REPORT ON

Limited Type Approval Testing of the McMurdo
NAV-7 NAVTEX Receiver in accordance with
IEC 61097-6 Ed.2 (2005-12)

COMMERCIAL- IN-CONFIDENCE

Report Number RM614796/01 Issue 1 **March 2006**

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REPORT ON Limited Type Approval Testing of the McMurdo NAV-7 NAVTEX Receiver in accordance with IEC 61097-6 Ed.2 (2005-12)

Report Number RM614796/01 Issue 1

March 2006

PREPARED FOR

McMurdo Limited
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APPROVED BY

M Jenkins
Authorised Signatory

DATED 16th March 2006

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SECTION 1

REPORT SUMMARY

Limited Type Approval Testing of the McMurdo
NAV-7 NAVTEX Receiver
in accordance with
IEC 61097-6 Ed.2 (2005-12)

1.1 STATUS

Manufacturer	McMurdo Limited
Type Designation	NAVTEX Receiver Type NAV-7
Serial Numbers	005, 007, 010, 011
Number of Samples Tested	Four
Test Specifications	IEC 61097-6 Ed.2 (2005-12)
Start of Test	19th December 2005
Finish of Test	8th February 2006
Test Engineer(s)	R A Blagg R V Henley Z Bailey

1.2 TEST HOUSE DECLARATION

We, BABT of Octagon House, Concorde Way, Segensworth North, Fareham, Hampshire PO15 5RL, declare under our sole responsibility that the product:

Equipment:	NAVTEX Receiver
Type:	NAV-7
Serial Numbers:	005, 007, 010, 011
Quantity:	Four

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

IEC 61097-6 Ed.2 (2005-12)

Clauses: 4.3.7, 4.3.8, 4.3.9.1, 4.3.9.2, 4.3.9.3, 4.4, 4.6.1.1, 4.6.1.2, 4.6.1.3, 4.6.1.4, 4.6.1.8, 4.6.1.9, 4.8.1.1, 4.8.1.2, 4.8.1.3, 7.2, 7.4, 8.1, 8.2, 8.3, 8.4, 8.5, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 11.1, 11.2, 11.4, 11.5, 11.6, 11.7, 11.8, and 12.1

Detailed results are recorded in Report No. RM614796/01 Issue 1

Place and date of issue: Fareham, March 2006

Signature: 

M Jenkins
Authorised Signatory

Date: 16th March 2006

1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with IEC 61097-6 Ed.2 is shown below.

Std / Clause	Test Description	Result	Levels / Comments
IEC 61097-6 Ed.2 4.3.7	Controls and indicators	PASS	
IEC 61097-6 Ed.2 4.3.8	Programmable control memories	PASS	
IEC 61097-6 Ed.2 4.3.9.1	Generation of alarms	PASS	
IEC 61097-6 Ed.2 4.3.9.2	Using the ALR formatter	PASS	
IEC 61097-6 Ed.2 4.3.9.3	Repetition of alarm conditions	PASS	
IEC 61097-6 Ed.2 4.3.10	Test facilities	N/A	
IEC 61097-6 Ed.2 4.4	Interfaces	PASS	
IEC 61097-6 Ed.2 4.5.1	Number of receivers	N/A	3
IEC 61097-6 Ed.2 4.5.2	Receive frequencies	N/A	490, 518, 4209.5 kHz
IEC 61097-6 Ed.2 4.6.1.1	User interface	PASS	
IEC 61097-6 Ed.2 4.6.1.2	Number of characters displayed per line	PASS	
IEC 61097-6 Ed.2 4.6.1.3	Number of lines displayed	PASS	
IEC 61097-6 Ed.2 4.6.1.4	Display requirements	PASS	
IEC 61097-6 Ed.2 4.6.1.5	Visibility of display	N/A	
IEC 61097-6 Ed.2 4.6.1.6	Automatic line feed	N/A	
IEC 61097-6 Ed.2 4.6.1.7	End of message display	N/A	

1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with IEC 61097-6 Ed.2 is shown below.

Std / Clause	Test Description	Result	Levels / Comments
IEC 61097-6 Ed.2 4.6.1.8	Corrupt characters	PASS	
IEC 61097-6 Ed.2 4.6.1.9	Printer interface message selection requirements	PASS	
IEC 61097-6 Ed.2 4.8.1.1	Number of messages	PASS	
IEC 61097-6 Ed.2 4.8.1.2	Message tagging	PASS	
IEC 61097-6 Ed.2 4.8.1.3	Automatic erasure	PASS	
IEC 61097-6 Ed.2 4.10	Source of UTC	N/A	
IEC 61097-6 Ed.2 7.2	INS input performance	PASS	
IEC 61097-6 Ed.2 7.4	INS output performance	PASS	
IEC 61097-6 Ed.2 8.1	Exclusion of stations	PASS	
IEC 61097-6 Ed.2 8.2	Exclusion of message categories	PASS	
IEC 61097-6 Ed.2 8.3	Receiver test facility	PASS	
IEC 61097-6 Ed.2 8.4	SAR alarm provision and reset	PASS	
IEC 61097-6 Ed.2 8.5	Additional alarms	PASS	
IEC 61097-6 Ed.2 9.1	Call Sensitivity	PASS	
IEC 61097-6 Ed.2 9.2	Interference Rejection & blocking Immunity	PASS	
IEC 61097-6 Ed.2 9.3	Co-channel Rejection	PASS	

1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with IEC 61097-6 Ed.2 is shown below.

Std / Clause	Test Description	Result	Levels / Comments
IEC 61097-6 Ed.2 9.4	Intermodulation	PASS	
IEC 61097-6 Ed.2 9.5	(Effects from) Off-Frequency Transmitter	PASS	
IEC 61097-6 Ed.2 9.6	Simultaneous Operation on Several Receive Frequencies	PASS	
IEC 61097-6 Ed.2 9.7	Protection of Input Circuits	PASS	
IEC 61097-6 Ed.2 11.1	Storage, Tagging & Erasure	PASS	
IEC 61097-6 Ed.2 11.2	Erasure of Message Identifications / Storage Time	PASS	
IEC 61097-6 Ed.2 11.4	Reception of Messages With Character errors	PASS	
IEC 61097-6 Ed.2 11.5	Unsatisfactory Reception	PASS	
IEC 61097-6 Ed.2 11.6	Power-Off	PASS	
IEC 61097-6 Ed.2 11.7	Brown-Out Test	PASS	
IEC 61097-6 Ed.2 11.8	UTC Handling Check	PASS	
IEC 61097-6 Ed.2 12.1	Spurious emissions	PASS	

