

REPORT ON

Limited Type Approval Testing of the McMurdo Limited 406 MHz Fastfind Plus PLB with internal GPS position encoded data and 121.5 MHz Radio locating device using -20°C battery pack in accordance with C/S T.007 - Issue 3 - Revision 7 October 2000

Report No. RM608213B

August 2001

Segensworth Road
Fareham
Hampshire
PO15 5RH
UK

REPORT ON

Limited Type Approval Testing of the McMurdo Limited 406 MHz Fastfind Plus PLB with internal GPS position encoded data and 121.5 MHz Radio locating device using -20°C battery pack in accordance with C/S T.007 - Issue 3 - Revision 7 October 2000

Report No. RM608213B

PREPARED FOR

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DISTRIBUTION

McMurdo Ltd	Mr R Read	Copy No. 1
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CONTENTS:-

Page No.

Status Page	3
Test House Declaration	4
Application Form	5

LIST OF MEASUREMENTS.

The list of measured parameters called for in C/S T.007 - Issue 3 - Revision 7 October 2000 is given below.

Tables

Summary of 406 MHz Beacon test results	6
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Graphs

Thermal Shock	9
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For copyright details see page 15 of 15.

Manufacturer:	McMurdo Ltd
Type Designation:	Fastfind Plus
Serial No.:	3
Number of Samples Tested:	One
Test Specification:	C/S T.007 Issue 3 – Revision 7 October 2000
Date of Receipt of Test Sample:	16 th May 2001
Start of Test:	15 th August 2001
Finish of Test:	15 th August 2001
Test Engineer(s):	N Forsyth

TEST HOUSE DECLARATION

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

Equipment : 406 MHz PLB with internal GPS position
encoded data and 121.5 MHz radio locating
data

Type : -

Model : Fastfind Plus

Serial Number : 3

Quantity : One

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

C/S T.007 - Issue 3 - Revision 7 October 2000
Clause 6.2.1 i) and ii)

Detailed results are recorded in Test Report No. RM608213B

Place and date of issue : Titchfield, August 2001

Signature :



M JENKINS
Wireless Telecoms Group Manager

Date : 24th August 2001

This report should be read in conjunction with BABT Report No. RM608213 which contains results from the Full Type Approval Testing of the McMurdo Limited 406 MHz Fastfind Plus PLB with internal GPS position encoded data and 121.5 MHz Radio locating device in accordance with C/S T.007 - Issue 3 - Revision 7 October 2000

APPLICATION FOR A COSPAS-SARSAT 406 MHz
BEACON TYPE APPROVAL CERTIFICATE

Beacon Manufacturer : McMurdo Ltd

Beacon Model : Fastfind Plus

Name and Location of Beacon Test Facility : BABT

Beacon Type : Aviation : [] Land : [✓] Maritime : [✓]

Specified Operating Temperature Range : -20°C to +55°C

Specified Operating Lifetime : 24 hr. [✓] 48 hr. [] Other []
Specify :

Beacon Battery Type(s) : Chemistry : Lithium

Manufacture & Model No. : Energiser L-91

Size & number of cells : 7 x 'AA'

Extra Features in Beacon :	No	Yes	Details
a) Auxiliary Radio-Locating Device :	[]	[✓]	Frequency : 121.5 MHz Power : +25 mW Min Tx. Duty Cycle : 100%
b) Transmits Encoded Position Data :	[]	[✓]	Nav. Device Internal Type. GPS
c) Transmits Long Message (144 bits) :	[]	[✓]	
d) Automatic Activation :	[✓]	[]	
e) Built-in Strobe Light :	[✓]	[]	Intensity : Flash rate :
f) Self-test mode :	[]	[✓]	-
g) Other :	[✓]	[]	Specify :

I hereby confirm that the 406 MHz beacon described above has been successfully tested in accordance with the specified clauses of Cospas-Sarsat Type Approval Standard (C/S T.007) and complies with the Cospas-Sarsat Specification (C/S T.001) as demonstrated in the attached report.

