

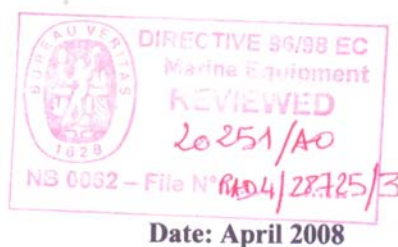
TEST REPORT

No 203 900 EMC

**NAVTEX NT-1800
JAPAN MARINA Co.**

**ELECTROMAGNETIC
COMPATIBILITY**

SPECIFICATIONS : EN 60945 : 2002



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1. INTRODUCTION

This report only concerns the product submitted for tests and described on page 5.

This product doesn't be sold.

2. TEST HOUSE

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Route de Coray
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Tel : 33-(02) 98 52 16 02 Fax : 33-(02) 98 52 14 19

Technical Manager : M. CHRISTIEN

Bureau Veritas certificate number : SMS.L.I/50130/B.O

2.1. CLIENT INFORMATION

Company : JAPAN MARINA Co.
Address : 36-2-1001 UDAGAWA-CHO, SHIBUYA-KU
TOKYO 150-0042
Country : JAPAN

Tel : (03)3461-3606 Fax : (03)3496-2078

People in charge : Hisashi ICHIKAWA

2.2. MANUFACTURER INFORMATION

Company : JAPAN MARINA Co.
Address : 36-2-1001 UDAGAWA-CHO, SHIBUYA-KU
TOKYO 150-0042
Country : JAPAN

Tel : (03)3461-3606 Fax : (03)3496-2078

3. SPECIFICATIONS REFERENCES

3.1. SPECIFICATION APPLIED FOR THE PRODUCT ON TEST

All testing are made in accordance with this generic or product specification.

EN 60945 : 2002 Maritime navigation and
radiocommunication equipment and
systems. Genenral requirements.
Methods of testing and required test
results.

3.2. DIFFERENTIAL APPLICATION

4. THE PRODUCT

4.1. PRODUCT DESCRIPTION

NAVTEX Receiver and Mounting Bracket. Model NT-1800

4.2. GENERAL SPECIFICATIONS

Power supply : 24Vdc

Power consumption : 0,4A

Height : 196mm

Width : 196mm

Length : 194mm

Other characteristics :

First receiver: 518kHz

Second receiver: 490kHz

4209.5kHz

5.7" (diagonal) color TFT, QVGA (320x240 pixels)

4.3. PRODUCT IDENTIFICATION

Model NT-1800

Serial number : S05600002

State : Serial

Note: The product must be full representative of commercial equipment.

4.4. INTERFERENCE POTENTIALITIES

4.5. INTERCONNECTION CABLES

Cable (Ref)	Identification	Timbering		Lenght (m)	Qty
		braid	sheet		
1	D.C. power cable		X	2.5	1
2					
3					
4					

4.6. PERIPHERICAL EQUIPMENTS

Périphérique 1	Type : Serial n°:	Manufacturer :
Périphérique 2	Type : serial n°:	Manufacturer :
Périphérique 3	Type : serial n°:	Manufacturer :
Périphérique 4	Type : serial n°:	Manufacturer :

5. PICTURE



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6. MEASUREMENTS

6.1. GENERAL CONDITIONS DURING THE TESTS

Made inside anechoïd room.

Temperature : 20°C

Humidity : 71%

6.2. MEASUREMENT INSTRUMENTATION UNCERTAINTY

Conducted disturbance (mains port) (150kHz – 30MHz)	±3,6dB
Vertically polarised radiated disturbance at a distance of 3m :	
- From 30MHz to 200MHz :	±4.7dB
- From 200MHz to 1GHz	±4.7dB
Horizontally polarised radiated disturbance at a distance of 3m :	
- From 30MHz to 200MHz	±4.9dB
- From 200MHz to 1GHz	±4.9dB
Immunity to continuous conducted signals (frequencies>150kHz)	±2.6dB
Immunity to surges on signal lines, AC and DC ports	±5.0dB
Immunity to electrical fast transients	±3.8dB
Immunity to radiated electromagnetic fields	±2.8dB
Immunity to electrostatic discharge	±5.4dB
Temperature	±1°C
Humidity	±10%

7. DOCUMENTS ON THE PRODUCT

OPERATOR MANUAL

SCHEMATICS

8. TESTING EQUIPMENTS

8.1. EMISSION

NAME AND MARK OF INSTRUMENT	MODEL	SERIAL N°	CALIBRATION
Spectrum Analyser Rhode & Schwartz	100Hz-5GHz FSB	861195/040	07/2007
Plotter Hewlett Packard	7470A	2517A 07901	
Log Periodic Antenna n°1	30MHz – 1GHz		07/2007
Log Periodic Antenna n°2	1GHz – 4GHz		07/2007
Coaxial cable n°1	1.5m		
Coaxial cable n°2	4m		
Anechoïd room			
Rotating board			

8.2. CONDUCTED EMISSION

NAME AND MARK OF INSTRUMENT	MODEL	SERIAL N°	CALIBRATION
Dual Phase V Network Telmeter Electronic	NNB-2/16Z	03/10206	07/2007
EMI test receiver Rohde et Schwarz	E.S.P.C.	843756/024	17/07/2007

8.3. ELECTROMAGNETIC FIELD

NAME AND MARK OF INSTRUMENT	MODEL	SERIAL N°	CALIBRATION
Signal Generator Adret	7200A		07/2007
Power Amplifier RPA	RF12	158	
Fieldmeter Chauvin Arnoux	C.A. 43		07/2007
Current injection probe Solar Electronics	9108-1N	031214	07/2007

8.4. TRANSIENTS

NAME AND MARK OF INSTRUMENT	MODEL	SERIAL N°	CALIBRATION
EFT Generator EMC PARTNER.	Transient 1000	TRA1000/158	07/2007
Capacitive coupling clamp	KCT	198	