1.4 APPLICATION FORM

APPLICANT'S DETAILS	
CATEGORY OF APPLICANT (please tick relevant box opposite)	(a) [✓] MANUFACTURER (b) [ ] IMPORTER (c) [ ] DISTRIBUTOR (d) [ ] AGENT
If box (b), (c) or (d) is ticked complete details in box below with respect to the manufacturer	
COMPANY NAME :	McMurdo Limited
NAME FOR CONTACT PURPOSES :	Nick Taylor
TELEPHONE NO : 02392 623975	FAX NO : 02392 623997 Email : nicktaylor@mcmurdo.co.uk

MANUFACTURER'S DETAILS	
COMPANY NAME :	McMurdo Ltd
ADDRESS :	Silver Point Airport Service Road Portsmouth PO3 5PB
NAME FOR CONTACT PURPOSES :	Nick Taylor
TELEPHONE NO : 02392 623975	FAX NO : 02392 623997 Email : nicktaylor@mcmurdo.co.uk

1.4 APPLICATIONS FORM

TYPE DESIGNATION (1)
The type designation may be either a single alphanumeric code or an alphanumeric/code divided into two parts. Please fill in EITHER : TYPE DESIGNATION AS A SINGLE ALPHANUMERIC CODE NAV-7 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".

1.4 APPLICATIONS FORM

TYPE OF EQUIPMENT		
[ ]	Base Station	(Equipment fitted with an antenna socket for use with an external antenna, and intended for use in a fixed location).
[ ]	Mobile Station	(Mobile equipment fitted with an antenna socket, for use with an external antenna, normally used in a vehicle or as a transportable station).
	Handportable	
[ ]		(fitted with an antenna socket)
[ ]		(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)
[✓]	Other	Triple frequency NAVTEX Receiver.

TRANSMITTER TECHNICAL CHARACTERISTICS
TRANSMITTER FREQUENCY
Method of frequency generation [ ] CRYSTAL [ ] SYNTHESIZER [ ] OTHER
TRANSMITTER CHANNEL SWITCHING FREQUENCY RANGE TRANSMITTER FREQUENCY ALIGNMENT RANGE

1.4 APPLICATIONS FORM

TRANSMITTER RF POWER CHARACTERISTICS	
TRANSMITTER PEAK OUTPUT POWER as stated by manufacturer:	
Is transmitter intended for : Continuous duty [ ] Yes [ ] No Intermittent duty [ ] Yes [ ] No If intermittent state DUTY CYCLE (Dependent upon operation)	
Is transmitter output power variable?	
Yes [ ]	No [ ]
[ ] continuously variable [ ] stepped dB per step maximum RF output power (Watts) minimum RF output power (Watts)	

TRANSMITTER – MODULATION
[ ] Angle (FREQUENCY)
[ ] Phase
[ ] Other :

1.4 APPLICATIONS FORM

RECEIVER CHARACTERISTICS
ITU DESIGNATION OR CLASS OF RECEPTION: F1B
CHANNEL SEPARATION: N/A
-State the maximum number of channels over which the equipment can operate: Three channels: 518 kHz, 490 kHz and 4209.5 kHz.

EXTREME TEMPERATURE RANGE over which equipment is to be type tested
[ ] -25°C to +55°C (External Unit)
[✓] -15°C to +55°C (Protected Units)
[ ] -10°C to +55°C

CONSTRUCTION OF EQUIPMENT
[✓] Single unit (5)
[ ] Multiple units
If multiple units describe each one clearly:

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

1.4 APPLICATIONS FORM

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 cut-off voltage [✓] Does not apply

1.4 APPLICATIONS FORM

POWER SOURCE	
[ ] AC MAINS	[ ] Single phase
AC MAINS FREQUENCY 50/60 Hz	[ ] Three phase
[✓] DC Voltage 12 V to 24 V	
DC Maximum Current 0.8 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)	

1.4 APPLICATIONS FORM

DECLARATION		
Are the equipments submitted representative production models?	[✓]	Yes
	[ ]	No
If not are the equipments pre-production models?	[ ]	Yes
	[ ]	No
If pre-production equipments are submitted will the final production equipments be identical in all respects with the equipment tested	[ ]	Yes
	[ ]	No
If no supply full details		
Is the Test Report to be used as part of a Maritime and Coastguard Agency Type Approval Application?	[✓]	Yes
	[ ]	No
If yes, has the product, any direct engineering predecessor, or variant ever been granted Type Approval in any EEC member country?	[ ]	Yes
	[✓]	No
If yes supply full details:		
Will labelling of the equipment comply with the requirements of IEC 60945?	[✓]	Yes
	[ ]	No
If no, supply full details		

The information within this form was supplied by Mr. Nick Taylor of McMurdo Limited, during testing.

BABT formally certifies that the manufacturer's declaration as typed out in this report is a true and accurate record of the information supplied by the applicant.

1.5 ADDITIONAL INFORMATION

This report contains results for type approval testing in accordance with IEC 61097-6 Ed.2 (2005-12). 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 test 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 McMurdo Ltd., in Portsmouth, in the presence of Mr. Fadi Ibrahim and Mr. Kevin Hornett of McMurdo Ltd.

SECTION 2

TEST DETAILS

Limited Type Approval Testing of the McMurdo
NAV-7 NAVTEX Receiver
in accordance with
IEC 61097-6 Ed.2 (2005-12)

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

SPECIFIC CHARACTERISTICS: IEC 61097-6 Ed.2, CLAUSE 4.3.7

NAV-7 S/No. 0011

Controls and Indicators

Test Instruction:	Desired Effect:	Result:
Press and Hold 'ENTER' on NAV-7.	NAV-7 shall enter SET-UP mode and display the coverage areas and message categories which have been excluded.	PASS

Requirements:

Details of the coverage areas and message categories which have been excluded by the operator from reception and/or display shall be readily available.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

SPECIFIC CHARACTERISTICS: IEC 61097-6 Ed.2, CLAUSE 4.3.8

NAV-7 S/No. 0011

Programmable Control Memories

Test Instruction:	Desired Effect:	Result:
Follow on from clause 4.3.7 test, switch off power for 6 hours.	N/A	N/A
Switch power back on and press and hold 'ENTER' to get back to set-up page.	Check that the message categories or station designators are marked as 'de-selected'.	PASS
Perform a factory reset then go to the SET-UP pages.	Check that none of the message categories or station designators are marked as 'de-selected'.	PASS