Dated : 21-08-01

Signed :

(for test facility)

Ambient temperature.....23°C Relative humidity.....54%

Table 2: SUMMARY OF 406 MHz BEACON TEST RESULTS

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min} (-20°C)	T _{amb} (+23°C)	T _{max} (+55°C)	
1. POWER OUTPUT						
•transmitter power output	35-39	dBm	38.88	38.40	38.00	
•power output rise time	< 5	ms	0.53	0.59	0.58	
•power output 1 ms before burst	<-10 dBm	✓*	✓	✓	✓	
2. DIGITAL MESSAGE						
•bit sync	15 bits "1"	✓	✓	✓	✓	
•frame sync	9 bits (000101111)	✓	✓	✓	✓	
•format flag	1 bit	data bit	1	1	1	
•protocol flag	1 bit	data bit	0	0	0	
•identification code	59 bits	✓	✓	✓	✓	
•BCH code	21 bits	✓	✓	✓	✓	
•emerg.code/nat use/ suppl.data	6 bits	data bits	110111	110111	110111	
•activation type	1 bit	✓	✓	✓	✓	
•additional data/BCH (if applicable)	32 bits	✓	✓	✓	✓	
•position error (if applicable)	< 5	✓	✓	✓	✓	
3. DIGITAL MESSAGE GENERATOR						
•repetition rate**						
minimum T _{rep}	47.5	seconds	48.77	48.77	48.78	
maximum T _{rep}	52.5	seconds	51.46	51.52	51.52	
•bit rate:						
minimum f _b	396	bits/sec.	400.035	400.035	399.932	
maximum f _b	404	bits/sec.	400.038	400.037	400.037	
•total transmission time:						
short message	435.6-444.4	ms	-	-	-	
long message (optional)	514.8-525.2	ms	519.387	519.365	519.368	
•CW preamble:						
minimum T _{cw}	158.4	ms	158.790	158.751	158.730	
maximum T _{cw}	161.6	ms	158.790	158.751	158.730	
•First burst delay	>47.5	seconds	120	120	120	

TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16

.....

Ambient temperature.....23°C Relative humidity.....54%

Table 2: SUMMARY OF 406 MHz BEACON TEST RESULTS - Continued

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min} (-20°C)	T _{amb} (+23°C)	T _{max} (+55°C)	
4. MODULATION						
•Biphase-L	✓	✓	✓	✓	✓	
•rise time	50-250	microsec	88.24	82.57	92.23	
•fall time	50-250	microsec	118.82	123.74	126.49	
•phase deviation: +ve	+(1.0 to 1.2)	radians	1.08	1.10	1.05	
•phase deviation: -ve	-(1.0 to 1.2)	radians	-1.14	-1.13	-1.13	
•symmetry measurement	≤ 0.05	✓	0.0124	0.0087	0.0003	
5. 406 MHz TRANSMITTED FREQUENCY						
•nominal value	406.023-406.027 or 406.027-406.029***)	MHz	406.028070	406.028057	406.028061	
•short term stability	≤2 x 10 ⁻⁹	/100 ms	3.558x10 ⁻¹⁰	2.04x10 ⁻¹⁰	2.386x10 ⁻¹⁰	
•medium term stability: -slope	(-1 to +1) x 10 ⁻⁹	/minute	3.03x10 ⁻¹⁰	-1.237x10 ⁻¹⁰	9.047x10 ⁻¹⁰	
-residual frequency variation	≤3 x 10 ⁻⁹		8.791x10 ⁻¹⁰	6.454x10 ⁻¹⁰	1.005x10 ⁻⁹	

TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16

.....

Ambient temperature.....22°C Relative humidity.....48%

Table 2: SUMMARY OF 406 MHz BEACON TEST RESULTS - continued

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min} (-20°C)	T _{amb} (+22°C)	T _{max} (+55°C)	
9. THERMAL SHOCK**** (30°C change) •Soak temperature: •Measurement temperature: <i>the following parameters are to be met within 15 minutes of beacon turn on and maintained for 2 hours:</i> •transmitted frequency: •nominal value •short-term stability •medium-term stability: -slope -residual frequency variation •transmitter power output •digital message			T _{soak} = +22 °C T _{meas} = +52 °C			See plots on Pages 9 to 13
	406.023-406.027 or 406.027-406.029***	MHz		✓		
	≤2 x 10 ⁻⁹	/100 ms		✓		
	(-1 to +1) x 10 ⁻⁹	/minute		✓		
	≤3 x 10 ⁻⁹			✓		
	35-39	dBm		✓		
	Must be correct	✓		✓		

