

REPORT ON

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

Report No. RM608213

July 2001

Segensworth Road
Fareham
Hampshire
PO15 5RH
UK

REPORT ON

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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

Report No. RM608213

PREPARED FOR

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Airport Service Road
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Hampshire
PO3 5PB

DISTRIBUTION

McMurdo Ltd	Mr R Read	Copy No. 1
COSPAS-SARSAT Secretariat		Copy No. 2
BABT		Copy No. 3
		Copy No

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

Effective Radiated Power (dBm)/Antenna Gain (dBi)	7
Summary of 406 MHz Beacon test results	8

Graphs

Spurious Output	14
Thermal Shock	17
Temperature Gradient	22
Operating Lifetime at Minimum Temperature	32

Photographs

Photographs of test sample(s)	37
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Annex A

Technical Data

Annex B

Results of the Satellite Qualitative Test and Antenna Characteristics

Annex C

Beacon coding software sample messages

For copyright details see page 48 of 48.

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:	6 th June 2001
Finish of Test:	9 th July 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

Detailed results are recorded in Test Report No. RM608213

Place and date of issue : Titchfield, July 2001

Signature :



M JENKINS
Wireless Telecoms Group Manager

Date : 19th July 2001

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 : -40°C to +55°C

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

Beacon Battery Type(s) : Chemistry : Lithium

Manufacture & Model No. : Saft LO29 or Energiser L-91

Size & number of cells : 4 x 'C' or 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 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 : 16-07-01

Signed :

(for test facility)

406 MHz BEACON SELF-TEST CHARACTERISTICS

406 MHz Beacon Model(s) : 503-1

		Answer (✓)	
		Yes	No
1.	Does beacon have a self-test mode ?	✓	
	if yes :		
	• does self-test have a separate switch position ?	✓	
	• does self-test switch automatically return to normal position when released ? if not, how long until the first "distress" message is emitted :	✓	
	• does self-test transmit a 406 MHz signal ?	✓	
	if yes :		
	- unmodulated signal only		
	- normal data, but with inverted frame synchronization pattern	✓	
	- 1 burst only		
	- 2 bursts only		
	- 3 or more bursts		
	• does self-test transmit a 121.5 MHz signal ?	✓	
	if yes :		
	- for less than 1 second	✓	
	- continually while self-test switch is activated		✓
	- other (please specify) :		
	• does self-test transmit any other frequency (e.g. 243 MHz) ?		✓
2.	Result of self-test is indicated by :		
	• pass/fail display indicator light	✓	
	• strobe light flash		✓
	• other (please specify) : $\approx$ 400 Hz Tone (Beep)		✓
3.	Can the self-test be performed without removing the beacon from its mounting bracket ?	N/A	
4.	What parameters are internally tested by the self-test ?		
	• battery voltage	✓	
	• RF power	✓	
	• approximate RF frequency		✓
	• phase locked loop	✓	
	• other (please specify) : GPS NMEA header correct		
5.	Do the above characteristics apply to this beacon model :		
	• for all countries where beacon is sold ?	✓	
	if no, please specify :		
	• for all production serial numbers ?	✓	
	if no, please specify :		
6.	Comments :		

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

406 MHz BEACON ANTENNA TEST RESULTS

Table 1: EFFECTIVE RADIATED POWER (dBm) / ANTENNA GAIN (dBi)

Azimuth Angle (degrees)	Elevation Angle (degrees)					
	10	20	30	40	47	50*
0	38.25 / 0.36	41.13 / 3.24	40.56 / 2.67	38.04 / 0.15	34.09 / -3.8	30.15 / -7.74
30	38.17 / 0.28	41.33 / 3.44	40.66 / 2.77	38.12 / 0.23	34.09 / -3.8	30.19 / -7.7
60	38.18 / 0.29	41.43 / 3.54	40.77 / 2.88	38.12 / 0.23	34.14 / -3.75	30.43 / -7.46
90	38.3 / 0.41	41.44 / 3.55	40.99 / 3.10	38.03 / 0.14	34.13 / -3.76	30.55 / -7.34
120	38.49 / 0.60	41.74 / 3.85	40.91 / 3.02	37.85 / -0.04	33.95 / -3.94	30.68 / -7.21
150	38.99 / 1.10	41.54 / 3.65	40.8 / 2.91	37.55 / -0.34	33.84 / -4.05	30.68 / -7.21
180	39.08 / 1.19	41.54 / 3.65	40.89 / 3.00	37.43 / -0.46	33.94 / -3.95	30.84 / -7.05
210	38.87 / 0.98	41.43 / 3.54	40.87 / 2.98	37.51 / -0.38	33.96 / -3.93	31.05 / -6.84
240	38.95 / 1.06	41.53 / 3.64	40.96 / 3.07	37.63 / -0.26	34.22 / -3.67	31.15 / -6.74
270	38.85 / 0.96	41.63 / 3.74	40.96 / 3.07	37.63 / -0.26	34.31 / -3.58	31.08 / -6.81
300	38.65 / 0.76	41.73 / 3.84	40.86 / 2.97	37.75 / -0.14	34.38 / -3.51	30.94 / -6.95
330	38.15 / 0.26	41.44 / 3.55	40.67 / 2.78	37.85 / -0.04	34.18 / -3.71	30.26 / -7.63
Overall Gain Variation	0.92	0.61	0.43	0.69	0.53	1.00

$$ERP_{\text{LOSS}} = P_{t_{\text{ambient}}} - P_{t_{\text{EOL}}} = -0.52 \text{ dB}$$

$$ERP_{\text{max EOL}} = \text{MAX} [ERP_{\text{max}}, (ERP_{\text{max}} - ERP_{\text{LOSS}})] = 42.26 \text{ dBm}$$

$$ERP_{\text{min EOL}} = \text{MIN} [ERP_{\text{min}}, (ERP_{\text{min}} - ERP_{\text{LOSS}})] = 34.36 \text{ dBm}$$

Remarks

* Results at an elevation angle of 50 degrees lie outside of the specification limits. The results at 47 degrees are within the specification limits and are accepted as valid over the 50 degree results as they are within the tolerance of ± 3 degrees from the 50 degree measurement angle.