Requirements:

Information for location (B1) and message (B2) designators in programmable memories shall be permanently stored in non-volatile memory and shall not be erased by interruptions in the power supply of less than 6 hours. Default programmable settings shall be, for the location (B1) designators set to all characters and for the message (B2) designators set to characters ABCDEFHJKLVZ.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

ALARMS: IEC 61097-6 Ed.2, CLAUSE 4.3.9.1

NAV-7 S/No. 0011

Generation of Alarms

Test Instruction:	Desired Effect:	Result:
Use the V4 Navtex test station to send a 'xDxx' message at – 101 dBm.	Check that reception of this message causes the 'ALARM' icon to appear at the top of the display.	PASS
N/A	NAV-7 contains relay contacts for the provision of an external sounder.	PASS
Generate an alarm condition.	Check that the internal alarm sounds.	PASS (single beep)
Go to the 'set-up' mode: system options page and select 'Audible alarm = OFF'. Generate an alarm condition.	Check that the internal alarm does not sound	PASS
Use the V4 Navtex test station to send a 'xDxx' message at – 101 dBm.	Check that the internal alarm sounds and is distinguishable from the normal alarm.	PASS
Use an Ohmmeter to prove that the N/C and N/O relay contacts are not connected to either system 0V or ship's earth.	Open circuit.	PASS
Use the V4 Navtex test station to send a 'xDxx' message at – 101 dBm.	Check that an ALR command is sent on the INS port.	PASS

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

ALARMS: IEC 61097-6 Ed.2, CLAUSE 4.3.9.1

NAV-7 S/No. 0011

Generation of Alarms (continued)

Requirements:

The receipt of search and rescue information (B2='D') shall give an alarm at the position at which the ship is normally navigated. It shall only be possible to reset this alarm manually.
The EUT may either contain an integral alarm sounder or a pair of relay contacts for the provision of an external sounder.
If an additional alarm is provided at the equipment to indicate, for example the reception of navigational and/or meteorological warnings, it shall be capable of being suppressed.
If an additional alarm is provided it shall be distinguishable from a search and rescue alarm.
The audible volume of the alarm shall be 75 dBA to 85 dBA.
If a pair of relay contacts is provided to switch an external sounder on for an alarm condition then the relay contacts shall be free of earth.
The alarm condition shall be reported via an ALR command on the INS serial port.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

Note:

The external alarm is provided by a third party, therefore no requirement to measure the audible volume.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

ALARMS: IEC 61097-6 Ed.2, CLAUSE 4.3.9.2

NAV-7 S/No. 0011

Using the ALR formatter

Test Instruction:	Desired Effect:	Results:
Use the V4 Navtex test station to send a 'xAxx' navigational warning at – 101 dBm.	Check that an ALR command with '001 "NAVTEX: Navigational warning"' is sent on the INS port.	PASS
Use the V4 Navtex test station to send a 'xBxx' meteorological warning at – 101 dBm.	Check that an ALR command with '002 "NAVTEX: Meteorological warning"' is sent on the INS port.	PASS
Use the V4 Navtex test station to send a 'xDxx' search and rescue report at – 101 dBm.	Check that an ALR command with '003 "NAVTEX: Search and rescue information"' is sent on the INS port.	PASS

Requirements:

An ALR sentence shall be used to report the reception of a search and rescue alarm, navigational or meteorological warnings or to indicate a failure or malfunction that will reduce the integrity of the NAVTEX receiver.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

ALARMS: IEC 61097-6 Ed.2, CLAUSE 4.3.9.3

NAV-7 S/No. 0011

Repetition of alarm conditions

Test Instruction:	Desired Effect:	Results:
Use the V4 Navtex test station to send a 'xAxx' navigational warning at – 101 dBm.	Check that an ALR command with '001 "NAVTEX: Navigational warning"' is sent on the INS port every 30 seconds & check that the ALARM icon is visible.	PASS
Read the alarm on the NAV-7		PASS

Requirements:

Whilst any alarm conditions persist, the NAVTEX receiver shall repeat the appropriate ALR sentences once every 30 seconds until acknowledged.

When all the alarm conditions are acknowledged (but still active), the NAVTEX receiver shall stop the output of any audible alarm indication (whether by integral sounder or relay contacts) but shall continue to repeat the ALR sentences once every 30 seconds.

When the alarm condition has returned to "healthy", an ALR sentence with the status set to "V" shall be sent out at one minute intervals.

When there are no active alarms, the NAVTEX receiver may send out a single ALR sentence with alarm number 006 and a status of "V" once every minute as an indication that all is well.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

INTERFACES: IEC 61097-6 Ed.2, CLAUSE 4.4

NAV-7 S/No. 0011

Interfaces

Test Instruction:	Desired Effect:	Results:
N/A	McMurdo state that they provide an NMEA0183 compatible I/O port and an IEC 61162-2 compatible I/O port.	PASS
Support for the ALR sentence has already been demonstrated in clause 4.3.9.3	N/A	PASS
Support for the ACK sentence shall be demonstrated by sending an xAxx message to invoke an alarm, then send $xxACK, 001, 54	ALR output sent. Alarm indicated on NAV-7	PASS
Support for the NRM sentence shall be demonstrated.	Successful reception and display of the NRM sentence.	PASS
Support for the NRX sentence shall be demonstrated.	Successful reception and display of the NRX sentence.	PASS

Requirements:

The equipment shall include at least one interface for the transfer of received data to other navigation or communication equipment.

All interfaces provided for communication with other navigation or communication equipment shall comply with IEC 61162 series of standards.