TEST EQUIPMENT USED

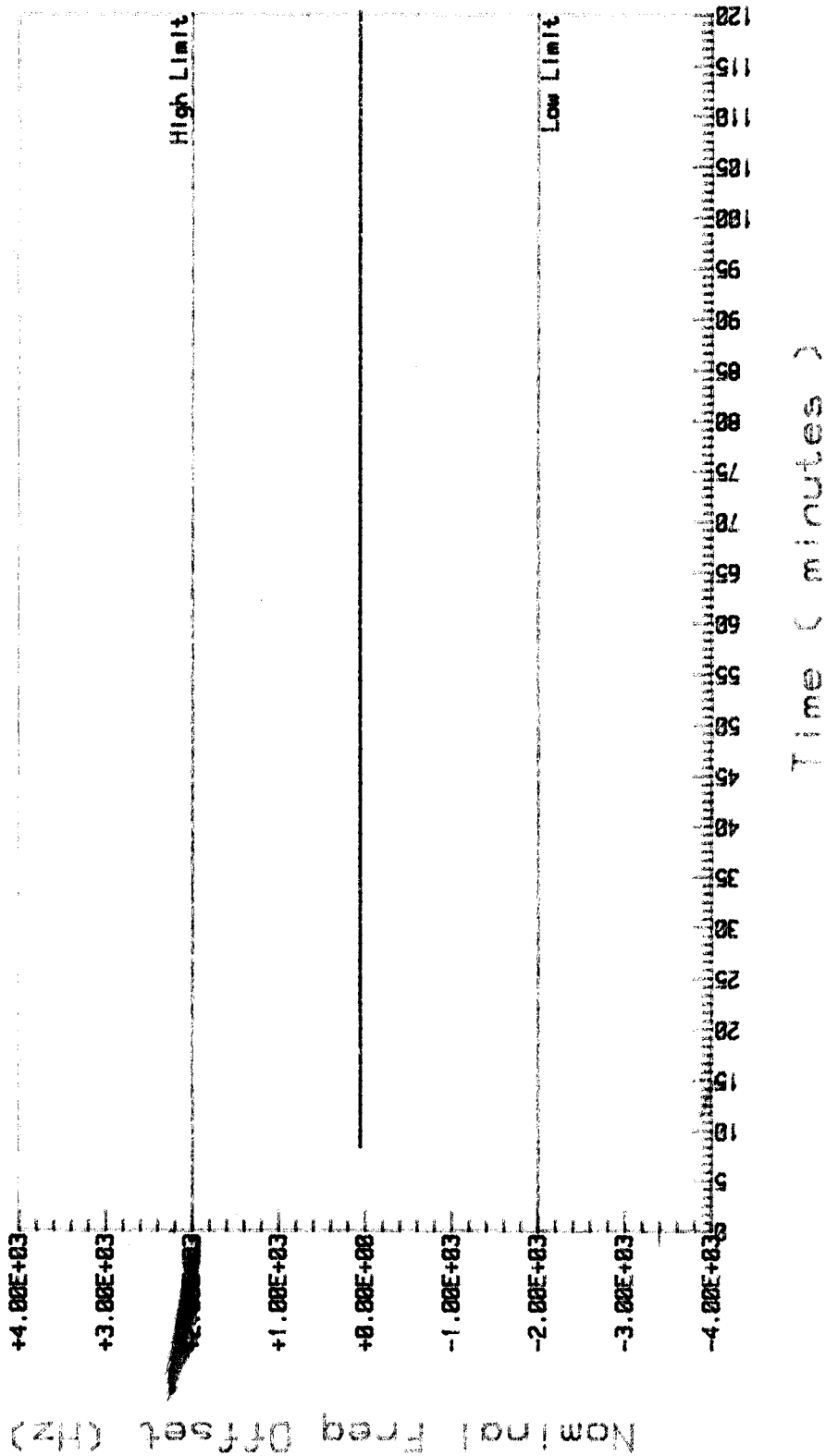
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16

.....