TEST EQUIPMENT USED

17, 18, 19, 20, 21, 22

Ambient temperature.....22°C Relative humidity.....37%

Table 2: SUMMARY OF 406 MHz BEACON TEST RESULTS

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min} (-40°C)	T _{amb} (+22°C)	T _{max} (+55°C)	
1. POWER OUTPUT						
•transmitter power output	35-39	dBm	38.41	37.89	37.32	
•power output rise time	< 5	ms	0.49	0.53	0.55	
•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	48.77	
maximum T _{rep}	52.5	seconds	51.52	51.52	51.46	
•bit rate:						
minimum f _b	396	bits/sec.	400.036	400.036	399.933	
maximum f _b	404	bits/sec.	400.140	400.038	400.038	
•total transmission time:						
short message	453.6-444.4	ms	-	-	-	
long message (optional)	514.8-525.2	ms	519.374	519.374	519.374	
•CW preamble:						
minimum T _{cw}	158.4	ms	158.960	159.300	158.730	
maximum T _{cw}	161.6	ms	159.061	159.300	158.730	
•First burst delay	>47.5	seconds	120.0	120.0	120.0	

TEST EQUIPMENT USED

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

.....

Ambient temperature.....22°C Relative humidity.....37%

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} (-40°C)	T _{amb} (+22°C)	T _{max} (+55°C)	
4. MODULATION						
•Biphase-L	✓	✓	✓	✓	✓	
•rise time	50-250	microsec	76.39	87.72	96.41	
•fall time	50-250	microsec	108.00	126.05	116.04	
•phase deviation: +ve	+(1.0 to 1.2)	radians	1.14	1.12	1.07	
•phase deviation: -ve	-(1.0 to 1.2)	radians	-1.15	-1.04	-1.01	
•symmetry measurement	≤ 0.05	✓	0.0161	0.0057	0.0000	
5. 406 MHz TRANSMITTED FREQUENCY						
•nominal value	406.023-406.027 or 406.027-406.029***)	MHz	406.028070	406.028.086	406.028117	
•short term stability	≤ 2 x 10 ⁻⁹	/100 ms	5.569x10 ⁻¹⁰	1.568x10 ⁻¹⁰	2.167x10 ⁻¹⁰	
•medium term stability: -slope	(-1 to +1) x 10 ⁻⁹	/minute	-2.307x10 ⁻¹⁰	-1.527x10 ⁻¹⁰	9.729x10 ⁻¹⁰	
-residual frequency variation	≤ 3 x 10 ⁻⁹		1.241x10 ⁻¹⁰	5.057x10 ⁻¹⁰	6.502x10 ⁻¹⁰	
6. SPURIOUS EMISSIONS**** (into 50 ohms)						
•in-band (406.0-406.1 MHz)	see spurious emission mask in C/S T.001	✓	✓	✓	✓	See plots on Pages 14-16
7. 406 MHz VSWR CHECK <i>after open circuit, short circuit, then while VSWR is 3:1, measure:</i>						
•nominal transmitted frequency	406.023-406.027 406.027-406.029***)	MHz	406.028079	406.028079	406.028117	
•Modulation:						
•rise time	50-250	microsec	71.71	75.62	79.81	
•fall time	50-250	microsec	115.95	119.87	115.62	
•phase deviation: +ve	+(1.0 to 1.2)	radians	1.15	1.13	1.10	
•phase deviation: -ve	-(1.0 to 1.2)	radians	-1.16	-1.06	-1.03	
•symmetry measurement	≤ 0.05	✓	0.0040	0.0051	0.0008	
•digital message	must be correct	✓	✓	✓	✓	

TEST EQUIPMENT USED

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

.....

Ambient temperature.....22°C Relative humidity.....37%

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} (-40°C)	T _{amb} (+22°C)	T _{max} (+55°C)		
8. SELF-TEST MODE (if applicable)							
•frame sync	9 bits (011010000)	✓	✓	✓	✓		
•format flag	1/0	bit	1	1	1		
•single radiated burst	440/520 (±1%)	ms	439.055	439.055	439.058		
•default position data (if applicable)	must be correct	✓	✓	✓	✓		
•description provided		✓	✓	✓	✓		
•design data provided on protection against repetitive self-test mode transmissions	Protection provided	✓	✓	✓	✓		
•single burst verification	one burst	✓	✓	✓	✓		
•provides for beacon 15 Hex ID	must be correct	✓	✓	✓	✓		
9. THERMAL SHOCK**** (30°C change)			T _{soak} = -8 °C T _{meas} = +22 °C			See plots on Pages 17-21	
•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	406.023-406.027 or 406.027-406.029***	MHz					✓
•short-term stability	≤2 x 10 ⁻⁹	/100 ms					✓
•medium-term stability:							
-slope	(-1 to +1) x 10 ⁻⁹	/minute					✓
-residual frequency variation	≤3 x 10 ⁻⁹						✓
•transmitter power output	35-39	dBm	✓				
•digital message	Must be correct	✓		✓			

TEST EQUIPMENT USED

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

.....

Ambient temperature.....23°C Relative humidity.....41%

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

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS	COMMENTS
10. OPERATING LIFETIME AT MINIMUM TEMPERATURE**** •duration •transmitted frequency: •nominal value •short-term stability •medium-term stability: -slope -residual frequency variation •transmitter power output •digital message	>24 406.023-406.027 or 406.027-406.029*** $\leq 2 \times 10^{-9}$ $(-1 \text{ to } +1) \times 10^{-9}$ $\leq 3 \times 10^{-9}$ 35-39 must be correct	hours MHz /100 ms /minute dBm ✓	24 hours at $T_{\min} = -40^{\circ}\text{C}$ ✓ ✓ ✓ ✓ ✓ ✓	See plots on Pages 32-36
11. TEMPERATURE GRADIENT**** (5°C/hr) •transmitted frequency: •nominal value •short-term stability •medium-term stability: -slope -residual frequency variation •transmitter power output •digital message	406.023-406.027 or 406.027-406.029*** $\leq 2 \times 10^{-9}$ $(-1 \text{ to } +1) \times 10^{-9}$ $\leq 3 \times 10^{-9}$ 35-39 must be correct	MHz /100 ms /minute dBm ✓	✓ ✓ ✓ ✓ ✓ ✓	See plots on Pages 22-31
12. LONG TERM FREQUENCY STABILITY •data provided	406.020-406.030 or 406.023-406.030***	MHz ✓	✓	See Annex A
13. PROTECTION AGAINST CONTINUOUS TRANSMISSION •description provided	≤ 45	Seconds ✓	✓	See Annex A
14. SATELLITE QUALITATIVE TESTS**** •results provided	Successfully located by satellites/LUT	✓	✓	See Annex B