As a minimum the equipment shall be capable of communicating with the sentences ACK, ALR, NRM and NRX with the electrical signal characteristics given in IEC 61162-1. The equipment shall also be capable of responding to query sentences as defined in IEC 61162-1 for the NRM and NRX sentences.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

DISPLAY: IEC 61097-6 Ed.2, CLAUSE 4.6.1.1

NAV-7 S/No. 0011

User interface

Test Instruction:	Desired Effect:	Results:
Already demonstrated in clause 4.3.7	Display mode showing which B1 and B2 are currently selected	PASS
Press and hold the illumination key.	The LCD set-up page shall appear.	PASS
Use the ▼▲ to adjust the LCD brightness.	The display brightness shall change.	PASS
Use the ◄ ► to adjust the LCD contrast.	The display contrast shall change.	PASS
Use the V4 Navtex test station to send a 'xAxx' navigational warning at – 101 dBm on 518 kHz.	The 518 Rx icon shall appear at the top of the display during reception of the message.	PASS
Use the V4 Navtex test station to send a 'xAxx' navigational warning at – 101 dBm on 490 kHz.	The 490 Rx icon shall appear at the top of the display during reception of the message.	PASS
Use the V4 Navtex test station to send a 'xAxx' navigational warning at – 101 dBm on 4209.5 kHz.	The 4209 Rx icon shall appear at the top of the display during reception of the message.	PASS
Use the V4 Navtex test station to send a 'xDxx' SAR message at – 101 dBm on 518 kHz.	Check that a pop-up appears stating that a SAR message has been received and that the ALARM icon is visible at the top of the display.	PASS
Use the 'ENTER' key to acknowledge the SAR message.	Check that the pop-up disappears and the SAR message is now visible.	PASS
Use the V4 Navtex test station to send a 'xExx' message at – 101 dBm on 518 kHz.	Check that a pop-up appears stating that an 'xExx' message has been received.	PASS
Press and hold 'ENTER' on NAV-7.	NAV-7 shall enter 'SET-UP' mode and display the coverage areas and message categories selected for storage/display, serial port O/P and printing.	PASS

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

DISPLAY: IEC 61097-6 Ed.2, CLAUSE 4.6.1.1

NAV-7 S/No. 0011

User interface (continued)

Requirements:

There shall be a display mode that clearly shows the user which transmitter coverage area (B1) and message types (B2) are currently selected for each receiver. There shall be controls for adjusting the display illumination and contrast settings. There shall be an indication of which receiver(s) are currently receiving. New search and rescue (SAR) messages shall be displayed immediately that they are received and stored, and shall cause an alarm to be set. SAR messages shall be displayed until they are acknowledged by the cancellation of the alarm. The reception and storage of new messages other than SAR messages shall be clearly indicated to the user by a method declared by the manufacturer. It shall be possible to select transmitter coverage area (B1) and message types (B2) independently for message storage to non-volatile memory, for message output to the INS port and for message output to the printer port.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

DISPLAY: IEC 61097-6 Ed.2, CLAUSE 4.6.1.2

NAV-7 S/No. 0011

Number of characters displayed per line:

Test Instruction:	Desired Effect:	Results:
Open a received message in 'FULL MESSAGE' display mode.	Check that at least 32 characters are displayed on a line.	PASS

Requirements:

The display device shall be able to display a minimum of 32 characters per line.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
……

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

DISPLAY: IEC 61097-6 Ed.2, CLAUSE 4.6.1.3

NAV-7 S/No. 0011

Number of lines displayed:

Test Instruction:	Desired Effect:	Results:
Open a received message in 'FULL MESSAGE' display mode.	Check that at least 16 lines are displayed on a page.	PASS

Requirements:

The display device shall be able to display at least 16 lines of message text.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
……

2.1 TEST RESULTS

Ambient temperature + 21.1 °C Relative humidity 26.5 %

DISPLAY: IEC 61097-6 Ed.2, CLAUSE 4.6.1.4

NAV-7 S/No. 0011

Display Requirements

Test Instruction:	Desired Effect:	Results:
a) Send an STS to the NAV-7 using the V4 Navtex test station.	Check that a pop-up with the correct message identifier appears on the screen.	PASS
Press the RIGHT key to clear the pop-up	Check that the pop-up disappears from the screen.	PASS
Send an STS to the NAV-7 using the V4 Navtex test station.	Check that a pop-up with the correct message identifier appears on the screen.	PASS
Wait for 24 hours.	Check that the pop-up disappears from the screen.	PASS
b) Send an STS to the NAV-7 using the V4 Navtex test station.	Check that a pop-up with the correct message identifier appears on the screen.	PASS
Press the 'ENTER' key to clear the pop-up.	Check that the pop-up disappears from the screen and the new message is displayed.	PASS
c) Demonstrate that messages are capable of being displayed and searchable by location (station) designators and type of message designators.	N/A	PASS

Requirements:

If a dedicated display device is used, the following requirements shall be met:

a) an indication of newly received selected messages shall be immediately displayed until acknowledged or until 24 h after receipt;

b) newly received selected messages shall also be capable of being displayed; and

c) stored messages shall be capable of being displayed and searchable by location (station) designators and type of message designators.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

DISPLAY: IEC 61097-6 Ed.2, CLAUSE 4.6.1.8

NAV-7 S/No. 0011

Corrupt characters:

Test Instruction:	Desired Effect:	Results:
Open a received message with >0% errors in 'FULL MESSAGE' display mode.	Check that the errors are replaced by '*' characters.	PASS

Requirements:

The equipment shall display an asterisk if the character is received corrupted.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 24.4 °C Relative humidity 23.2 %

DISPLAY: IEC 61097-6 Ed.2, CLAUSE 4.6.1.9

NAV-7 S/No. 0011

Printer Interface message selection requirements:

Test Instruction:	Desired Effect (when printer connected):	Results:
a) Send messages to the NAV-7.	Verify that the messages are output to the printer	PASS
b) Select messages from the store and display them.	Verify that the messages are output to the printer	PASS
c) Receive a message from a specified frequency, then from a specified location, then with a specified message designator.	Verify that the messages are output to the printer	PASS (during reception)
d) Display a message.	Verify that the message is output to the printer	PASS
e) Select an individual message from those appearing on the display.	Verify that the message is output to the printer	PASS

Requirements:

Where the printer is not integrated, it shall be possible to select the following data to be output to the printer interface: a) all messages as they are received; b) all messages stored in the message memory; c) all messages received on specified frequencies, from specified locations or having specified message designators; d) all messages currently displayed; and e) individual messages selected from those appearing on the display.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 21.1 °C Relative humidity 23.2 %

NAVTEX MESSAGE MEMORY: IEC 61097-6 Ed.2, CLAUSE 4.8.1.1

NAV-7 S/No. 005

Number of messages

Test Instruction:	Desired Effect:	Results:
Use the V4 Navtex test station to send 200 x 500 character messages at – 101 dBm on 518 kHz with sequential identifiers.	Check that all 200 messages appear in memory.	PASS
Use the V4 Navtex test station to send 200 x 500 character messages at – 101 dBm on 490 kHz with sequential identifiers. (different to those above).	Check that all 400 messages appear in memory.	PASS
Use the V4 Navtex test station to send 200 x 500 character messages at – 101 dBm on 4209.5 kHz with sequential identifiers. (different to those above).	Check that all 600 messages appear in memory.	PASS
Use the V4 Navtex test station to send an 8000 character message at – 101 dBm on 518 kHz with a previously unused identifier.	Check that the new message appears in memory and can be opened and read.	PASS

Requirements:

For each receiver fitted it shall be possible to record at least 200 messages of average length 500 characters (printable and non-printable) in non-volatile message memory.