8.5. SURGES

NAME AND MARK OF INSTRUMENT	MODEL	SERIAL N°	CALIBRATION
ESD Generator EMC Partner	Transient 1000	TRA1000/15 8	07/2007

8.6. VOLTAGE VARIATION

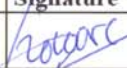
NAME AND MARK OF INSTRUMENT	MODEL	SERIAL N°	CALIBRATION
EMC Generator	EMC PARTNER Transient 1000	TRA 1000/158	07/2007
CC Module			
Power supply Rohde et Schwarz	NGSM 32/10	192081031	
Burst Generator	8012B	2352A	

9. CONCLUSION

All measurements complied with the specification EN 60945 : 2002

Emission : Conducted emission

Immunity : RF electromagnetic field
RF common mode
Fast transients
Electrostatic discharge

	Nom	Date	Signature
Tests made by :	T. RONARC'H	April, 1 st 2008	
Tests approved by :	JY. CHRISTIEN	April, 1 st 2008	

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This test report n° 203 900 contains 38 pages numbered 1/38 à 38/38 and 1 annex.

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10. OPERATIONAL CHECK - IEC 60945 CLAUSE 6

6.1 Ergonomics and Human Machine Interface	6.1.1 General		Compliant
	6.1.2 Arrangement	a)	Compliant
		b)	Compliant
		c)	Not Applicable
		d)	Compliant
		e)	Not Applicable
		f)	Compliant
		g)	Not Applicable
		h)	Compliant
	6.1.3 Operation	a)	Compliant
		b)	Compliant
		c)	Compliant
		d)	Compliant
	6.1.4 Identification	a)	Compliant
		b)	Compliant
		c)	Compliant
		d)	Compliant
	6.1.5 Screen display and indicators	a)	Compliant
		b)	Not Applicable
		c)	Compliant
		d)	Compliant
		e)	Compliant
		f)	Compliant
		g)	Compliant
		h)	Compliant
		i)	Not Applicable
		j)	Compliant
		k)	Compliant
		l)	Not Applicable
		m)	Compliant
		n)	Compliant
		o)	Compliant
		p)	Compliant
		q)	Compliant
		r)	Compliant
		s)	Compliant
		t)	Not Applicable
	6.1.6 Voice announcement	a)	Not Applicable
		b)	Not Applicable
		c)	Not Applicable
		d)	Not Applicable

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	6.1.7 Safety of operation	a)	Compliant
		b)	Compliant
		c)	Compliant
		d)	Compliant
		e)	Compliant
	6.1.8 Distress Alert	a)	Not Applicable
		b)	Not Applicable
		c)	Not Applicable
		d)	Not Applicable
		e)	Not Applicable
		f)	Not Applicable

6.2 Hardware	6.2.1 General	a)	Compliant
		b)	Compliant
		c)	Compliant
		d)	Not Applicable
	6.2.2 Alarms and indicators	a)	Compliant
		b)	Compliant
		c)	Compliant
	6.2.3 Illumination	a)	Compliant
		b)	Compliant
		c)	Not Applicable
		d)	Compliant
		e)	Compliant
		f)	Not Applicable
		g)	Compliant
		h)	Compliant
		i)	Compliant

6.3 Software	6.3.1 General		Compliant
	6.3.2 Safety of operation	a)	Compliant
		b)	Not Applicable
		c)	Not Applicable
		d)	Not Applicable
		e)	Compliant
	6.3.3 Monitoring		Compliant
	6.3.4 Operation		Not Applicable
	6.3.5 Inter-unit connection	a)	Compliant
		b)	Compliant

11. POWER SUPPLY – METHODS OF TESTING AND REQUIRED TEST RESULTS – IEC 60945 CLAUSE 7

See §

12. DURABILITY AND RESISTANCE TO ENVIRONMENTAL CONDITIONS - METHODS OF TESTING AND REQUIRED TEST RESULTS – IEC 60945 CLAUSE 8

8.2 Dry heat	For the test result, see annex A
8.3 Damp heat	For the test result, see annex A
8.4 Low temperature	For the test result, see annex A
8.5 Thermal shock	Not Applicable
8.6 Drop	Not Applicable
8.7 Vibration	For the test result, see annex A
8.8 Rain and spray	Not Applicable
8.9 Immersion	Not Applicable
8.10 Solar radiation	Not Applicable
8.11 Oil resistance	Not Applicable
8.12 Corrosion	For the test result, see annex A

13. ELECTROMAGNETIC EMISSION – IEC 60945 CLAUSE 9

13.1. CONDUCTED SPURIOUS EMISSIONS

FREQUENCY BAND : 10kHz – 150kHz SPURIOUS EMISSION LEVELS DBμV QUASI-PEAK		
Frequency (kHz)	Results	Limits
147.2	9.27	96dB μ V – 50dB μ V

