
REPORT ON

Type Approval Testing of the Japan Radio Company Limited
JHS-182 Automatic Identification System
in accordance with IEC 61993-2 (December 2001)
and IEC 60945 (2002)

Report Number RM611325-01

September 2003

REPORT ON

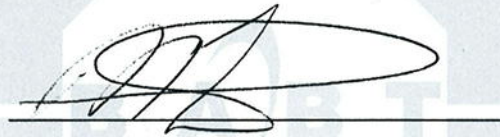
Type Approval Testing of the JHS-182 Automatic Identification System in accordance with IEC 61993-2 (December 2001) and IEC 60945 (2002)

Report Number RM611325-01

PREPARED FOR

Japan Radio Company Ltd
Mitaka Plant
1-1 Shimorenjaku5-chome
Mitaka-shi
Tokyo 181-8510
Japan

APPROVED BY



M JENKINS
Wireless Group Leader

DISTRIBUTION

JRC	Mr J Moon	Copy No. 1
QINETIQ	Mr P Goddard	Copy No. 2
BABT		Copy No. 3

Copy No:



0141
Group



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Manufacturers Declarations

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Manufacturer: Japan Radio Company Ltd

Type Designation: Automatic Identification System Type JHS-182
Comprising:
NTE-182 Transponder with integral antenna,
NQD-4382 Junction Box,
NQE-3182 Connection Box,
NCM-779 AIS Controller.
NBD-577B Power Supply Unit

Serial Nos.: JHS-182 System:
NTE-182: BB34322
NQD-4382: -----
NQE-3182: -----
NCM-779: BB14322
NBD-577B: -----

Number of Samples Tested: One system, comprising five separate units.

Test Specifications: IEC 60945 (2002)
IEC 61993-2 (December 2001),

**Date of Receipt
of Test Samples:** 7th July 2003

Start of Test: 7th July 2003

Finish of Test: 25th July 2003

Test Engineer: R.A.Blagg



TEST HOUSE DECLARATION

We, BABT of Segensworth Road, Fareham, Hampshire PO15 5RH, declare under our sole responsibility that the products:

Equipment: Automatic Identification System

Type: JHS-182, comprising:

Model: NTE-182 Transponder with integral antenna,
NQD-4382 Junction Box,
NQE-3182 Connection Box,
NCM-779 AIS Controller.
NBD-577B Power Supply Unit

Serial Numbers: JHS-182 System: BB44322
NTE-182: BB34322
NQD-4382: -----
NQE-3182: -----
NCM-779: BB14322
NBD-577B: -----

Quantity: One system, comprising five separate units.

to which this declaration relates are in conformity with the following standard(s) or other normative document(s):

IEC 60945 (2002)
IEC 61993-2 (December 2001)

Detailed results are recorded in Report No. RM611325-01

Place and date of issue: Fareham, September 2003

Signature:



M JENKINS
Wireless Group Leader

Date:

4th September 2003



APPLICANT'S DETAILS

CATEGORY OF APPLICANT
(please tick relevant box opposite)

(a) MANUFACTURER

(b) IMPORTER

If box (b), (c) or (d) is ticked
complete details in box below with
respect to the manufacturer

(c) DISTRIBUTOR

(d) AGENT

COMPANY NAME : Japan Radio Company

ADDRESS :

NAME FOR CONTACT PURPOSES : Mr James Moon

TELEPHONE NO : 01306 631180

FAX NO : 01306 631759

TELEX NO : N/A

MANUFACTURER'S DETAILS

COMPANY NAME : Japan Radio Company

ADDRESS : 1-1, Shimorenjaku 5-chome
Mitaka-shi
Tokyo
181-8510
Japan

NAME FOR CONTACT PURPOSES : Mr. T. Shinya

TELEPHONE NO : +81-3-3348-2351

FAX NO : +81-3-3348-4132

TELEX NO : j04588_shinya@m1.jrc.co.jp



TYPE DESIGNATION (1)	
The type designation may be either a single alphanumeric code <u>or</u> an alphanumeric/code divided into two parts.	
Please fill in	
EITHER :	
TYPE DESIGNATION AS A SINGLE ALPHANUMERIC CODE	JHS-182
OR :	
TYPE DESIGNATION IN TWO PARTS :	
1. EQUIPMENT SERIES NO. (2) ("MODEL NUMBER")	//////////
AND	
2. EQUIPMENT SPECIFIC NO. (3) ("IDENTIFICATION NO")	//////////

- (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".