It shall not be possible for the user to erase messages from memory.

When the memory is full, the oldest messages shall be overwritten by new messages.

It shall be possible to record individual messages up to 8000 characters in length.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 21.1 °C Relative humidity 23.2 %

NAVTEX MESSAGE MEMORY: IEC 61097-6 Ed.2, CLAUSE 4.8.1.2

NAV-7 S/No. 005

Message tagging

Test Instruction:	Desired Effect:	Results:
Tag individual messages for permanent retention.	Tagged messages shall be permanently retained.	PASS
Demonstrate that the maximum number of tagged messages does not exceed 25% of the memory capacity.	Tagging of messages in excess of 25% of memory storage capacity shall not be allowed.	PASS
Remove tags and overwrite messages	Untagged messages may be overwritten.	PASS

Requirements:

The user shall be able to tag individual messages for permanent retention. These messages may occupy up to 25% of the available memory (i.e. up to 50 of the required minimum of 200 x 500 character message slots) and shall not be overwritten by new messages. When no longer required, the user shall be able to remove the tag on these messages which may then be overwritten in normal course. *The message tagging function does not need to be supported on a Navtex receiver which does not have a dedicated display device.*

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 21.1 °C Relative humidity 23.2 %

NAVTEX MESSAGE MEMORY: IEC 61097-6 Ed.2, CLAUSE 4.8.1.3

NAV-7 S/No. 005

Automatic Erasure

Conditions:	Results:
Automatic erasure of messages after 60 to 72 hours	PASS
Non-erasure of tagged messages	PASS
Erasure of messages in excess of capacity	PASS

Requirements:

After between 60 hours and 72 hours, a message and message identification shall automatically be erased from the store (unless tagged for permanent retention). If the number of received messages exceeds the capacity of the store, the oldest message and message identification shall be erased.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 23 °C Relative humidity 22.1 %

SERIAL INTERFACE TESTS: IEC 61097-6 Ed.2, CLAUSE 7.2

NAV-7 S/No. 011

INS input performance

Conditions:	Results
Operate the input with simulated data that represent the receiver control functions defined in IEC 61097-6 Annex C, including messages with invalid and unavailable data formatters. This test shall include loading the EUT input with 100 % of the interface's capacity for a period of not less than 5 min. Check for correct operation of the EUT.	PASS

Required results:

Verify that the displayed data/EUT operation agrees with the simulated input data and that invalid and unavailable data formats do not stop/inhibit the correct operation of the EUT.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 23 °C Relative humidity 22.1 %

SERIAL INTERFACE TESTS: IEC 61097-6 Ed.2, CLAUSE 7.4

NAV-7 S/No. 011

INS output performance

Conditions:	Results
Set the EUT to output to the INS port so that it is loaded with 100 % of the interface's capacity. Check for correct operation of the EUT.	PASS

Required results:

Verify that the output data/EUT operation agrees with the requested output data**.**

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 23 °C Relative humidity 22.1 %

GENERAL AND SIGNAL PROCESSING TESTS: IEC 61097-6 Ed.2, CLAUSE 8.1

NAV-7 S/No. 011

Exclusion of Stations

Conditions:	Results
518 kHz: Disable 'A' station. 518 kHz: 'A' station message not received and not displayed.	All except 'A' received and displayed.
490 kHz: Disable 'B' station. 490 kHz: 'B' station message not received and not displayed.	All except 'B' received and displayed.
4209.5 kHz: Disable 'C' station. 4209.5 kHz: 'C' station message not received and not displayed.	All except 'C' received and displayed.

Required results:

For each value of B_1 not selected, the EUT shall neither display nor print the test message.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
……

2.1 TEST RESULTS

Ambient temperature + 23 °C Relative humidity 22.1 %

GENERAL AND SIGNAL PROCESSING TESTS: IEC 61097-6 Ed.2, CLAUSE 8.2

NAV-7 S/No. 011

Exclusion of Message Categories

Conditions:	Results
518 kHz: Disable 'C' message. 518 kHz: 'C' message not received and not displayed.	All except 'C' received and displayed.
490 kHz: Disable 'E' message. 490 kHz: 'E' message not received and not displayed.	All except 'E' received and displayed.
4209.5 kHz: Disable 'F' message. 4209.5 kHz: 'F' message not received and not displayed.	All except 'F' received and displayed.

Required results:

The EUT shall display *or print* the messages with the currently programmed B_2 characters, and also the messages with the B_2 characters A, B, D and L.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 23 °C Relative humidity 25 %

GENERAL AND SIGNAL PROCESSING TESTS: IEC 61097-6 Ed.2, CLAUSE 8.3

NAV-7 S/No. 011

Receiver Test Facility

Conditions:	Results
Self test check	PASS

Required results:

The test display/printout shall contain at least 36 valid characters and an indication of whether the test passed or failed. The test data shall be displayed but not stored in memory.

Remarks:

Supply voltage: 18 V DC

Hardware failures were forced on each of the three channels. Error boxes appeared for each of the forced failures.

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
……..…

2.1 TEST RESULTS

Ambient temperature + 23 °C Relative humidity 22.1 %

GENERAL AND SIGNAL PROCESSING TESTS: IEC 61097-6 Ed.2, CLAUSE 8.4

NAV-7 S/No. 007

Search and rescue (SAR) Alarm Provision and Reset

Conditions:	Results
An alarm shall be activated.	PASS
An alarm can be reset manually. (Press the 'ENTER' key)	PASS
An alarm can be reset via the INS port and the use of the IEC 61162 'ACK' sentence.	PASS
The audible level of the alarm signal shall be measured to be between 75 dbA and 85 dBA..	N/A (See remark below)

Required results:

An alarm shall be activated. The EUT shall be examined for the means whereby an alarm is generated.
It shall be demonstrated that that this alarm can be reset manually via the user interface in the case of an EUT with integral display.
It shall be demonstrated that this alarm can be reset via the INS port and the use of the IEC 61162 'ACK' sentence.
The audible level of the alarm signal shall be measured to be between 75 dbA and 85 dBA..