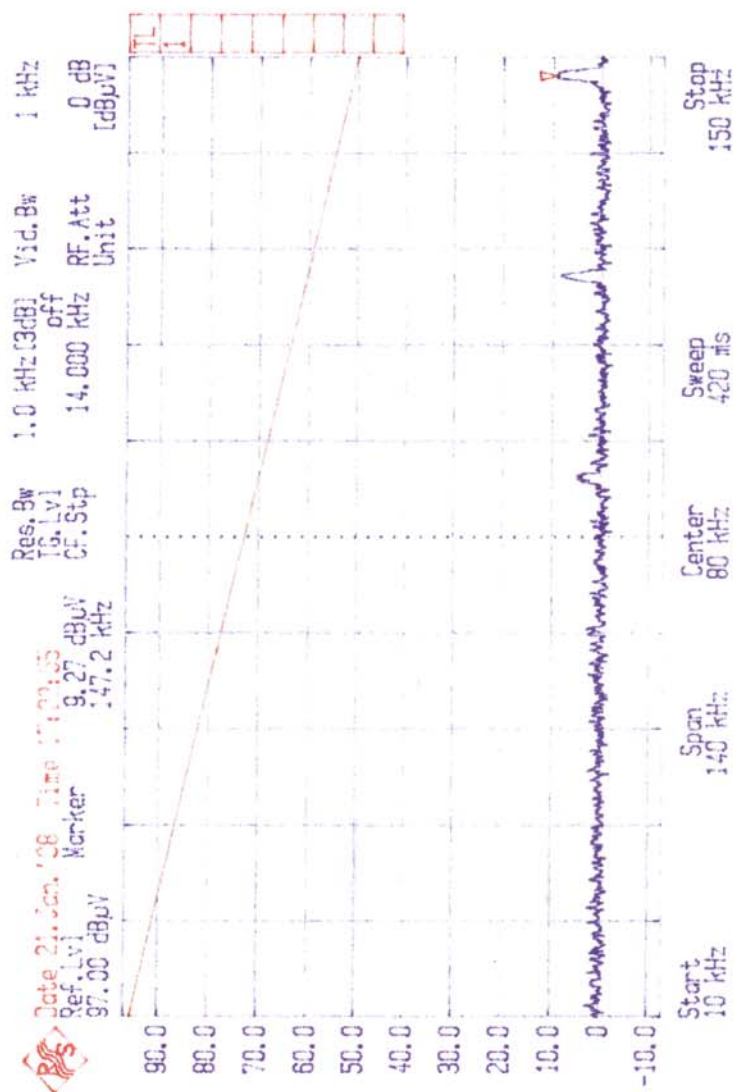
FREQUENCY BAND : 150kHz – 350kHz SPURIOUS EMISSION LEVELS DBμV QUASI-PEAK		
Frequency (kHz)	Results	Limits
150.0	15.36	60dB μ V – 50dB μ V
153.0	15.07	
163.0	21.43	
173.0	14.31	
176.0	14.41	
277.0	22.11	
327.0	40.87	
350.0	17.59	

FREQUENCY BAND : 350kHz – 30MHz SPURIOUS EMISSION LEVELS DBμV QUASI-PEAK		
Frequency (MHz)	Results	Limits
0.4	42.78	50dB μ V
0.49	38.56	
12.0	37.31	
12.4	35.83	
12.8	37.38	
13.2	34.61	
19.34	34.31	
19.39	34.53	

Result : **COMPLIANT**

Comments :

13.2. CONDUCTED EMISSION GRAPHS RADIATED EMISSIONS

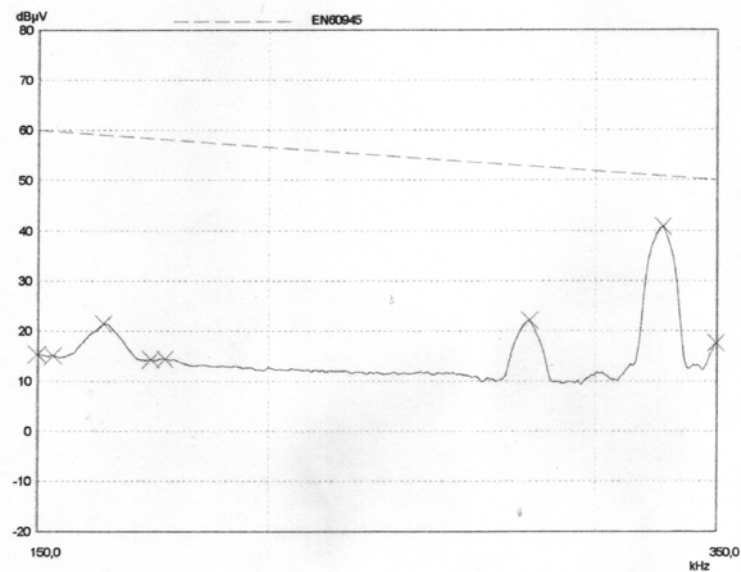


ElectroMagnetic Compatibility Conducted Emission

EUT: NT 1800
 Manuf: Japan Marina Co
 Op Cond: In faraday room
 Operator: T. RONARCHI
 Test Spec: EN 60945
 Comment: On DC power supply

Scan Settings			(1 Range)					Receiver Settings		
Start	Stop	Step	IF BW	Detector	M-Time	Atten	OpRge			
150kHz	350kHz	1kHz	10kHz	QP	50msec	Auto	60dB			

Prescan Measurement: X QP
 Meas Time: see scan settings
 Peaks: 8
 Acc Margin: 80 dB



PAGE 1

ElectroMagnetic Compatibility Conducted Emission

EUT: NT 1800
Manuf: Japan Marina Co
Op Cond: In faraday room
Operator: T. RONARCH
Test Spec: EN 60945
Comment: On DC power supply

Scan Settings		(1 Range)		Receiver Settings				
Frequencies		Step	IF BW	Detector	M-Time	Atten	OpRge	
Start 150kHz	Stop 350kHz	Step 1kHz	IF BW 10kHz	QP	50msec	Auto	60dB	
Prescan Measurement:		X QP						
		Meas Time: see scan settings						
		Peaks: 8						
		Acc Margin: 80 dB						
Peak Search Results:								
Frequency kHz	QP Level dBµV	QP Limit dBµV	QP Delta dB					
150,0	15,36	60,00	44,64					
153,0	15,07	59,77	44,70					
163,0	21,43	59,02	37,59					
173,0	14,31	58,32	44,01					
176,0	14,41	58,11	43,70					
277,0	22,11	52,76	30,65					
327,0	40,87	50,80	9,93					
350,0	17,59	50,00	32,41					