EPIRB NOMINAL FREQUENCY

PROJECT: RM608213
 MANUFACTURER: mcmurao
 MODEL NUMBER: c/s
 SERIAL NUMBER: nk

DATE: 13-8-01
 TESTED BY: Not signed

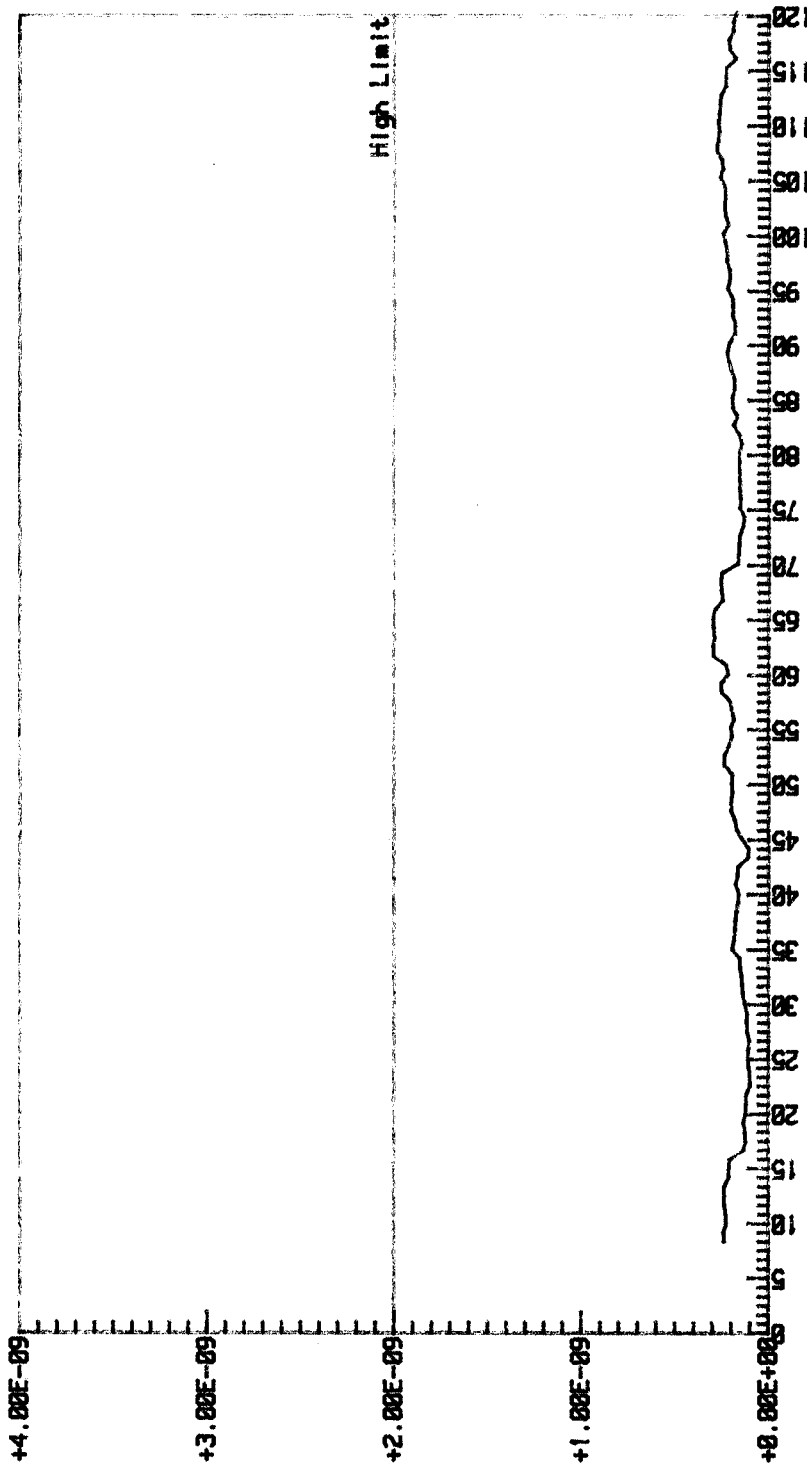


EPIRB SHORT TERM STABILITY

PROJECT: RM608213
 MANUFACTURER: mcmurdo
 MODEL NUMBER: c/s
 SERIAL NUMBER: nk

DATE: 13-8-01
 TESTED BY: *Not signed*

Short term (part in 10^9)