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
15. ANTENNA CHARACTERISTICS •polarization •VSWR •ERP_{max} EOL •ERP_{min} EOL •azimuth gain variation at 40° elevation angle	Linear or RHCP ≤1.5 ≤20 ≥1.6 ≤3	✓ ✓ - Watts Watts dB	✓ - N/A 16.83 2.73 0.69	Integral Antenna
16. BEACON CODING SOFTWARE •sample message provided for each coding option of the applicable coding protocol types. •sample messages provided, if applicable with encoded positions at least 5 km apart •sample self-test message provided for each coding option of the applicable coding protocol types	Must be correct (attach to report) Must be correct (attach to report) Must be correct (attach to report)	✓ ✓ ✓	✓ ✓ ✓	See Annex C

TEST EQUIPMENT USED
17, 18, 19, 20, 21, 22

.....

Ambient temperature.....22°C Relative humidity.....41%

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

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS	COMMENTS
17.NAVIGATION SYSTEM**** (as applicable)				
•position data default values	Must be correct	✓	✓	
•position acquisition time	<30/1	minutes	3	
•encoded position data update interval	>20	minutes	20	
•position data input update interval (as applicable)	20/1	minutes	N/A	
•delta offset				
- position direction	must be correct	✓	✓	
- negative direction	must be correct	✓	✓	
- overrange to 2 times coarse res.	must be correct	✓	✓	
•last valid position				
- retained after navigation input lost	240 (± 5)	minutes	236	
- cleared when beacon re-activated	must be correct	✓	✓	
•design data provided on protection against beacon degradation due to navigation device, interface or signal failure or malfunction	no degradation	✓	✓	

*the tick mark (✓) can be used where indicated to record that the requirement is met (no value needs to be shown)

** if ($T_{R\max} - T_{R\min}$) > 1 second, the manufacturer must provide a technical explanation, as described in section A3.1.1

***From 1 January 2000 new 406 MHz beacon models submitted for type approval can be set to transmit at 406.028 +/- 1kHz. The transmitted frequency shall not vary more than +2kHz/-5kHz from 406.028 MHz in 5 years. It shall not vary more than 2 parts in 10^9 in 100ms. After 1 January 2002, all new beacon models submitted for type approval must be set at the frequency 406.028 MHz +/- 1kHz and satisfy the above requirements.

**** attach graphs of test results for test numbers 6, 9, 10 and 11 and a summary table of results for test number 14, and, if applicable test number 17.

TEST EQUIPMENT USED

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

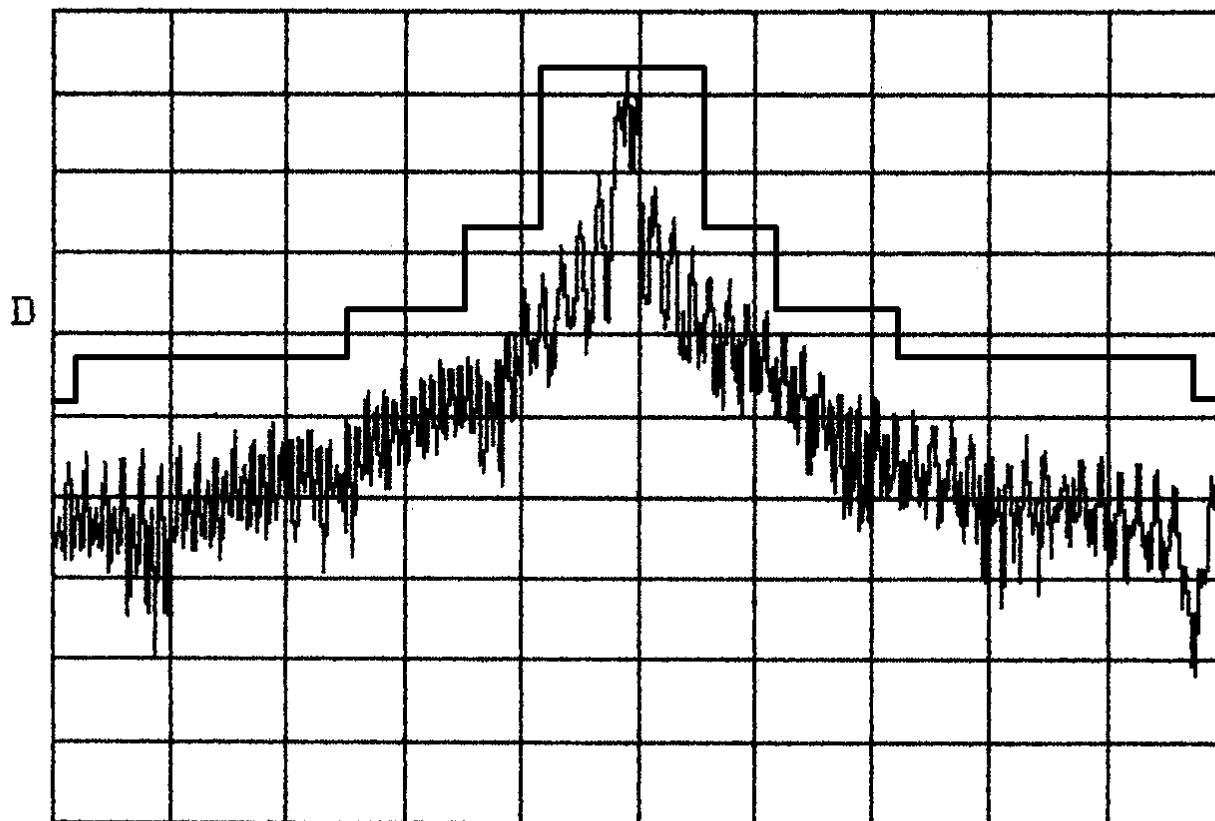
.....