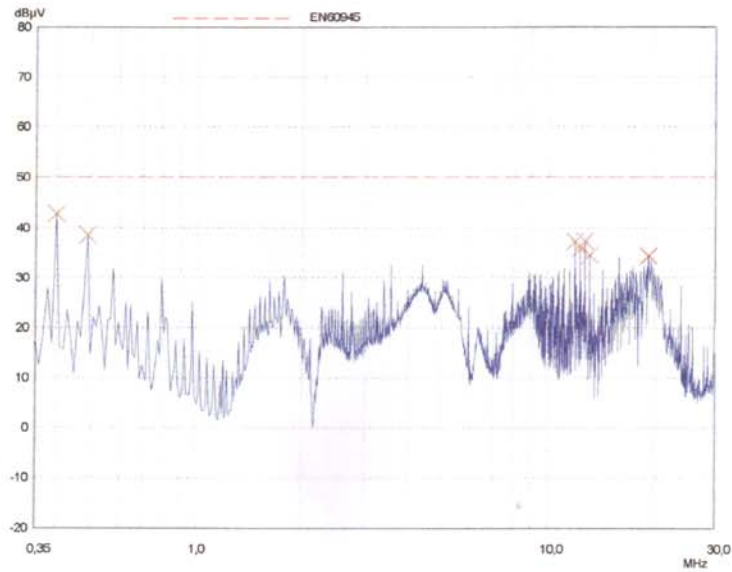
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PAGE 2

ElectroMagnetic Compatibility Conducted Emission

EUT: NT 1800
 Manuf: Japan Marina Co
 Op Cond: In faraday room
 Operator: T. RONARCH
 Test Spec: EN 60945
 Comment: On DC power supply

Scan Settings			(1 Range)					Receiver Settings		
Start	Stop	Step	IF BW	Detector	M-Time	Atten	OpRge			
350kHz	30MHz	10kHz	10kHz	QP	50msec	Auto	60dB			
Prescan Measurement:			X QP							
			Meas Time: see scan settings							
			Peaks: 8							
			Acc Margin: 80 dB							



PAGE 1

ElectroMagnetic Compatibility

Conducted Emission

EUT: NT 1800
 Manuf: Japan Marina Co
 Op Cond: In faraday room
 Operator: T. RONARC'H
 Test Spec: EN 60945
 Comment: On DC power supply

Scan Settings		(1 Range)		Receiver Settings			
Start	Frequencies	Step	IF BW	Detector	M-Time	Atten	OpRge
350kHz	Stop 30MHz	10kHz	10kHz	QP	50msec	Auto	60dB
Prescan Measurement:		X QP					
		Meas Time:		see scan settings			
		Peaks:		8			
		Acc Margin:		80 dB			
Peak Search Results:							
Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB				
0,4	42,78	50,00	7,22				
0,49	38,56	50,00	11,44				
12,0	37,31	50,00	12,69				
12,4	36,83	50,00	14,17				
12,8	37,36	50,00	12,62				
13,2	34,61	50,00	15,39				
19,34	34,31	50,00	15,69				
19,39	34,53	50,00	15,47				

* limit exceeded

PAGE 2

13.3. RADIATED EMISSIONS FROM ENCLOSURE PORT

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DB μ V/m AT 3m		
Frequency (MHz)	Results	Limits
184.2	32.72	54
311.2	36.39	54
1955.5	43.47	54

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DB μ V/m AT 3m		
Frequency (MHz)	Results	Limits
160.53	19.79	30

VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DB μ V/m AT 3m		
Frequency (MHz)	Results	Limits
56	49.89	54
431.9	39.13	54
1971.1	44.49	54

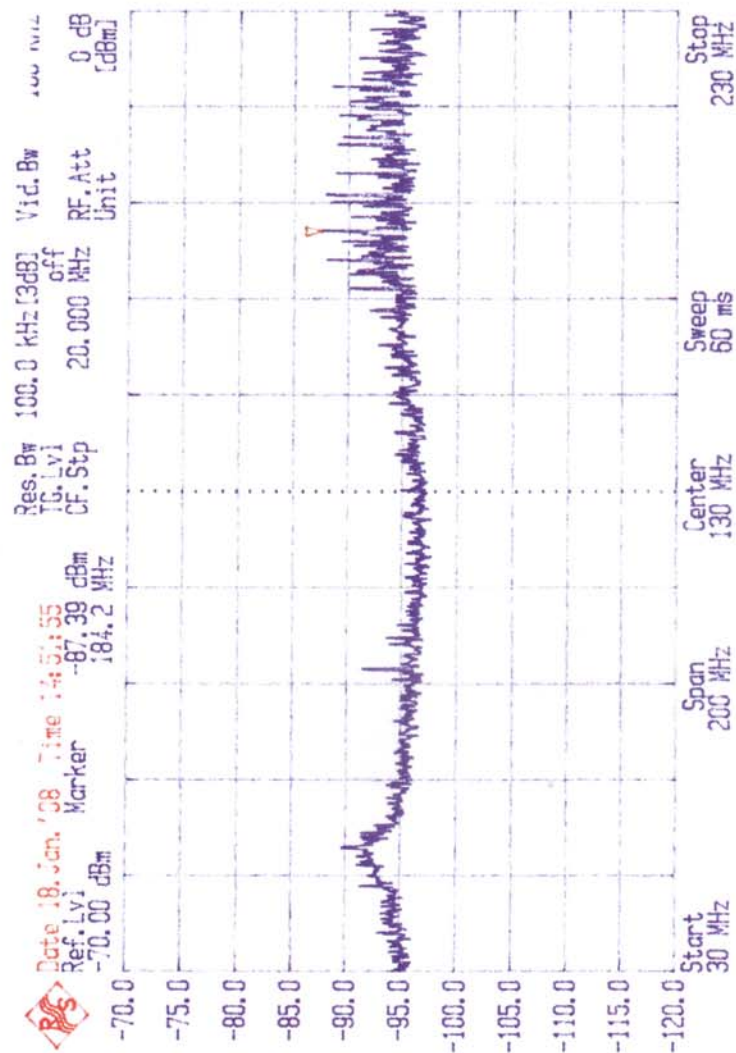
FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DB μ V/m AT 3m		
Frequency (MHz)	Results	Limits
160.37	16.84	30