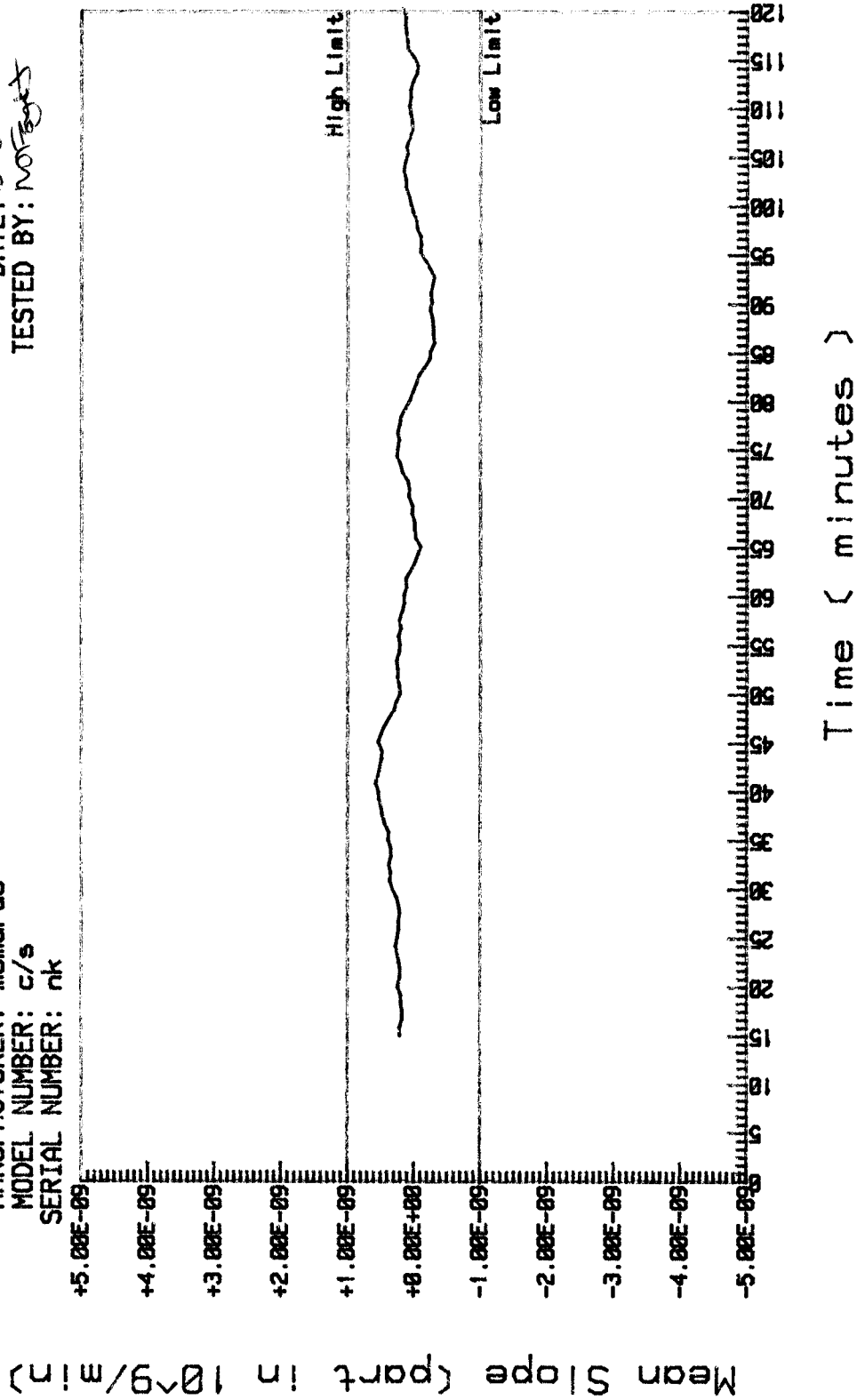


Time (minutes)