Remarks:

Supply voltage: 18 V DC

The alarm associated with this EUT is external and is provided by a 3rd party.

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
…….

2.1 TEST RESULTS

Ambient temperature + 23 °C Relative humidity 25 %

GENERAL AND SIGNAL PROCESSING TESTS: IEC 61097-6 Ed.2, CLAUSE 8.5

NAV-7 S/No. 011

Additional Alarms

Conditions:	Results
Antenna Failure	PASS
490 kHz Receiver Fault	PASS
518 kHz Receiver Fault	PASS
4209.5 kHz Receiver Fault	PASS

Required results:

It shall be demonstrated that such additional alarms can be suppressed.
It shall be demonstrated that such additional alarms can be reset.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
……

2.1 TEST RESULTS

Ambient temperature +21.6°C Relative humidity 30.0%

RECEIVER TESTS: IEC 61097-6 Ed.2, CLAUSE 9.1

NAV-7 S/No. 010

Call Sensitivity

Test Voltage (V DC)	RF Signal Level (dBm)	Test Frequency (kHz)	Error Rate (%)
18	-107.0	518	0.867
		490	0.067
		4209.5	Zero (no errors)

Test Voltage (V DC)	RF Signal Level (dBm)	Test Frequency (kHz)	Error Rate (%)
10.8	-107.0	518	0.667
		490	0.067
		4209.5	Zero (no errors)

Test Voltage (V DC)	RF Signal Level (dBm)	Test Frequency (kHz)	Error Rate (%)
31.2	-107.0	518	0.467
		490	Zero (no errors)
		4209.5	Zero (no errors)

Required results:

The character error rate shall be ≤4%

Remarks:

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5, 6
……

2.1 TEST RESULTS

Ambient temperature +26.4°C Relative humidity 24.6%

RECEIVER TESTS: IEC 61097-6 Ed.2, CLAUSE 9.2

NAV-7 S/No. 010

Interference Rejection and Blocking Immunity

Receive Frequency (kHz)	Interfering Frequency Range	Interfering Signal Level (relative to wanted level, dB)	Frequency Step Size	Character Error Rate (%)
518	517 kHz to 517.5 kHz	+20	10 Hz	0.067
	518.5 kHz to 519 kHz	+20	10 Hz	Zero (no errors)
	515 kHz to 517 kHz	+40	100 Hz	Zero (no errors)
	519 kHz to 521 kHz	+40	100 Hz	Zero (no errors)
	100 kHz to 515 kHz	+70	100 Hz	0.200
	521 kHz to 30 MHz	+70	10 kHz	0.067
	156 MHz to 174 MHz	+70	10 kHz	Zero (no errors)
	450 MHz to 470 MHz	+70	10 kHz	Zero (no errors)
490	489 kHz to 489.5 kHz	+20	10 Hz	Zero (no errors)
	490.5 kHz to 491 kHz	+20	10 Hz	Zero (no errors)
	487 kHz to 489 kHz	+40	100 Hz	Zero (no errors)
	491 kHz to 493 kHz	+40	100 Hz	Zero (no errors)
	* 100 kHz to 487 kHz	+70	100 Hz	Zero (no errors)
	493 kHz to 30 MHz	+70	10 kHz	Zero (no errors)
	156 MHz to 174 MHz	+70	10 kHz	Zero (no errors)
	450 MHz to 470 MHz	+70	10 kHz	Zero (no errors)
4209.5	4208.5 kHz to 4209 kHz	+20	10 Hz	Zero (no errors)
	4210 kHz to 4210.5 kHz	+20	10 Hz	Zero (no errors)
	4206.5 kHz to 4208.5 kHz	+40	100 Hz	Zero (no errors)
	4210.5 kHz to 4212.5 kHz	+40	100 Hz	Zero (no errors)
	100 kHz to 4206.5 kHz	+70	100 Hz	Zero (no errors)
	4212.5 kHz to 30 MHz	+70	10 kHz	Zero (no errors)
	156 MHz to 174 MHz	+70	10 kHz	Zero (no errors)
	450 MHz to 470 MHz	+70	10 kHz	Zero (no errors)

2.1 TEST RESULTS

Ambient temperature +26.4°C Relative humidity 24.6%

RECEIVER TESTS: IEC 61097-6 Ed.2, CLAUSE 9.2

NAV-7 S/No. 010

Interference Rejection and Blocking Immunity (continued)

Required results:

The unwanted signal shall not induce a character error rate >4% in any of the received messages.

Remarks:

EUT supply voltage: 18V DC.

The EUT satisfied the requirements of this test.

* Note: The frequency range in test 5 for the 490 kHz receiver is incorrect in IEC 61097-6 CDV (2005-02).

TEST EQUIPMENT USED:
1, 2, 3, 5, 6, 7, 8, 10
……

2.1 TEST RESULTS

Ambient temperature +23.5°C Relative humidity 26.0%

RECEIVER TESTS: IEC 61097-6 Ed.2, CLAUSE 9.3

NAV-7 S/No. 010

Co-channel Rejection

Receive Frequency (kHz)	Character Error Rate (%)
518	Zero (no errors)
490	Zero (no errors)
4209.5	Zero (no errors)

Required results:

The unwanted signal shall not induce a character error rate >4% in any of the received messages.

Remarks:

EUT supply voltage: 18V DC.

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 5, 6, 7, 8, 10
……

2.1 TEST RESULTS

Ambient temperature +25.3°C Relative humidity 25.8%

RECEIVER TESTS: IEC 61097-6 Ed.2, CLAUSE 9.4

NAV-7 S/No. 010

Intermodulation

Receive Frequency (kHz)	Intermodulation Frequency Pair (kHz)		Character Error Rate (%)
518	516	514	0.067
	515	512	0.600
	514	510	0.467
	520	522	0.467
	521	524	Zero (no errors)
	522	526	Zero (no errors)
490	488	486	Zero (no errors)
	487	484	Zero (no errors)
	486	482	Zero (no errors)
	492	494	Zero (no errors)
	493	496	Zero (no errors)
	494	498	Zero (no errors)
4209.5	4207.5	4205.5	Zero (no errors)
	4206.5	4203.5	Zero (no errors)
	4205.5	4201.5	Zero (no errors)
	4211.5	4213.5	Zero (no errors)
	4212.5	4215.5	Zero (no errors)
	4213.5	4217.5	Zero (no errors)

Required results:

Intermodulation shall not induce a character error rate >4%.