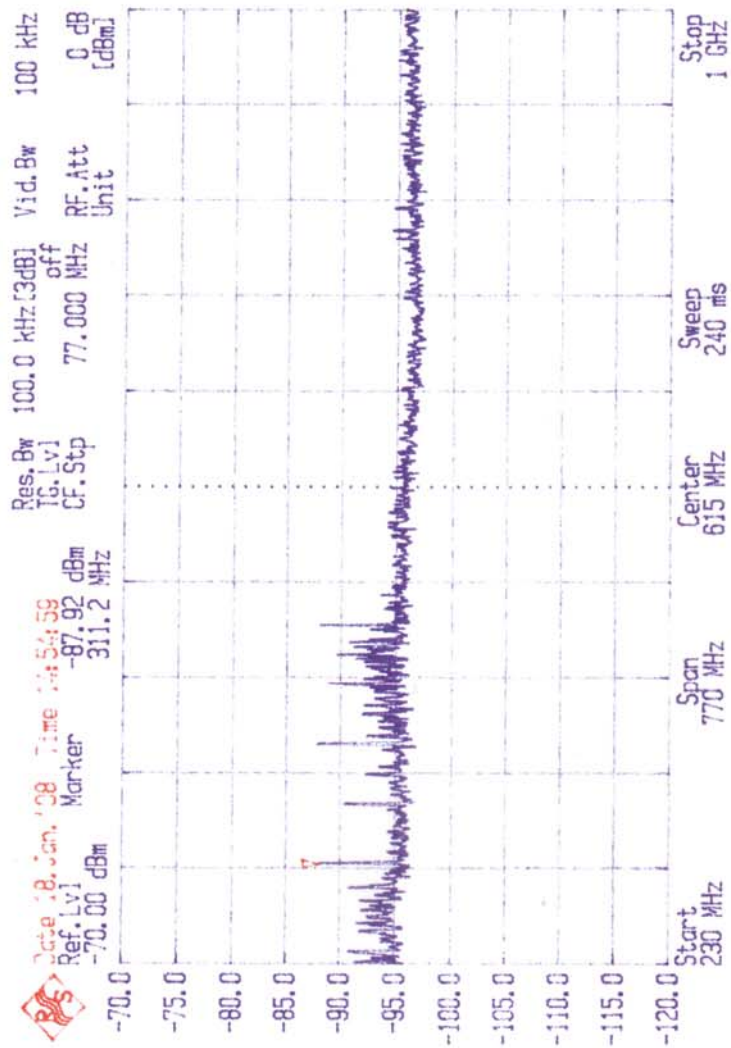
Result : **COMPLIANT**

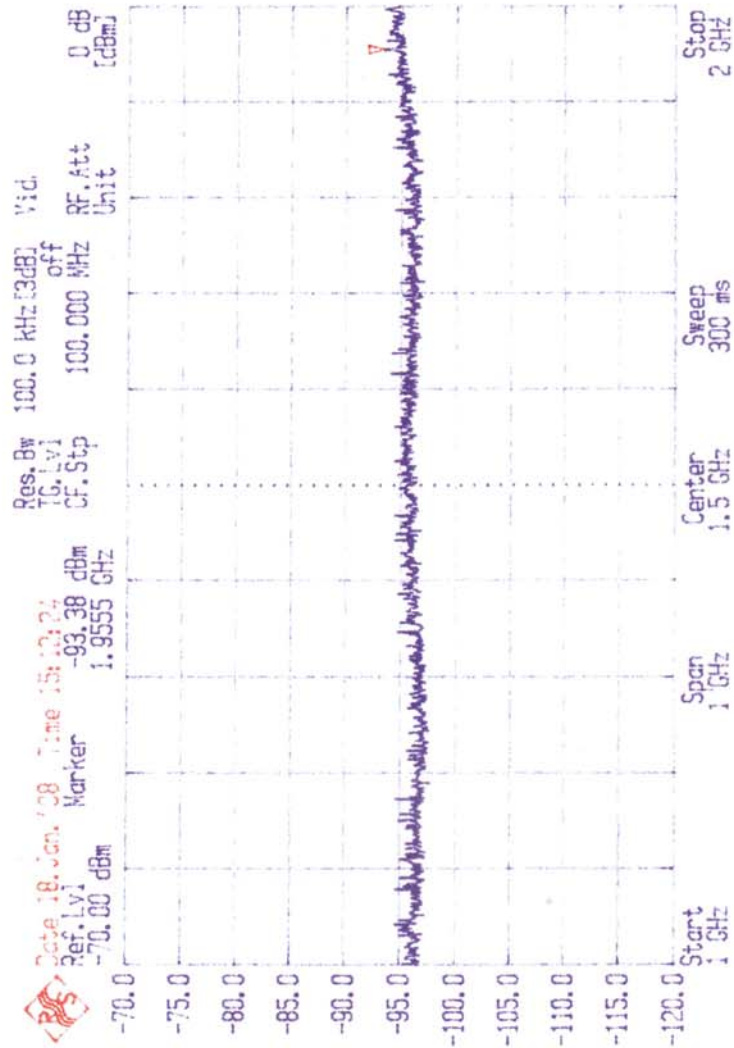
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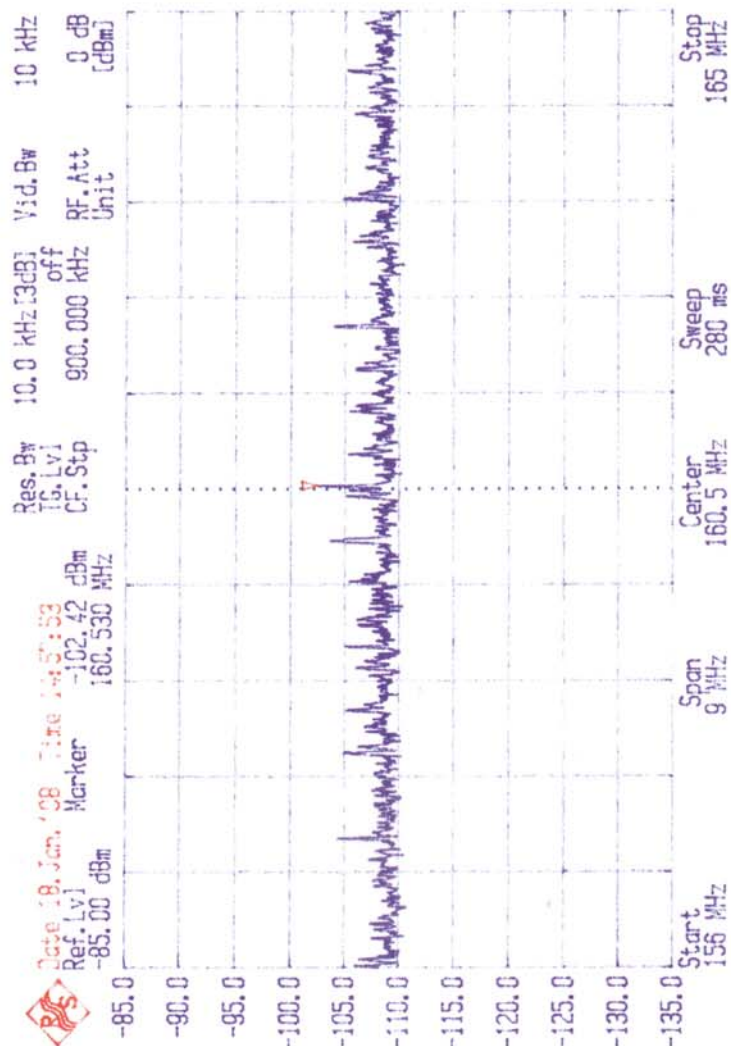
13.4. RADIATION GRAPHS