TECHNICAL VARIANTS	
IDENTIFICATION	COMMENTS



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 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).
	<u>Handportable</u>
<input type="checkbox"/>	(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 checked="" type="checkbox"/> <u>Other</u>	Class A shipborne universal Automatic Identification System.

BASE STATION	
<input type="checkbox"/> Transmitter	<input type="checkbox"/> Simplex
<input type="checkbox"/> Receiver	<input type="checkbox"/> Duplex
<input type="checkbox"/> Transceiver	<input type="checkbox"/> Communal Site Use (70dB limit)
MOBILE STATION	
<input type="checkbox"/> Transmitter	
<input type="checkbox"/> Receiver	
<input type="checkbox"/> Transceiver	
<input type="checkbox"/> Remote Control Head	
HANDPORTABLE	
<input type="checkbox"/> Transmitter	<input type="checkbox"/> Simplex
<input type="checkbox"/> Receiver	<input type="checkbox"/> Duplex
<input type="checkbox"/> Transceiver	



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 to 162.025 MHz	
TRANSMITTER FREQUENCY ALIGNMENT RANGE	
156.025 MHz to 162.025 MHz	



TRANSMITTER RF POWER CHARACTERISTICS

MAXIMUM RATED TRANSMITTER OUTPUT POWER as stated by manufacturer
12.5 W AT AMPLIFIER RF OUTPUT CONNECTOR (as declared by manufacturer)
12.5 W EFFECTIVE RADIATED POWER (for equipment with integral antenna)

Is transmitter intended for :

Continuous duty Yes
 No

Intermittent duty Yes
 No

If intermittent state DUTY CYCLE (Dependent upon operation)

Transmitter ON minute

Transmitter OFF minute

Is transmitter output power variable?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
<input type="checkbox"/> continuously variable <input checked="" type="checkbox"/> stepped dB per step maximum RF output power (Watts) 12.5 minimum RF output power (Watts) 2	Maximum power (Watts)

TRANSMITTER – MODULATION

- Angle (FREQUENCY)
- Phase
- Other : GMSK and FSK



TRANSMITTER MODULATION INPUT CHARACTERISTICS			
Modulation input signal level for 60% of maximum deviation at kHz			
At			
Microphone socket	mV	Impedance	Ohms
Accessory socket	mV	Impedance	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.

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 50.75 MHz / 38.85MHz (TDMA dual receiver), 45 MHz (DSC receiver)
<input checked="" type="checkbox"/> 2nd 450 kHz
<input type="checkbox"/> 3rd
Is local oscillator injection frequency higher or lower than the receiver nominal frequency?
<input checked="" type="checkbox"/> Higher (for 50.75 / 38.85 I.F.) (TDMA receivers)
<input checked="" type="checkbox"/> Lower (for 45 MHz I.F.) (DSC receiver)
RECEIVER CHANNEL SWITCHING FREQUENCY RANGE
156.025 MHz to 162.025 MHz
RECEIVER FREQUENCY ALIGNMENT RANGE
156.025 MHz to 162.025 MHz



RECEIVER AUDIO (AF) CHARACTERISTICS

MAXIMUM RATED AUDIO (AF) FREQUENCY OUTPUT POWER

INTO LOUDSPEAKER Watts

TO LINE dBm

INTO EARPIECE Watts

BALANCED YES

NO

UNBALANCED YES

NO

Does connection carry DC voltage?