Spurious Emissions – Ambient Temperature +22°C

*ATTEN 20dB

RL 10.0dBm

10dB/



CENTER 406.02800MHz

SPAN 50.00kHz

*RBW 100Hz

VBW 100Hz

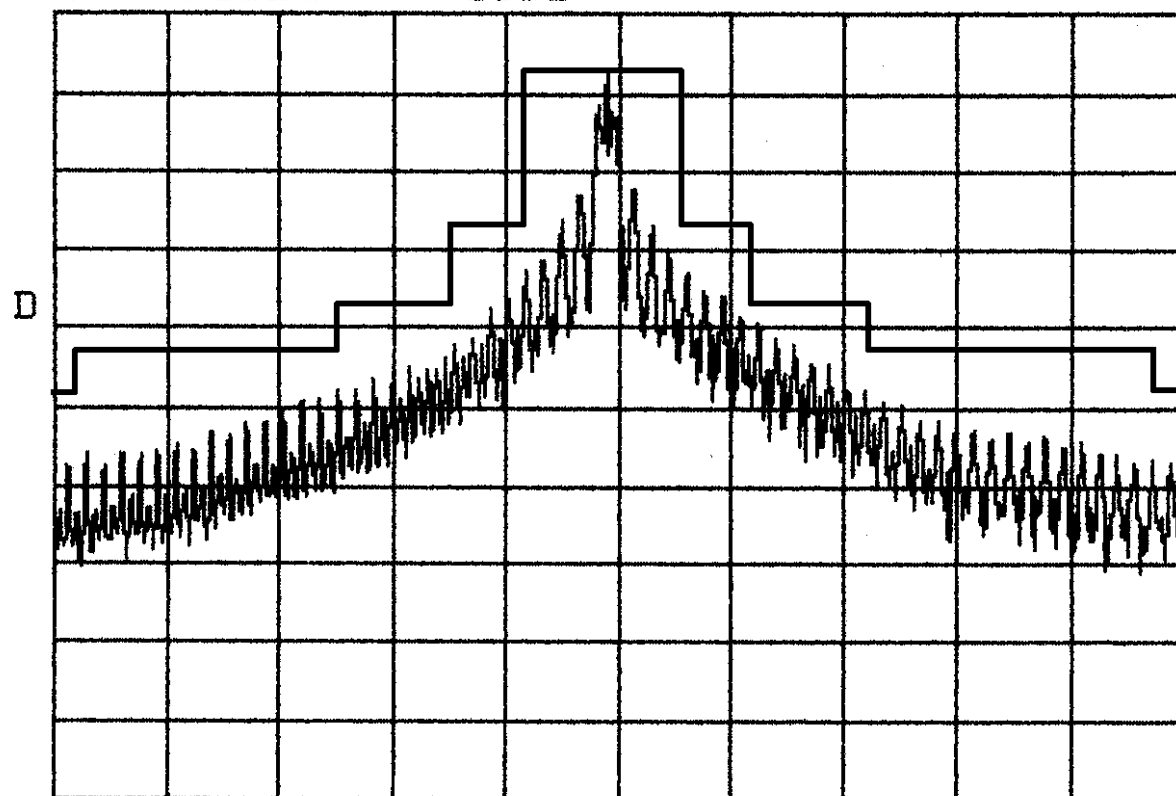
SWP 20sec

Spurious Emissions – Minimum Temperature -40°C