HORIZONTAL POLARIZATION

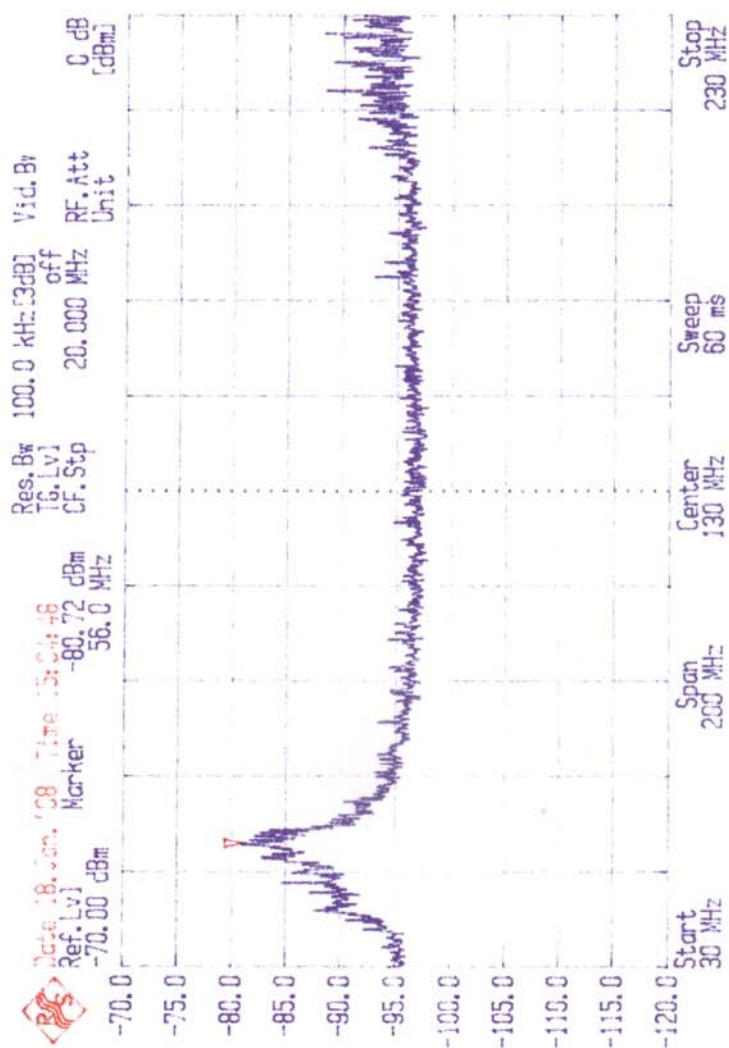


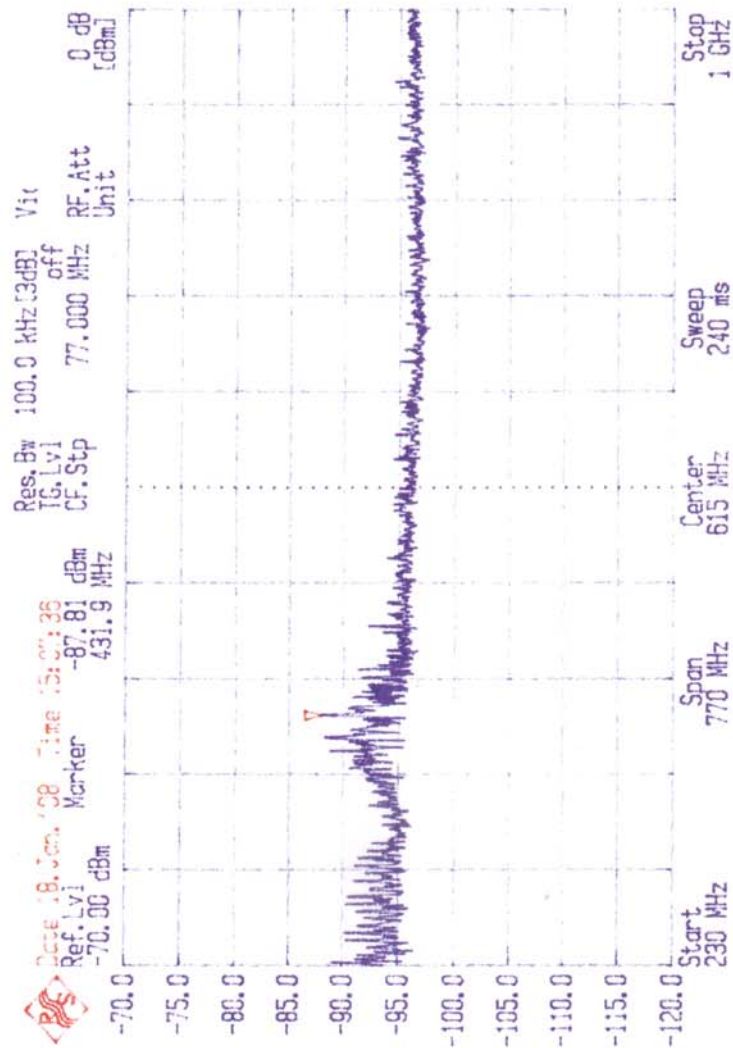


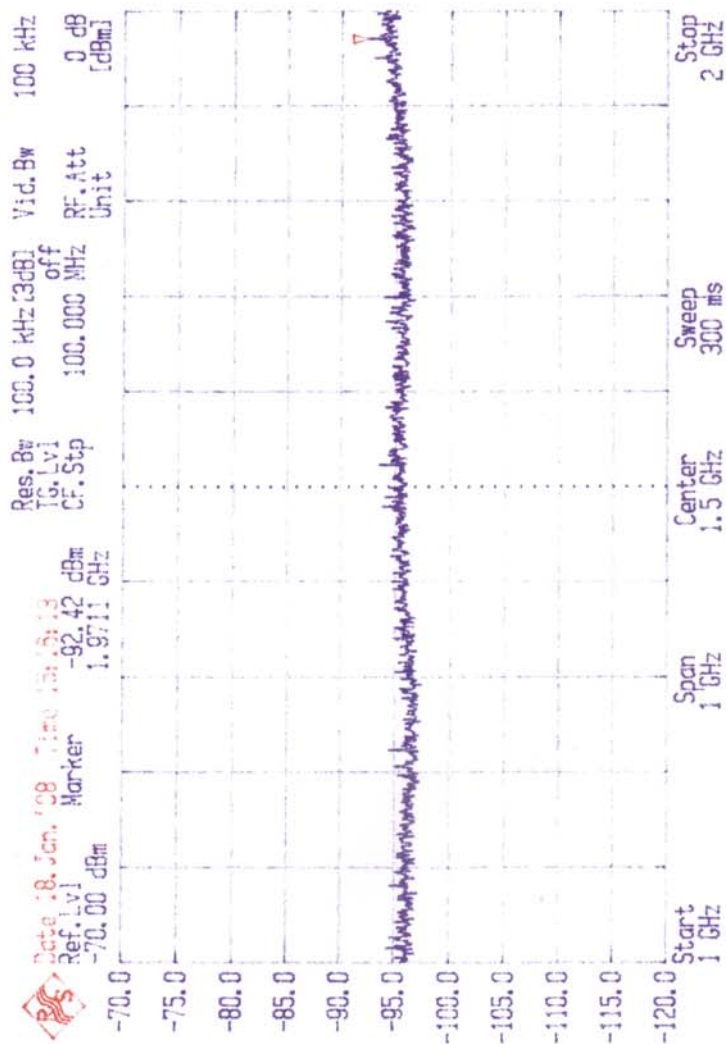


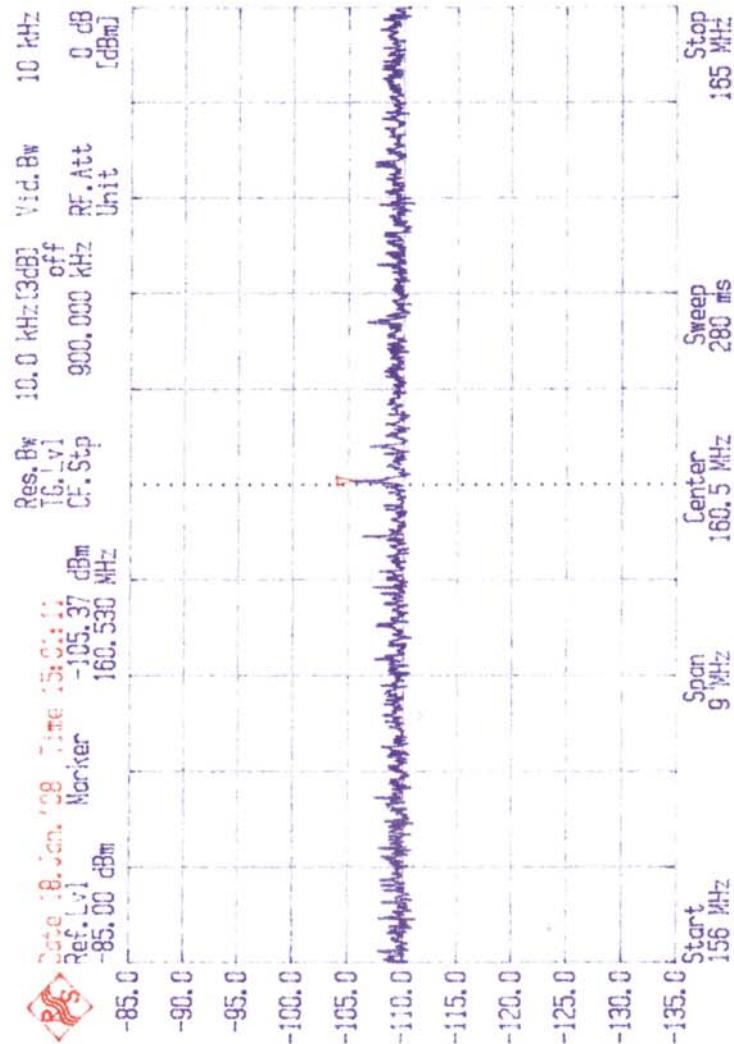


VERTICAL POLARIZATION









14. IMMUNITY

14.1. IMMUNITY TO CONDUCTED RADIO FREQUENCY DISTURBANCE

TESTS SUMMARY	
Type of port	Power line DC and data Lines
Basic standard	EN 61000-4-6
Performance criteria	A
Frequency/Levels	- 3Vrms amplitude swept over the frequency range 150KHz to 80MHz - 10Vrms amplitude at spot frequencies : 2MHz, 3MHz, 4MHz, 6.2MHz, 8.2MHz, 12.6MHz, 16.5MHz, 18.8MHz, 22MHz and 25MHz
Exclusion Band	
Modulation	AM 80% / 400Hz
Sweep	1.5×10^{-3} decades/sec.
Frequencies for which a spurious answer has been found :	
None	