YES

NO

If yes, state value

Normal Audio load impedance

AT LOUDSPEAKER ohms

AT EARPIECE ohms

AT LINE OUTPUT ohms

At audio accessory connection or facility socket (if fitted)

Output Watts

Impedance ohms

Max input level at audio accessory socket

 mV

Impedance ohms



TRANSMITTER AND RECEIVER CHARACTERISTICS
ITU DESIGNATION OR CLASS OF EMISSION: G1D (F1D), G2B (F2B)
CHANNEL SEPARATION: 12.5 kHz or 25 kHz
-State the maximum number of channels over which the equipment can operate: 56 channels at 25 kHz spacing, 111 channels at 12.5 kHz spacing.

EXTREME TEMPERATURE RANGE over which equipment is to be type tested
<input checked="" type="checkbox"/> -25°C to +55°C NTE-182, NQD-4382
<input checked="" type="checkbox"/> -15°C to +55°C NCM-779, NQE-3182, NBD-577B
<input type="checkbox"/> -10°C to +55°C

CONSTRUCTION OF EQUIPMENT
<input type="checkbox"/> Single unit (5)
<input checked="" type="checkbox"/> Multiple units
If multiple units describe each one clearly: The NCM-779 is an AIS Controller with integral display and keypad. The NQD-4382 is a Junction Box. The NQE-3182 is a Connection Box. The NBD-577B is a Power Supply Unit The NTE-182 is a VHF Transponder with VHF antenna and integral GPS receiver. (These five units comprise the JHS-180 system.)

(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.
<input type="checkbox"/> Applies cut-off voltage
<input checked="" type="checkbox"/> Does not apply



POWER SOURCE

AC MAINS 100/110/120 or 200/220/240 V rms Single phase

AC MAINS FREQUENCY 50/60 Hz Three phase

24V DC Voltage (V)

4A DC Maximum Current (A)

Other

BATTERY

Nickel Cadmium

Mercury

Alkaline

Lead acid (Vehicle regulated)

Leclanche

Lithium

Other

volts nominal. End point voltage as quoted by equipment manufacturer V
(Refer to Clause 5.3.2 and 5.4.2 of the Standard when completing the above)

SIGNALLING (See note (c))

Is selective signalling fitted Yes

No

Is selective signalling

Analogue

Digital

If analogue, state format

Tone Frequencies

If digital, state modulation method

bit rate



ALIGNMENT RANGE

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.

- 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

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.

CHANNEL IDENTIFICATION

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.

Equipment Identification e.g. Serial Number	Channel No.	Transmit Nominal Freq kHz	Receive Nominal Freq kHz



OTHER ITEMS SUPPLIED

- | | |
|--|------------------------------|
| Spare batteries
e.g. (portable equipment) | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No |
| Battery charging device | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No |
| Special tools for dismantling equipment | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No |
| Encoder | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No |
| Test interface box (if applicable) or
where appropriate the RF test fixture | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No |
| Full documentation on equipment
(Handbook and circuit diagrams) | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No |
| Others | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No |

If Yes, please specify :



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 <u>all</u> respects with the equipment tested	<input type="checkbox"/>	Yes
	<input type="checkbox"/>	No
If no supply full details		
Is the Test Report to be used as part of a Maritime and Coastguard Agency Type Approval Application?	<input checked="" type="checkbox"/>	Yes
	<input 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 checked="" type="checkbox"/>	No
If yes supply full details:		
Will labelling of the equipment comply with the requirements of IEC 61993-2?	<input checked="" type="checkbox"/>	Yes
	<input type="checkbox"/>	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: Held on file at BABT
Name: James Moon
Position held: Deputy General Manager
Date: 16th June 2003

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.



ADDITIONAL INFORMATION.

This report contains results for type approval testing in accordance with IEC 61993-2 (December 2001) and IEC 60945 (2002). The test definitions, methods and requirements follow the applicable version (as indicated earlier) of the above specifications.

BABT retains all results, plots and printouts for the tests performed and also calibration details of the test equipment used.

The test results relate only to the item(s) tested.

The report shall not be reproduced without the written approval of the testing laboratory.

Testing was performed at Mitaka in Japan, in the presence of Mr S Kuromori of JRC Limited.