Remarks:

EUT supply voltage: 18V DC.

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 5, 6, 7, 8, 9, 10, 11
……..…

2.1 TEST RESULTS

Ambient temperature +23.5°C Relative humidity 34.2%

RECEIVER TESTS: IEC 61097-6 Ed.2, CLAUSE 9.5

NAV-7 S/No. 010

Off Frequency Transmitter

Receive Frequency (kHz)	Frequency Shift (Hz)	Character Error Rate (%)
518	-25	0.6
	+25	0.467
490	-25	Zero (no errors)
	+25	Zero (no errors)
4209.5	-25	Zero (no errors)
	+25	Zero (no errors)

Required results:

The test signal shall not produce in the EUT a character error rate >4% for each test.

Remarks:

EUT supply voltage: 18V DC.

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5, 6
……

2.1 TEST RESULTS

Ambient temperature +24.5°C Relative humidity 26.4%

RECEIVER TESTS: IEC 61097-6 Ed.2, CLAUSE 9.6

NAV-7 S/No. 010

Simultaneous Operation on Several Receive Frequencies

Receive Frequencies / Levels (above STS)	Character Error Rates (%)
518 kHz / STS +6 dB (518k/490k) 490 kHz / STS +50 dB (518k/490k)	Zero (no errors) Zero (no errors)
518 kHz / STS +50 dB (518k/490k) 490 kHz / STS +6 dB (518k/490k)	Zero (no errors) Zero (no errors)
518 kHz / STS +6 dB (518k/4209.5k) 4209.5 kHz / STS +50 dB (518k/4209.5k)	Zero (no errors) Zero (no errors)
518 kHz / STS +50 dB (518k/4209.5k) 4209.5 kHz / STS +6 dB (518k/4209.5k)	Zero (no errors) Zero (no errors)
490 kHz / STS +6 dB (490k/4209.5k) 4209.5 kHz / STS +50 dB (490k/4209.5k)	0.067 Zero (no errors)
490 kHz / STS +50 dB (490k/4209.5k) 4209.5 kHz / STS +6 dB (490k/4209.5k)	Zero (no errors) 0.267

Required results:

The display of the STS transmitted on each frequency shall have a character error rate of ≤4%.

Remarks:

EUT supply voltage: 18V DC.

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 5, 6, 8, 10, 12, 13
……

2.1 TEST RESULTS

Ambient temperature + 20 °C Relative humidity 32 %

RECEIVER TESTS: IEC 61097-6 Ed.2, CLAUSE 9.7

NAV-7 S/No. 007

Protection of Input Circuits

Chosen Test Frequency (kHz)	Test Level (V rms)	Test Time (Minutes)	Result 518 kHz	Result 490 kHz	Result 4209.5 kHz
1000	30	15	PASS	PASS	PASS

Required results:

The EUT shall continue to operate normally.

Remarks:

A level of 30 V rms was applied to the antenna socket of the EUT for a period of fifteen minutes. At the end of the fifteen minutes test period, the EUT was checked for character error rate (%) on all three channels with 25*STS messages.

EUT supply voltage: 24V DC.

The EUT satisfied the requirements of this test.

Full details of this test have been recorded in TUV PS Report Number OO614796/02 Issue 1

TEST EQUIPMENT USED:
See Report Number OO614796/02 Issue 1
……..

2.1 TEST RESULTS

Ambient temperature + 22.6 °C Relative humidity 29.7 %

MEMORY TESTS: IEC 61097-6 Ed.2, CLAUSE 11.1

NAV-7 NAVTEX Receiver S/No. 011

Internal Storage, Message Tagging and Erasure of Oldest Message Identifications

Requirement (Clause 11.1.2)	Results		
	518 kHz	490 kHz	4209.5 kHz
a) Storage of all messages of the STF	✓	✓	✓
b) Tagging of five oldest messages	✓	✓	✓
c) Storage of further messages of the STF	✓	✓	✓
c) Storage of first five tagged messages	✓	✓	✓
c) Erasure of ten oldest messages	✓	✓	✓
d) Ten oldest messages replaced by ten new messages	✓	✓	✓

Required Results:

a) A check of the EUT shall indicate that all messages of the STF have been stored.

b) The EUT shall be checked to ensure it has correctly tagged the messages.

c) A check of the EUT shall indicate that all messages of the test script have been stored, that the first (oldest) 5 tagged messages are still stored and that the next 10 oldest messages of the STF are no longer stored.

d) A check of the EUT shall indicate that the 10 oldest messages have been replaced by the 10 new messages.

Remarks:

Supply voltage: 15 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 14
……..……..…….

2.1 TEST RESULTS

Ambient temperature + 22.6 °C Relative humidity 29.7 %

MEMORY TESTS: IEC 61097-6 Ed.2, CLAUSE 11.2

NAV-7 NAVTEX Receiver S/No. 011

Erasure of Message Identifications / Storage Time

Requirement (Clause 11.2.2)	Results		
	518 kHz	490 kHz	4209.5 kHz
a) Non storage of new message	PASS		
a) Non overwriting of any stored contents			
b) 61 hour message 'A' stored		PASS	
b) 61 hour message overwrote oldest message		PASS	
c) 73 hour check that only message 'A' & tagged message are stored	PASS	PASS	
d) Storage of test script & tagged message	PASS	PASS	PASS

Required Results:

a) A check of the EUT shall indicate that the message applied after 59 hours was not stored and did not overwrite any of the stored contents of the EUT.

b) A check of the EUT shall indicate that the message 'A' applied after 61 hours was stored and overwrote the oldest message stored in the EUT.

c) A check of the EUT after 73 hours shall indicate that only message 'A' and the message tagged for retention are stored in the EUT.

d) After applying the test script the EUT shall contain the contents of the test script, and the message tagged for retention.

Remarks:

Tests were performed using all three input channels in turn.

Supply voltage: 15 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 14
……..…….

2.1 TEST RESULTS

Ambient temperature + 22 °C Relative humidity 25 %

MEMORY TESTS: IEC 61097-6 Ed.2, CLAUSE 11.4

NAV-7 NAVTEX Receiver S/No. 011

Reception of Messages with Character Errors

Conditions	Results
a) 35 messages with CER at 26 %	PASS
b) 35 messages with CER at 14 %	PASS

Required results:

a) The EUT shall store (non-printing EUTs) or print (printing EUTs) the 35 messages, each indicating the character error rate of >20% and ≤33%. b) The EUT shall store (non-printing EUTs) or print (printing EUTs) the 35 messages, each indicating the character error rate of >4% and ≤20%.