*ATTEN 20dB

RL 10.0dBm

10dB/



CENTER 406.02800MHz

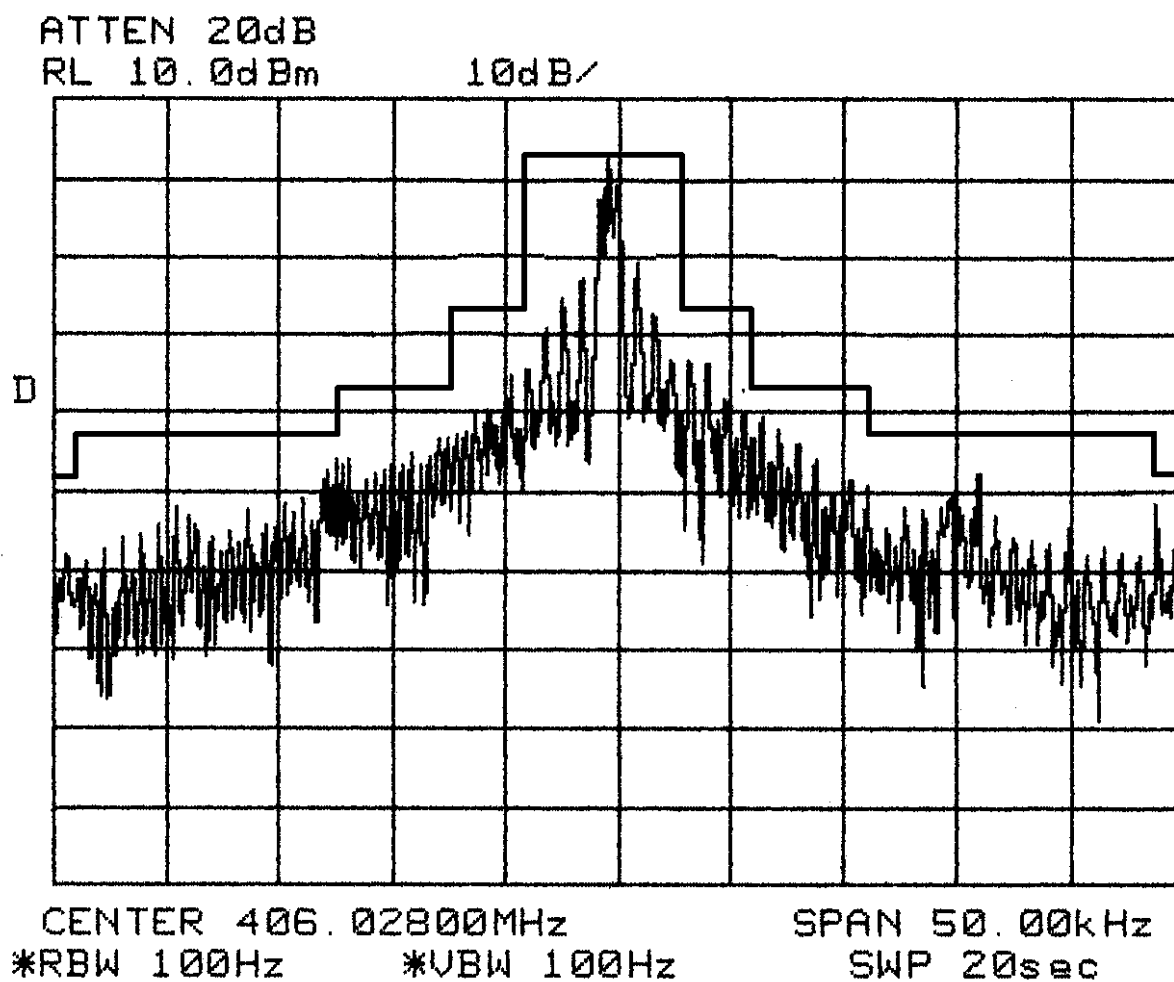
*RBW 100Hz

*VBW 100Hz

SPAN 50.00kHz

SWP 20sec

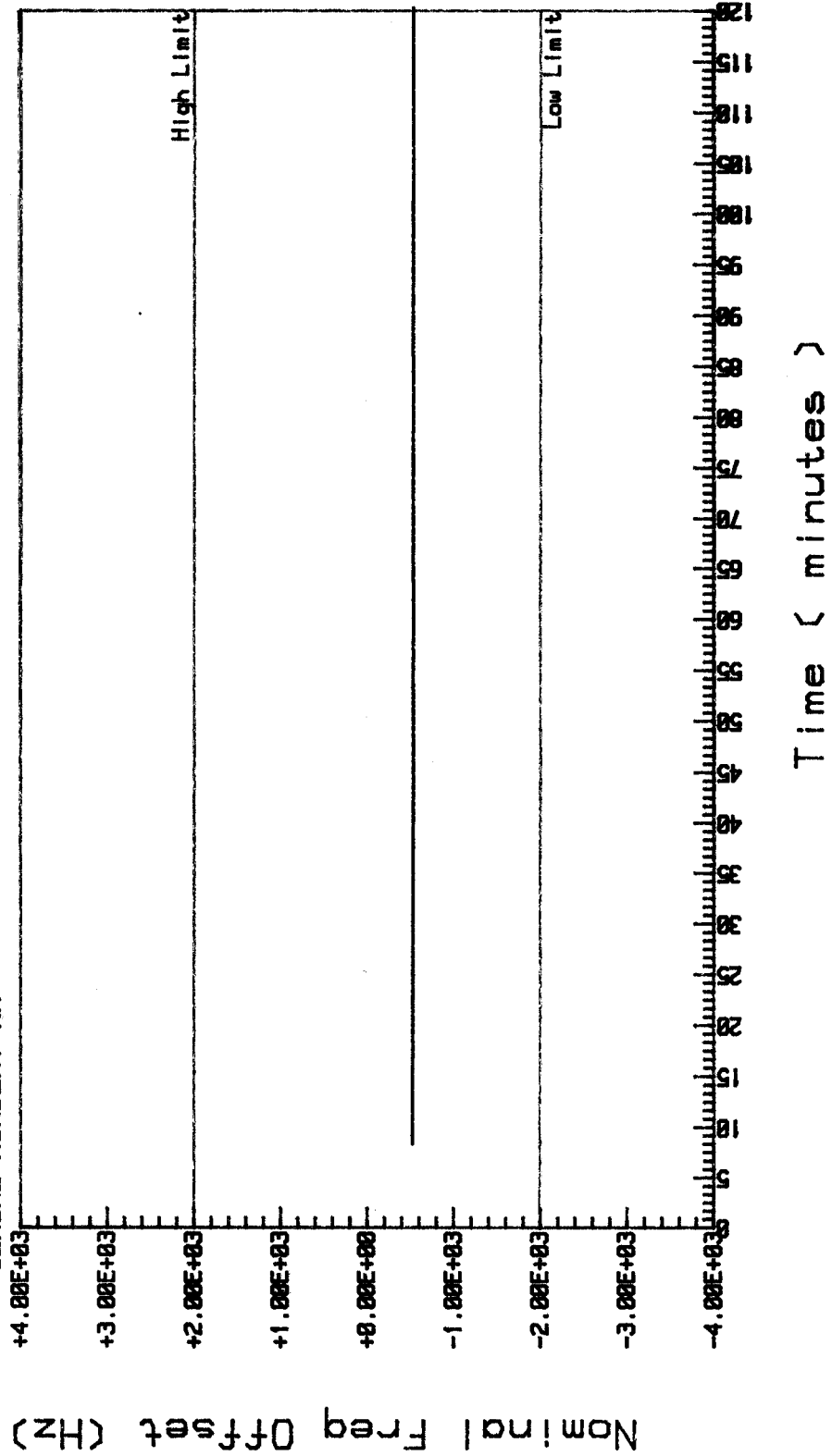
Spurious Emissions – Maximum Temperature +55°C