Ambient temperature +24.8 °C Relative humidity 55 %

POWER SUPPLY TEST (not an IEC requirement).

The output of the dc to dc converter in the NQE-3182 Connection Box was monitored whilst the input to the NBD-577B was varied over the complete extreme voltage range, and the EUT was switched between Receive and Transmit. The following table gives the results, and justifies testing at only one voltage during normal temperature tests.

(All normal temperature tests were carried out at a supply voltage of 220 V, 60 Hz).

Supply Voltage	Supply Frequency (Hz)	DC output (Receive) V	DC output (Transmit) V
90	47.5	24.06	23.88
90	63	24.06	23.88
100	50	24.06	23.88
132	47.5	24.06	23.88
132	63	24.06	23.88
180	47.5	24.06	23.88
180	63	24.06	23.88
220	60	24.06	23.88
264	47.5	24.06	23.88
264	63	24.06	23.88
21.6	dc	24.07	23.88
24	dc	24.06	23.88
31.2	dc	24.06	23.88

Software used: 55 to 58

TEST EQUIPMENT USED:

4, 28, 30 to 52, 88 to 90

.....



Ambient temperature +25.1 °C Relative humidity 65 %

EXCESSIVE CONDITIONS

IEC 60945, CLAUSE 5.2.3

> 24 V dc / >100 V ac / >240 V ac Supply

Reverse polarity on 24 V dc input:

The dc supply to the JHS-182 was reverse polarised for a period of 5 minutes. The EUT operated normally after resumption of the correctly polarised dc supply.

Excessive voltage on 24 V dc input:

The protection circuitry within the JHS-182 AIS caused the power supply to shut down when the dc supply voltage was increased above 36.4 V dc. Upon resumption of the 24 V dc supply, the EUT operated normally. No manual reset was required and no fuses were ruptured.

Excessive voltage on 100V ac input:

The protection circuitry within the JHS-182 AIS caused the power supply to shut down when the ac supply voltage was increased above 141 V ac. Upon resumption of the 100 V dc supply, the EUT operated normally. No manual reset was required and no fuses were ruptured.

Excessive voltage on 220V ac input:

The protection circuitry within the JHS-182 AIS caused the power supply to shut down when the ac supply voltage was increased above 282 V ac. Upon resumption of the 220 V dc supply, the EUT operated normally. No manual reset was required and no fuses were ruptured.

On completion of this test, the JHS-182 AIS was checked and was found to operate normally in all available modes.

Required results:

During and after the test the EUT shall not be damaged. After removal of the excessive supply conditions the EUT shall be able to operate normally for all available modes.

The EUT satisfied the requirements of this test.

Software used: 55 to 58

TEST EQUIPMENT USED:

4, 28, 30 to 52, 88 to 90

.....



Ambient temperature +24.1 °C Relative humidity 68 %

Environment (+70°C): DRY HEAT STORAGE

IEC 60945, CLAUSE 8.2.1.2

Performance Check : The limits are derived from IEC 61993-2, clause 14.1.1 and IEC 60945, table 3 under extreme conditions.

Test Condition	14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
AC 100 V, 50 Hz (normal)	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 90 V, 47.5 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 132 V, 63 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 220 V, 50 Hz (normal)	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 180 V, 47.5 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 264 V, 63 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 24 V (normal)	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 21.6 V	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 31.2 V	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Remarks

The AIS was stored for 13.25 hours in accordance with the specification for internally and externally mounted equipment and the performance was checked at normal and extreme conditions after the storage period.

The EUT satisfied the requirements of this test.

Software used: 55 to 58

TEST EQUIPMENT USED:
4, 28, 30 to 52, 88 to 90
.....



Ambient temperature +25.7°C Relative humidity 79 %

Environment (+55°C): DRY HEAT & EXTREMES

IEC 60945, CLAUSE 8.2.2.2
Extreme supply, IEC 61993-2, CLAUSE 10.2

Performance Check : The limits are derived from IEC 61993-2, clause 14.1.1 and IEC 60945, table 3 under extreme conditions.