EPIRB MEDIUM TERM STABILITY

PROJECT: rm608213
 MANUFACTURER: mcmurdo
 MODEL NUMBER: c/s
 SERIAL NUMBER: nk

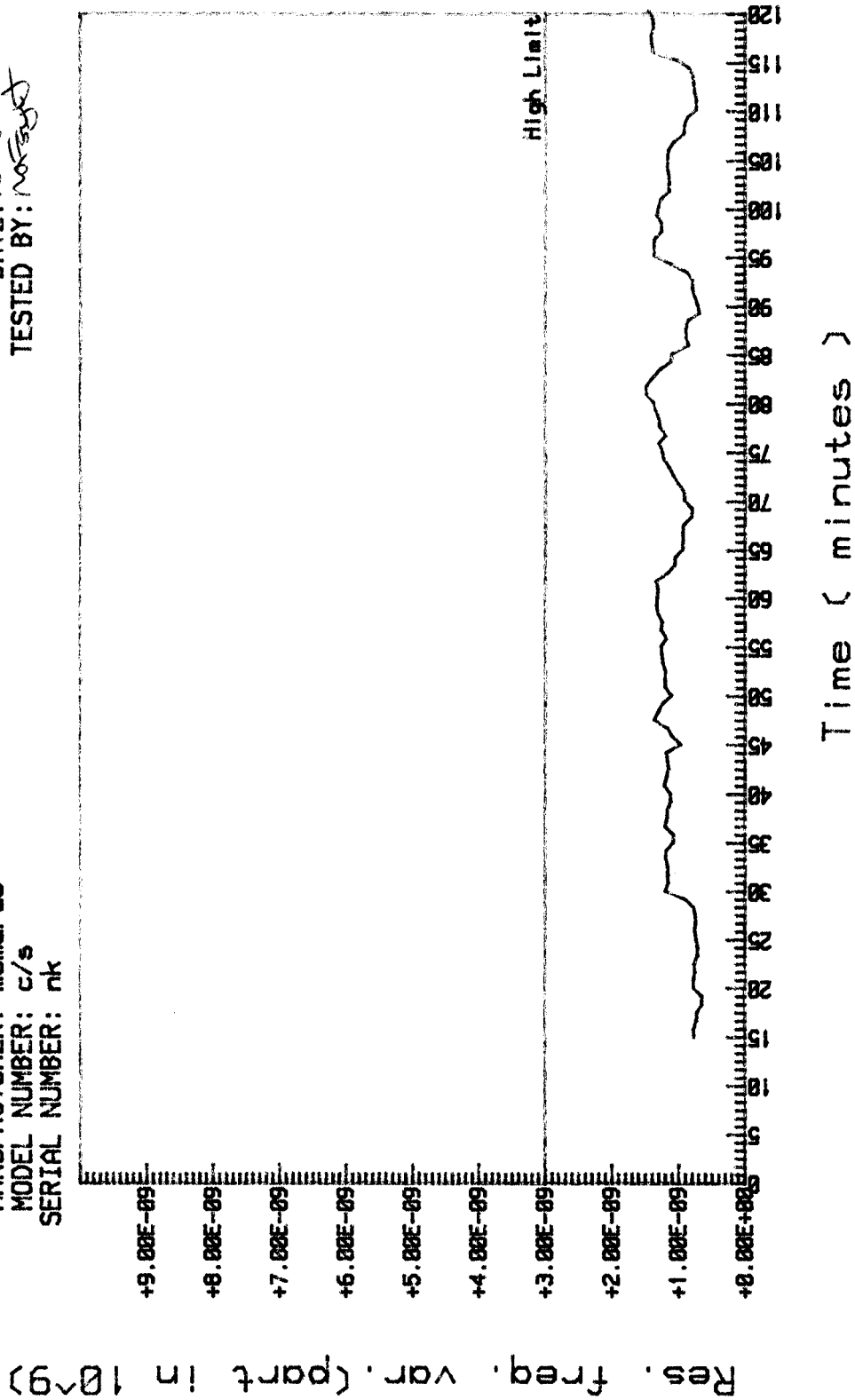
DATE: 13-8-01
 TESTED BY: NOT TESTED



EPIRB MEDIUM TERM STABILITY

PROJECT: rm608213
 MANUFACTURER: mcmurdo
 MODEL NUMBER: c/s
 SERIAL NUMBER: nk

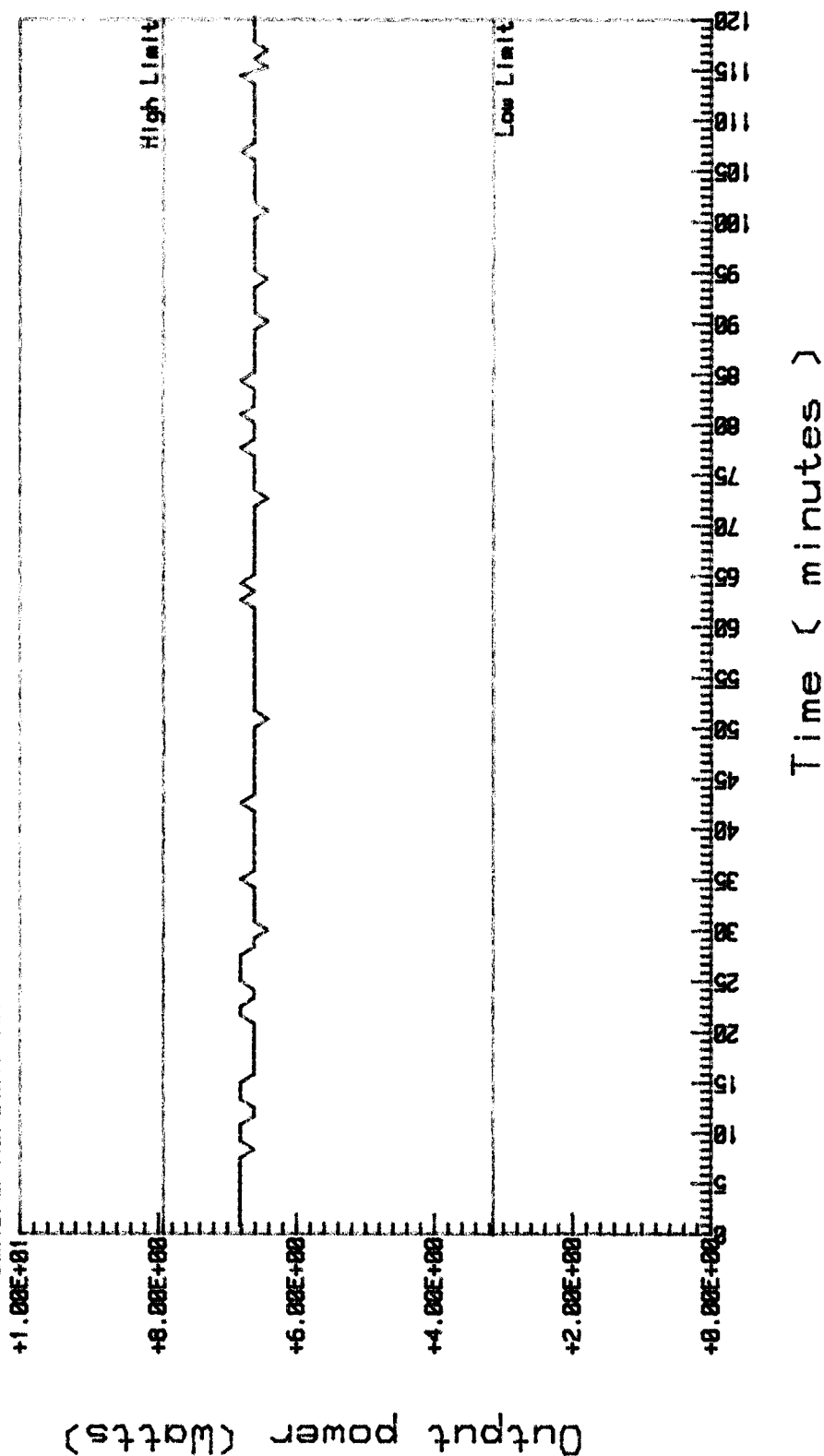
DATE: 13-8-01
 TESTED BY: *not signed*



406 SIGNAL OUTPUT POWER

PROJECT: rm608213
MANUFACTURER: mcmurdo
MODEL NUMBER: c/s
SERIAL NUMBER: nk

DATE: 13-8-01
TESTED BY: *nk*



TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
1	Hygrometer	A1	Rotronic	N/S
2	Freq & Time Interval Analyser	5372A	Hewlett Packard	3141A1073
3	Logic Analyser	1613D	Hewlett Packard	2713A62725
4	Signal Generator	SMX	Rohde & Schwarz	82737-002
5	10 dB Attenuator	47-10-34	Weinschel	AT 4937
6	10 dB Attenuator	HFP-50N	Texscan	N/S
7	3 dB Attenuator	HFP-50N	Texscan	N/S
8	Power Splitter	1506A	Weinschel	AC5343
9	Power Splitter	1506A	Weinschel	AC4934
10	Crystal Detector	8470B	Hewlett Packard	1822A15821
11	Mixer	M2TC	Watkins Johnson	050033
12	Low Pass Filter	WLJ 1.4C9EF	Wainwright	1
13	Spectrum Analyser	8566A	Hewlett Packard	2349A03049
14	Environmental Chamber	MINI-P-MEGH-P	Montford	3369-K5707
15	Power Meter	436A	Hewlett Packard	2330A15908
16	Power Sensor	8482A	Hewlett Packard	2349A08833



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