EPIRB NOMINAL FREQUENCY

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

DATE: 5-7-01
 TESTED BY: N. FORSYTH



EPIRB SHORT TERM STABILITY

PROJECT: rm608213

MANUFACTURER: mcmurdo

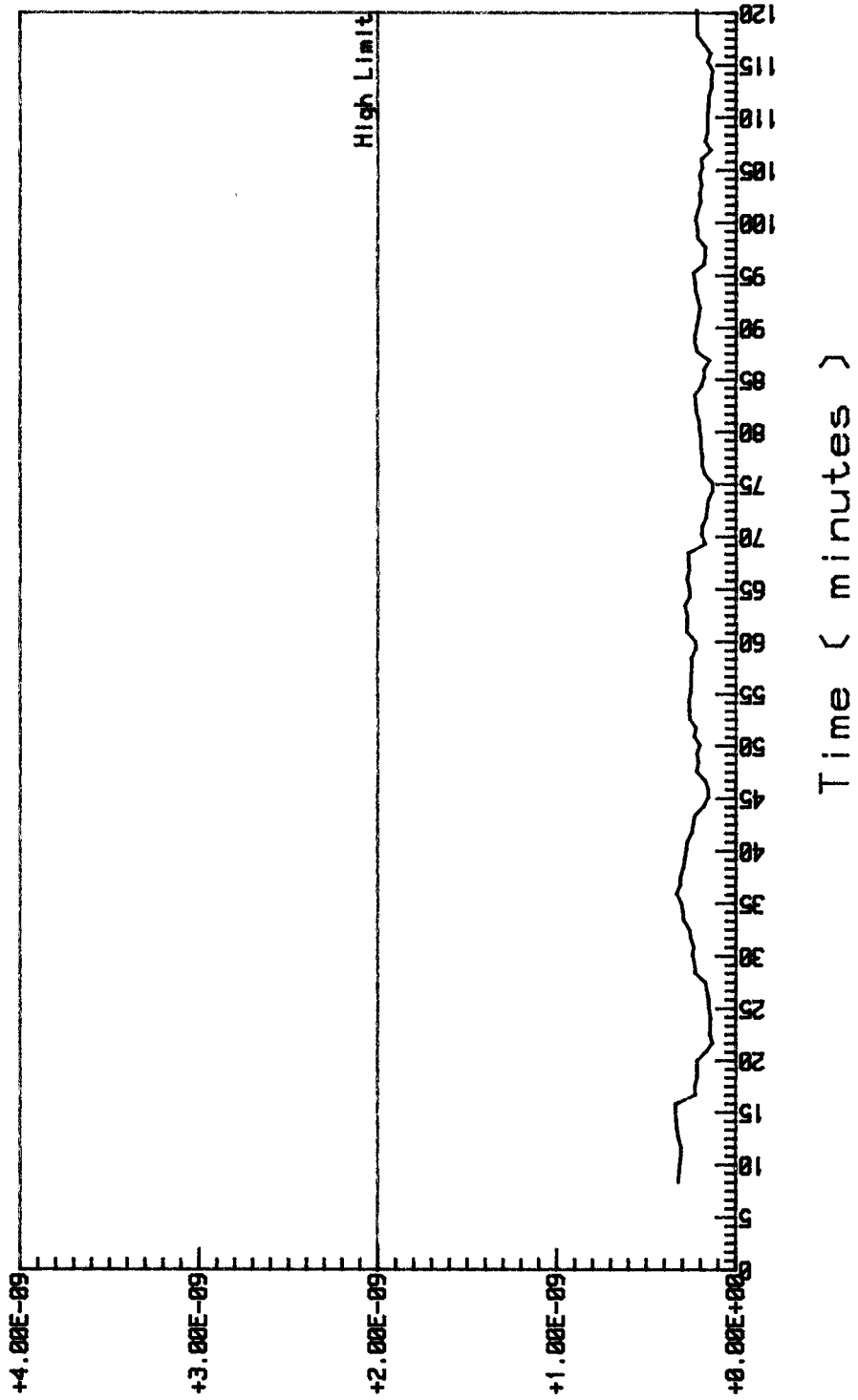
MODEL NUMBER: c/s

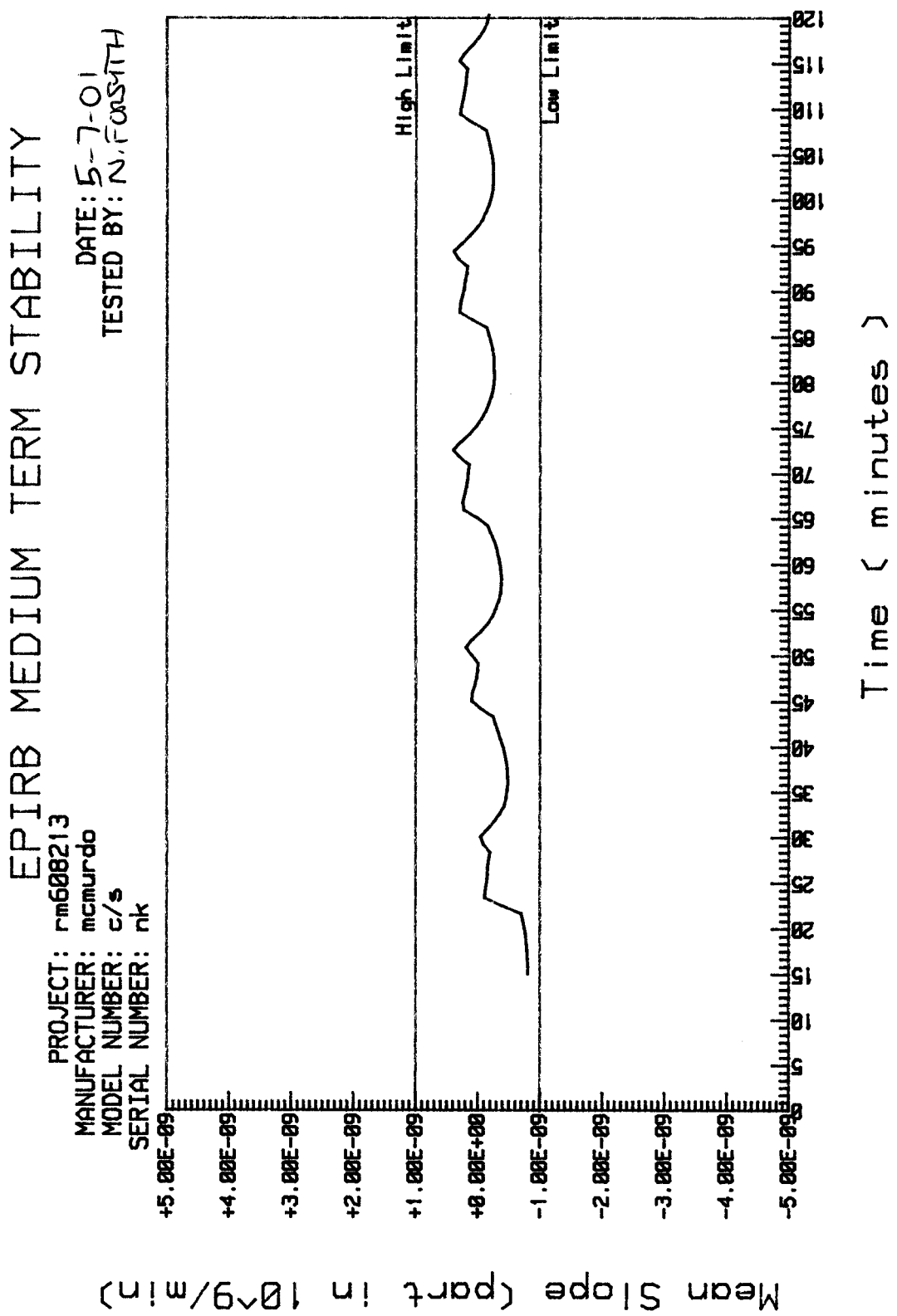
SERIAL NUMBER: nk

DATE: S-7-01

TESTED BY: N. FORSYTH

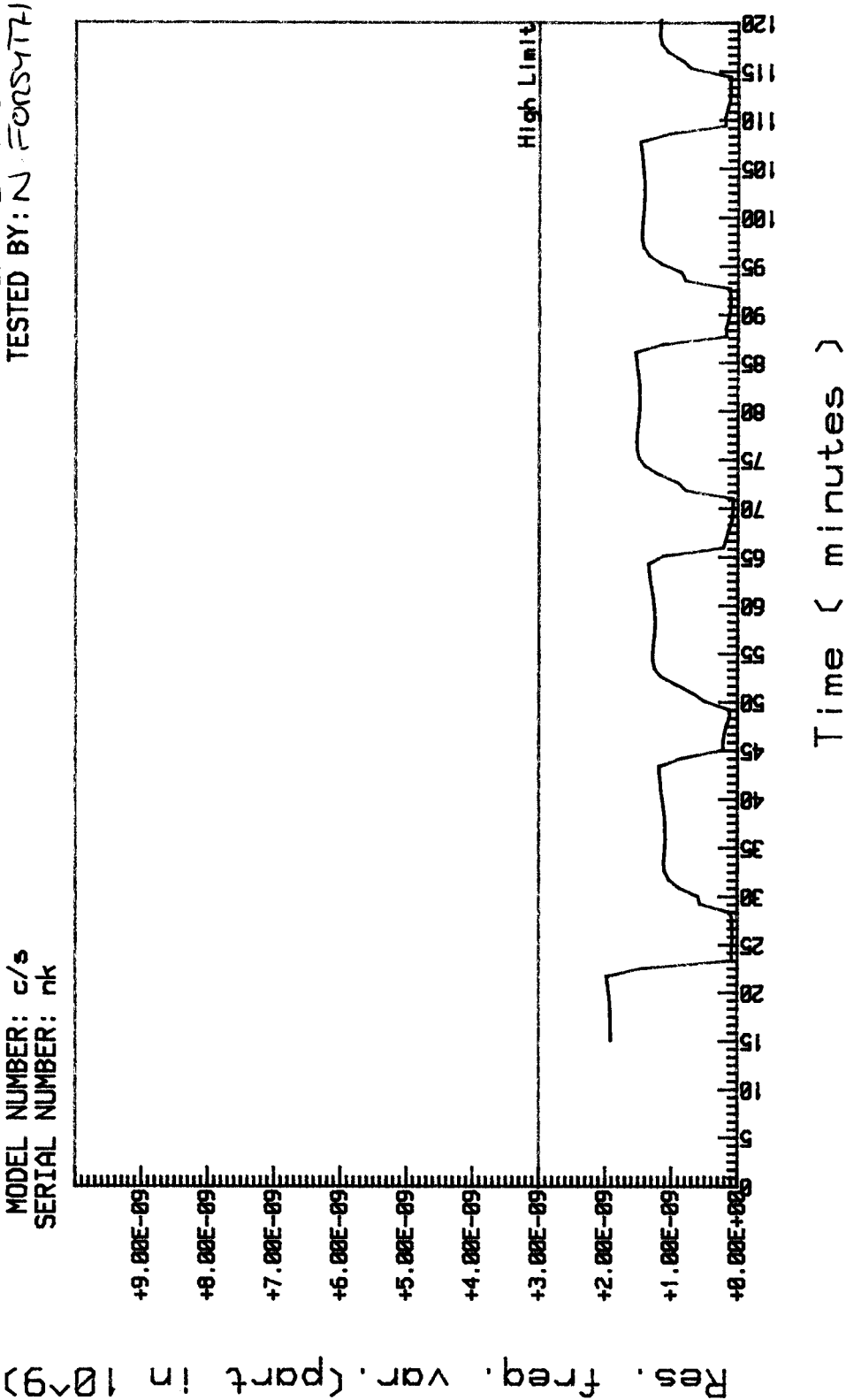
Short term (part in 10^9)