Test Condition	14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
AC 90 V, 47.5 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 132 V, 63 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 180 V, 47.5 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 264 V, 63 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 21.6 V	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 31.2 V	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 220 V, 60 Hz (after recovering to ambient)	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Remarks

The unit was stored in accordance with the specification for internally and externally mounted equipment and the performance was monitored during the 2 hour period.

The EUT satisfied the requirements of this test.

Software used: 55 to 58

TEST EQUIPMENT USED:
4, 28, 30 to 52, 88 to 90

.....



Ambient temperature +24.9°C Relative humidity 76%

Environment: DAMP HEAT +40°C, 93% RH.

IEC 60945, CLAUSE 8.3.1.2

Performance Check : The limit required for output is taken from IEC 61993-2, clause 14.1.1 and IEC 60945, table 3 under extreme conditions.

Test Condition	14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
AC 100V, 50 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 220 V, 60 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 24 V	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Performance check after ambient recovery and stabilisation:

Test Condition	14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
AC 100V, 50 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 220 V, 60 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 24 V	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Remarks

The unit was stored in accordance with the specification and the performance check was carried out during the 2 hour power on period. (AC 220V, 60 Hz applied during 2 hour period)

The EUT satisfied the requirements of this test.

Software used: 55 to 58

TEST EQUIPMENT USED:

4, 28, 30 to 52, 88 to 90

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Ambient temperature +23.5 °C Relative humidity 72 %

Environment (-15/-25°C): LOW TEMPERATURE

IEC 60945, CLAUSE 8.4

Performance Check : . The limits are derived from IEC 61993-2, clauses 14.1.1.1 & 14.1.1.2, and IEC 60945, table 3 under extreme conditions.

Test Condition	14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
AC 100 V, 50 Hz (normal)	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 90 V, 47.5 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 132 V, 63 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 220 V, 50 Hz (normal)	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 180 V, 47.5 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
AC 264 V, 63 Hz	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 24 V (normal)	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 21.6 V	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]
DC 31.2 V	CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Remarks

The units were stored in accordance with the specification for internally and externally mounted equipment and the performance was rechecked 3 hours after ambient recovery.

The EUT satisfied the requirements of this clause.

Software used: 55 to 58

TEST EQUIPMENT USED:
4, 28, 30 to 52, 88 to 90
.....



Ambient temperature +26.1°C Relative humidity 58%

Environment: VIBRATION TEST

IEC 61993-2, 14.1.1 & IEC 60945, CLAUSE 8.7

Performance Check : . The limits are derived from IEC 61993-2 clauses 14.1.1.1, 14.1.1.2, and IEC 60945, table 3 under extreme conditions. EUT supply voltage: 100V a.c., 50Hz.

Vibration Axis: Lateral (X), 25.39 Hz (NCM-779 only)

14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Vibration Axis: Lateral (X) 95.34 Hz (NBD-577B only)

14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Vibration Axis: Lateral (X), 30Hz, (NTE-182, NQD-4382 & NQE-3182)

14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Vibration Axis Fore / Aft (Y) , 30Hz, (all units)

14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Vibration Axis: Vertical (Z) , 30Hz, (all units)

14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Required results:

14.1.1.1 Transmit position reports: (2) required results: Confirm that the EUT transmits continuously and that the transmitted data complies with sensor inputs.

14.1.1.2 Receive position reports: (2) required results: Confirm that the EUT receives continuously under conditions a) and b) and outputs the received messages via the PI.

- a) Switch on test targets, then start operation of the EUT.
- b) Start operation of the EUT, then switch on test targets.

Remarks

Resonances with MF>5 occurred only in the Lateral (X) plane for the NCM-779 at 25.39 Hz and for the NBD-577B at 95.34 Hz. All other vibration was applied at 30 Hz

At the conclusion of the vibration endurance tests, all five units were internally and externally inspected for loose components and / or mechanical damage. There was no visible damage or loose components in any of the five units.

The EUT satisfied the requirements of this clause.