Remarks:

Tests were performed at 518 kHz.

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
……

2.1 TEST RESULTS

Ambient temperature + 22 °C Relative humidity 25 %

MEMORY TESTS: IEC 61097-6 Ed.2, CLAUSE 11.5

NAV-7 NAVTEX Receiver S/No. 011

Unsatisfactory Reception

Conditions	Results
35 messages with correct ID and CER > 33%.	PASS

Required results:

The EUT shall not store messages or message identifications. *An EUT with an integral printer shall not print any of the test messages.*

Remarks:

Tests were performed at 518 kHz.

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
……

2.1 TEST RESULTS

Ambient temperature + 21.1 °C Relative humidity 23.5 %

MEMORY TESTS: IEC 61097-6 Ed.2, CLAUSE 11.6

NAV-7 NAVTEX Receiver S/No. 011

Power-Off Check

Requirement (Clause 11.6.2)	Results after six hours power-off		
	518 kHz	490 kHz	4209.5 kHz
Contents of non-volatile message storage	NT	PASS	NT
Settings for transmitter coverage area (B_1)	PASS	PASS	PASS
Settings for message type (B_2)	PASS	PASS	PASS
User settings: LED function, key click, audible alarm, NRX O/P, message pop-up, full font size	PASS	PASS	PASS
User settings: OSC518, OSC490, OSC4209, AGC, RSSI, IQ-swap	PASS	PASS	PASS

Required Results:

After a 6 hour power-down cycle, the EUT's non-volatile message storage shall contain the set of messages defined in the STF. All settings that the manufacturer has declared as non-volatile shall be unchanged from before the power-off cycle.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 4
……..……..……

2.1 TEST RESULTS

Ambient temperature + 22 °C Relative humidity 25 %

MEMORY TESTS: IEC 61097-6 Ed.2, CLAUSE 11.7

NAV-7 NAVTEX Receiver S/No. 011
Brown-Out Test

Requirement (Clause 11.7.2)	Results after brown-out		
	518 kHz	490 kHz	4209.5 kHz
Contents of non-volatile message storage	PASS	PASS	PASS
Settings for transmitter coverage area (B_1)	PASS	PASS	PASS
Settings for message type (B_2)	PASS	PASS	PASS
Declared non volatile settings unchanged	PASS	PASS	PASS

Required Results:

After a power supply brown-out, the EUT's non-volatile message storage shall contain the set of messages defined in the STF. All settings that the manufacturer has declared as non-volatile shall be unchanged from before the power-off cycle.

Remarks:

Supply voltage: start at 24 V DC reducing to 9.6 V DC, 1 minute wait, then increasing to 19.2 V DC (30 second ramp times).

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
3, 4, 5, 14, 15
……

2.1 TEST RESULTS

Ambient temperature + 21.1 °C Relative humidity 26.5 %

MEMORY TESTS: IEC 61097-6 Ed.2, CLAUSE 11.8

NAV-7 NAVTEX Receiver S/No. 5

UTC Handling Check

Requirement (Clause 11.8.2)	Results after six hours power-off		
	518 kHz	490 kHz	4209.5 kHz
Memory contents check after 6 hours power-down	PASS	PASS	PASS
Memory contents check after a further 53 hours power on	PASS	PASS	PASS

Required Results:

After a 6 hour power-down cycle, the EUT's non-volatile message storage shall contain the set of messages defined in the STF. After a further 53 hours power on, the memory contents shall not have changed.

Remarks:

Supply voltage: 18 V DC

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 3, 4, 5
……..……

2.1 TEST RESULTS

Ambient temperature + 22.6 °C Relative humidity 29.7 %

MISCELLANEOUS TESTS: IEC 61097-6 Ed.2, CLAUSE 12.1

NAV-7 NAVTEX Receiver S/No. 005

Spurious Emissions

Spurious (9 kHz to 2 GHz)	Bandwidth (kHz)	Level (dBm)
None		

Required results:

The power of any discrete component shall be $\leq$ 1 x 10^{-9} W (1nW) (-60dBm)

Remarks:

EUT supply voltage: 18 V DC.

There were no spurious emissions within 10dB of the limit within the frequency range 9 kHz to 2 GHz..

The EUT satisfied the requirements of this test.

TEST EQUIPMENT USED:
1, 2, 4, 16
……

SECTION 3

TEST EQUIPMENT

3.1 TEST EQUIPMENT

List of absolute measuring and other principal items of test equipment.

No.	Instrument/Ancillary	Type	Manufacturer	Serial Number or Inventory Number
1*	Thermohygrograph	A1	Rotronic	BABT TE2749
2*	Digital Multimeter	IDM101	Iso-Tech	BABT TE0466
3	RF Signal Generator	2023A	IFR	202306632
4	DC Power Supply	PPT-1830 GPIB	GW	E0438 (TU)
5	Modem	V4 NAVTEX	ICS	100099 (TU)
6	DC Power Supply	EX4210R	Thurlby Thandar	E0441 (TU)
7	RF Signal Generator	742A	Adret	0156M
8	Combiner	ZFSCJ-2-3	Mini Circuits	0 9746 (TU)
9	Combiner	ZSCJ-2-1	Mini Circuits	0 0239 (TU)
10	Spectrum Analyser	E4411B	Agilent	MY41440723
11	RF Signal Generator	8657B	Hewlett Packard	2935U00485
12	RF Signal Generator	2023A	IFR	202303750
13	Modem	V4 NAVTEX	ICS	100098 (TU)
14	DC Power Supply	650.679	Skytronic	E0039 (TU)
15	Digital Multimeter	PM2534	Philips	DM551001M
16	Spectrum Analyser	E4405B	Agilent	US41060896

* Items 1 & 2 were supplied by BABT, all other items were supplied by McMurdo Ltd.

SECTION 4

PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Figure 1: NAV-7 front view.

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Figure 2: NAV-7 rear view.

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Figure 3: NAV-7 internal view (display).

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Figure 4: NAV-7 internal view (receivers)

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Figure 5: NAV-7 label view

SECTION 5

DISCLAIMERS AND COPYRIGHT

5.1 DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.