COMPLIANT

14.2. IMMUNITY TO RADIATED RADIOFREQUENCIES

TESTS SUMMARY	
Basic standard	EN 61000-4-3
Performance criteria	A
Frequencies/level	80 MHz to 2 GHz 10V/m
Exclusion Band	
Modulation	AM 80% / 400HzkHz
Sweep rate	1.5×10^{-3} decade/sec. 80MHz - 1GHz 0.5×10^{-3} decades/sec. 1GHz - 2GHz

Frequencies for which a spurious answer has been found :

The equipment has been tested on all sides. Its good working has been checked during the tests.

COMPLIANT

14.3. IMMUNITY TO FAST TRANSIENTS

TESTS SUMMARY	
Type of port	D.C. power ports Signal and control ports
Basic standard	EN 61000-4-4
Basic criteria	B
Requirements	Signal / Control port +/- 1kV common mode

Port	Results					
	+/- 0.5kV	+/- 1kV	+/-2kV	+/- 2.5kV	+/-3kV	+/- 4kV
Signal and control ports		OK				



COMPLIANT

14.4. IMMUNITY TO SURGES ON A.C. POWER LINES

TESTS SUMMARY	
Type of port	a.c. power line
Basic standard	EN 61000-4-5
Basic criteria	B
Requirements	Common mode

Port	Results					
	+/- 0.5kV	+/- 1kV	+/-2kV	+/- 2.5kV	+/-3kV	+/- 4kV
Line/earth						
Line/line						

NOT APPLICABLE

14.5. IMMUNITY TO POWER SUPPLY SHORT-TERM VARIATION

TESTS SUMMARY	
Type of port	a.c. power line
Basic standard	EN 61000-4-11
Basic criteria	B
Requirement	+/-20% voltage +/-10% frequency

NOT APPLICABLE

14.6. IMMUNITY TO POWER SUPPLY FAILURE

TESTS SUMMARY	
Type of port	Power ligne DC
Basic standard	EN 61000-4-11
Basic criteria	C
Requirement	Test Voltage : 24V Test duration : 3 breaks Power cut duration : 60s

COMPLIANT

14.7. IMMUNITY TO ELECTROSTATIC DISCHARGE

TESTS SUMMARY	
Type of port	Cabinet
Basic standard	EN 61000-4-2
Basic criteria	B
Requirement	Contact +/- 6 KV Air +/- 8 KV



Loss of function during positive air and contact discharges, after the test the EUT is self-recoverable.

COMPLIANT

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15. SPECIAL PURPOSE TESTS – IEC 60945 CLAUSE 11**15.1. ACOUSTIC NOISE AND SIGNALS****COMPLIANT****15.2. COMPASS SAFE DISTANCE**

MOUNTING	STANDARD COMPASS	STEERING COMPASS
Cabinet alone	0.60m	0.40m
Cabinet with bracket	0.80m	0.45m

COMPLIANT**16. SAFETY PRECAUTION – IEC 60945 CLAUSE 12****16.1. PROTECTION AGAINST ACCIDENTAL ACCESS TO DANGEROUS VOLTAGES****NOT APPLICABLE****16.2. ELECTROMAGNETIC RADIO FREQUENCY RADIATION****NOT APPLICABLE****16.3. EMISSION FROM VISUAL DISPLAY UNIT****NOT APPLICABLE****16.4. X-RADIATION****NOT APPLICABLE****17. MAINTENANCE – IEC 60945 CLAUSE 13****Maintenance of hardware**

No elaborate recalibration or readjustement after maintenance

COMPLIANT**Maintenance of software**

Software can be update by "I/O DATA" connector

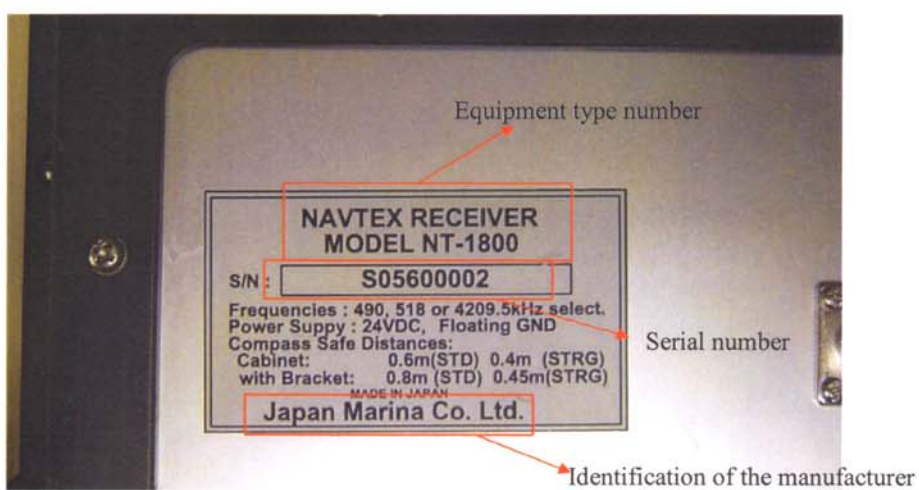
The version of software is present on the display at equipment start up

COMPLIANT

18. EQUIPMENT MANUALS – IEC 60945 CLAUSE 14

Circuit diagrams, component layouts and component parts are provided in "Operation and Installation" manual clause 8 "Summarized Theory of Operation".

COMPLIANT

19. MARKING AND IDENTIFICATION – IEC 60945 CLAUSE 15

COMPLIANT