Software used: 55 to 58

TEST EQUIPMENT USED:
4, 28, 30 to 52, 88 to 90

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Ambient temperature +23.4°C Relative humidity 69%

RAIN TEST

IEC 61993-2, clause 14.1.1; IEC 60945, CLAUSE 8.8

Items subjected to test: NTE-182 and NQD-4382 (Exposed category)

Performance Check : The limits are derived from IEC 61993-2, clause 14.1.1.1, 14.1.1.2; and IEC 60945 table 3 under extreme conditions.

14.1.1.1 Transmit position reports.	14.1.1.2 Receive position reports.
CH A: [✓] CH B: [✓]	a) [✓] b) [✓]

Remarks

The rain test is not applicable to the NQE-3182, NBD-577B and NCM-779 (Protected category).

There was no visible ingress of water inside either the NTE-182 AIS Transponder or the NQD-4382 Junction Box when inspected immediately after the 30 minute rain test.

The EUT satisfied the requirements of this test.

Software used: 55 to 58

TEST EQUIPMENT USED:

4, 28, 30 to 52, 88 to 90

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Test Procedure for Type Approval - Functional Tests

1. Note: *Italic sentences are quotations from IEC 61993-2.*

2. Abbreviations:

EUT	Equipment Under Test
min	minute
MKD	Minimum Keyboard and Display
msg	message(s)
PI	Presentation Interface
Rx	Receive, Receiver
Tx	Transmit, Transmitter
VDL	Very High Frequency (VHF) Data Link



Ambient temperature +27.3 °C Relative humidity 72 %

OPERATING MODES/CAPABILITY	IEC 61993-2, CLAUSE 14.1 (4.2)
AUTONOMOUS MODE	IEC 61993-2, CLAUSE 14.1.1 (4.2.1, M.1371-1 A2/3.3.5)
TRANSMIT POSITION REPORTS	IEC 61993-2, CLAUSE 14.1.1.1

(1) Method of measurement

Set up a test environment of at least 5 test targets.

Record the VDL communication and check for messages of the EUT.

(2) Required results

Confirm that the EUT transmits continuously and that the transmitted data complies with sensor inputs.

(3) Test results

Conditions		Results
	Channel A	√
	Channel B	√

The EUT satisfied the requirements of this test.

Software used: 55 to 58

TEST EQUIPMENT USED:

4, 28, 30 to 52, 88 to 90

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Ambient temperature +27.3 °C Relative humidity 72 %

RECEIVE POSITION REPORTS

IEC 61993-2, CLAUSE 14.1.1.2

Method of measurement

Set up a test environment of at least 5 test targets.

a) Switch on Test targets, then start operation of the EUT

b) Start operation of the EUT, then switch on Test targets

Check the VDL communication and Presentation Interface outputs of the EUT.

(1) Required results

Confirm that the EUT receives continuously under conditions a) and b) and outputs the received messages via the PI.

(2) Test results

Conditions	Results
Switch on Test targets, then start operation of the EUT	√
Start operation of the EUT, then switch on Test targets	√

The EUT satisfied the requirements of this test.

Software used: 55 to 58

TEST EQUIPMENT USED:

4, 28, 30 to 52, 88 to 90

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Ambient temperature +27.3 °C Relative humidity 72 %

ASSIGNED MODE

IEC 61993-2, CLAUSE 14.1.2 (4.2.1 M.1371-1 A2/3.3.6)

(1) Method of measurement

Set up standard test environment and operate EUT in autonomous mode.

Transmit an Assigned mode command msg 16 to the EUT with:

a) Slot offset and increment

b) Designated reporting rate.

Record transmitted messages.

(2) Required results

Confirm that the EUT transmits position reports msg 2 according to defined parameters and reverts to SOTDMA msg 1 with standard reporting rate after 4 min to 8 min.

(3) Test results

Conditions	Results
Slot offset: 100, Increment:125	√
For Designated reporting rate Slot offset: 120, Increment: 0	√

The EUT satisfied the requirements of this test.

Software used: 55 to 58, 75

TEST EQUIPMENT USED:

4, 28, 30 to 52, 63, 66, 67, 79, 88 to 90

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