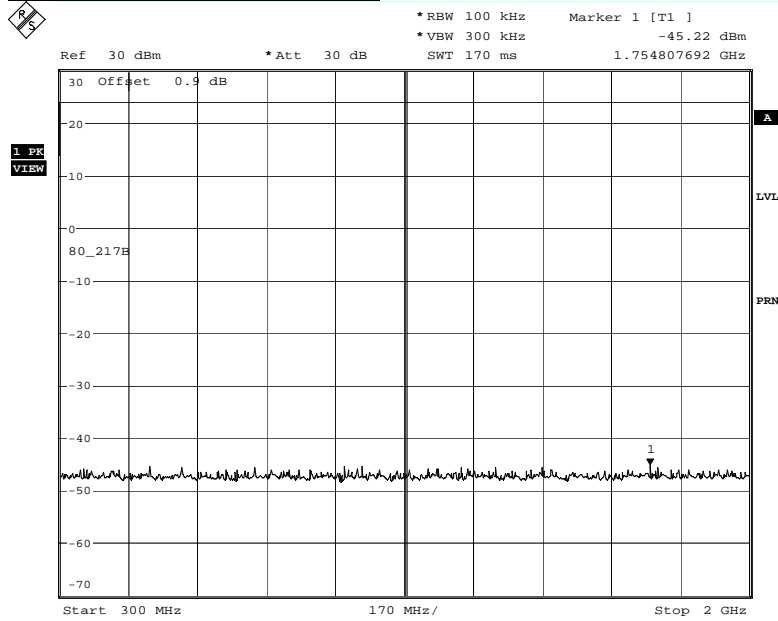
Configuration 1 – Mode 2

Channel 16 – 9kHz to 300MHz



Date: 6.MAR.2008 11:52:41

Channel 16 – 300MHz to 2GHz



Date: 6.MAR.2008 11:58:56



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 2.2 EMC - Radiated Emissions					
Spectrum Analyser	Hewlett Packard	8562A	14	12	9-Jun-2008
Antenna (Horn, 11.9GHz-18.0GHz)	IFI	1824-20	29	-	TU
Modulation Analyser	Hewlett Packard	8901B	45	12	4-Jul-2008
Load (50ohm)	Diamond Antenna	DL-30N	217	12	13-Apr-2008
Load	Diamond Antenna	DL-30N	218	12	20-Jun-2008
Antenna (Bilog)	Schaffner	CBL6143	287	24	21-Jan-2010
Variac	R.S Components	8 AMP	290	-	TU
Load (50ohm, 30W)	JFW	50T-054	351	12	18-Jun-2009
Attenuator (30dB, 50W)	Bird	8321	494	12	9-Jan-2009
Attenuator (30dB, 200W)	Bird	8322	562	12	9-Jan-2009
Power Passport: 50, 60 or 400Hz Power Supply	Behlman Hauppauge	P1350-CE	1434	-	TU
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
Audio Analyser	Hewlett Packard	8903B	1881	12	1-Oct-2008
Sensor	Hewlett Packard	11722A	2787	12	21-Aug-2008
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
Comb Generator	Schaffner	RSG1000	3034	-	TU
Antenna (Log Periodic)	Schaffner	UPA6108	3108	12	31-Mar-2008
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	11-Jul-2008
Termination	Tyco Electronics	1329823-1	3252	12	21-Aug-2008
Compliance 3 Emissions	Schaffner	C3e Software V.4.00.00	3274	-	N/A - Software
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	15-Mar-2009



Section 2.4 Radio - Suppression of Interference Aboard Ships					
Signal Generator	Hewlett Packard	ESG4000A	38	12	12-Mar-2008
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Multimeter	Iso-tech	IDM101	2424	12	13-Aug-2008
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	24-Jul-2008
Hygrometer	Rotronic	A1	2760	12	4-Jun-2008
Section 2.1 Radio (Tx) - Conducted Spurious Emissions					
Signal Generator	Hewlett Packard	ESG4000A	38	12	12-Mar-2008
Attenuator (30dB/ 50W)	Bird	8321	46	12	29-Nov-2008
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
High Pass Filter	Mini-Circuits	NHP-300	1640	12	16-Aug-2008
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Multimeter	Iso-tech	IDM101	2424	12	13-Aug-2008
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	24-Jul-2008
Hygrometer	Rotronic	A1	2760	12	4-Jun-2008
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	29-May-2008
Attenuator (20dB, 150W)	Narda	769-20	3367	12	11-May-2008
Section 2.3 Radio (Tx) - Power Characteristics					
Signal Generator	Hewlett Packard	ESG4000A	38	12	12-Mar-2008
Modulation Analyser	Hewlett Packard	8901B	45	12	4-Jul-2008
Attenuator (30dB/ 50W)	Bird	8321	46	12	29-Nov-2008
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Multimeter	Iso-tech	IDM101	2424	12	13-Aug-2008
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	24-Jul-2008
Hygrometer	Rotronic	A1	2760	12	4-Jun-2008
Sensor	Hewlett Packard	11722A	2787	12	21-Aug-2008
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	5-Sep-2008

TU – Traceability Unscheduled

OP MON – Output Monitored with Calibrated Equipment



3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Emission Limitations (Conducted Transmitter Spurious)	-	± 2.41dB
Emission Limitations (Radiated Transmitter / Receiver Spurious)	30MHz to 1GHz Amplitude	± 5.1dB
	1GHz to 40GHz Amplitude	6.3dB*
Transmitter Power	-	± 0.7dB
Suppression of Interference Aboard Ships	-	± 2.41dB



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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