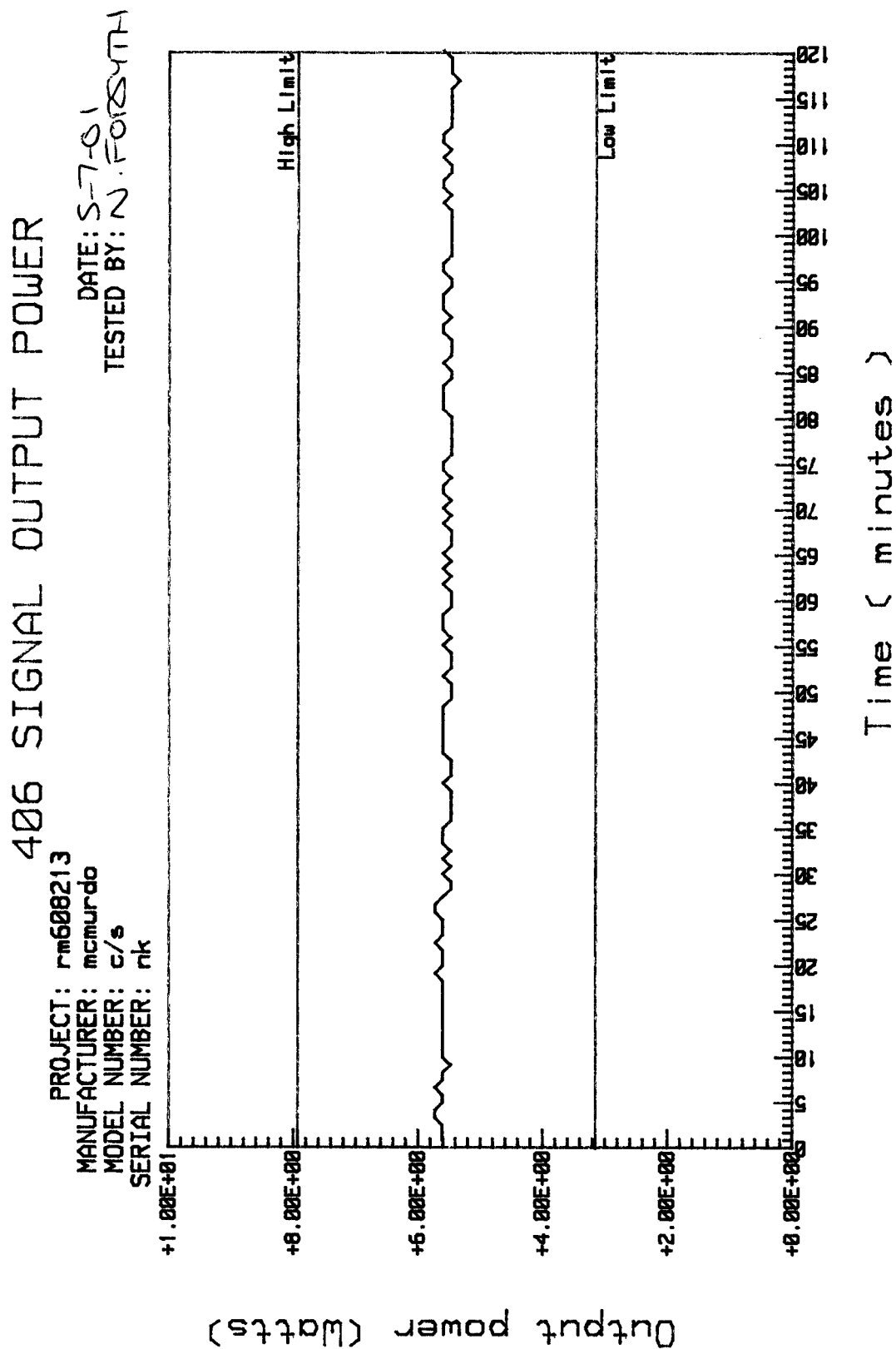




EPIRB MEDIUM TERM STABILITY

PROJECT: rm608213
MANUFACTURER: mcmurdo
MODEL NUMBER: c/s
SERIAL NUMBER: nk
DATE: 5-7-01
TESTED BY: N FORSYTH





EPIRB NOMINAL FREQUENCY

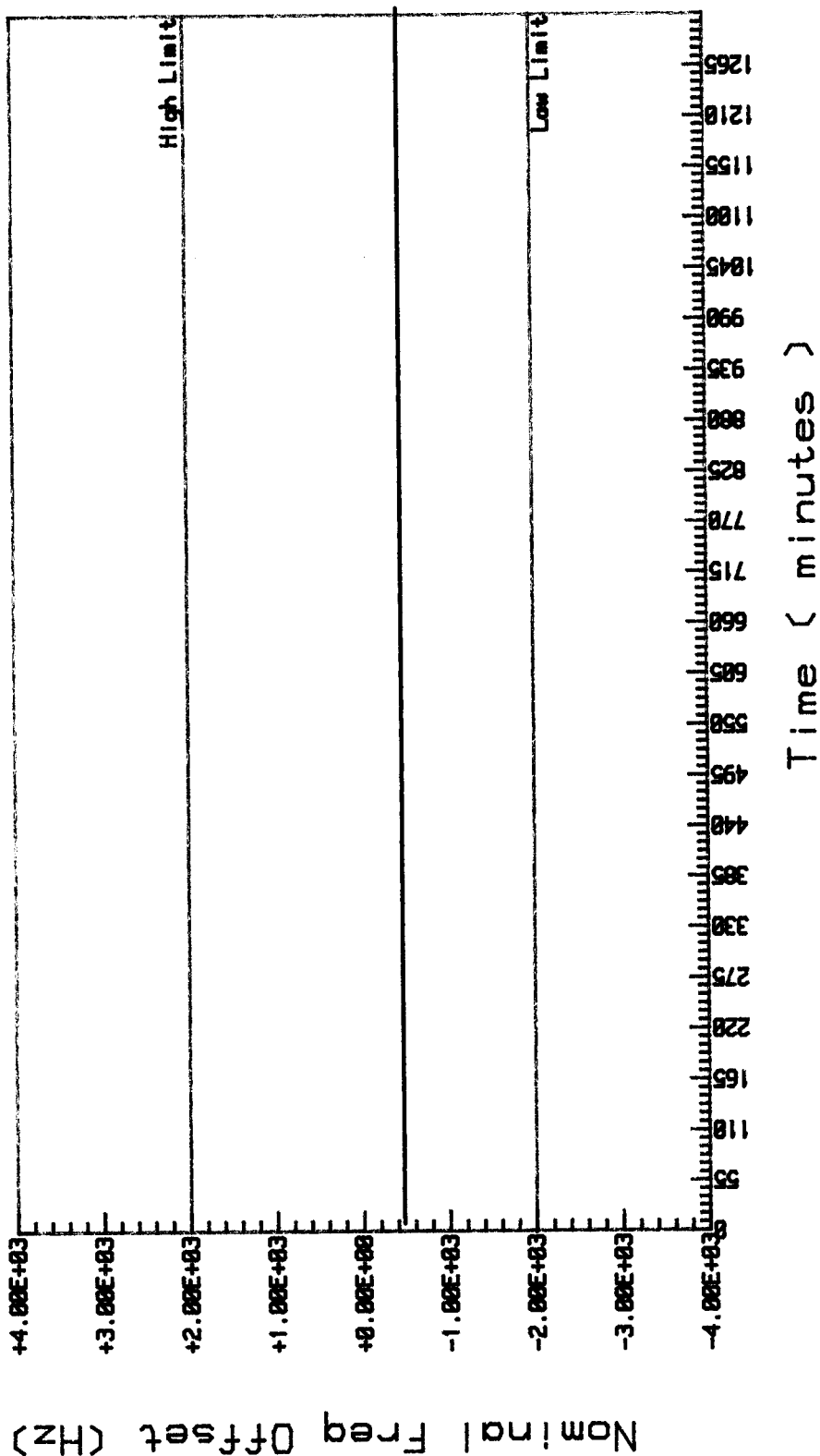
PROJECT: RM608213

MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 6-7-01
TESTED BY: N. FORSMITH



EPIRB SHORT TERM STABILITY

PROJECT: rm608213

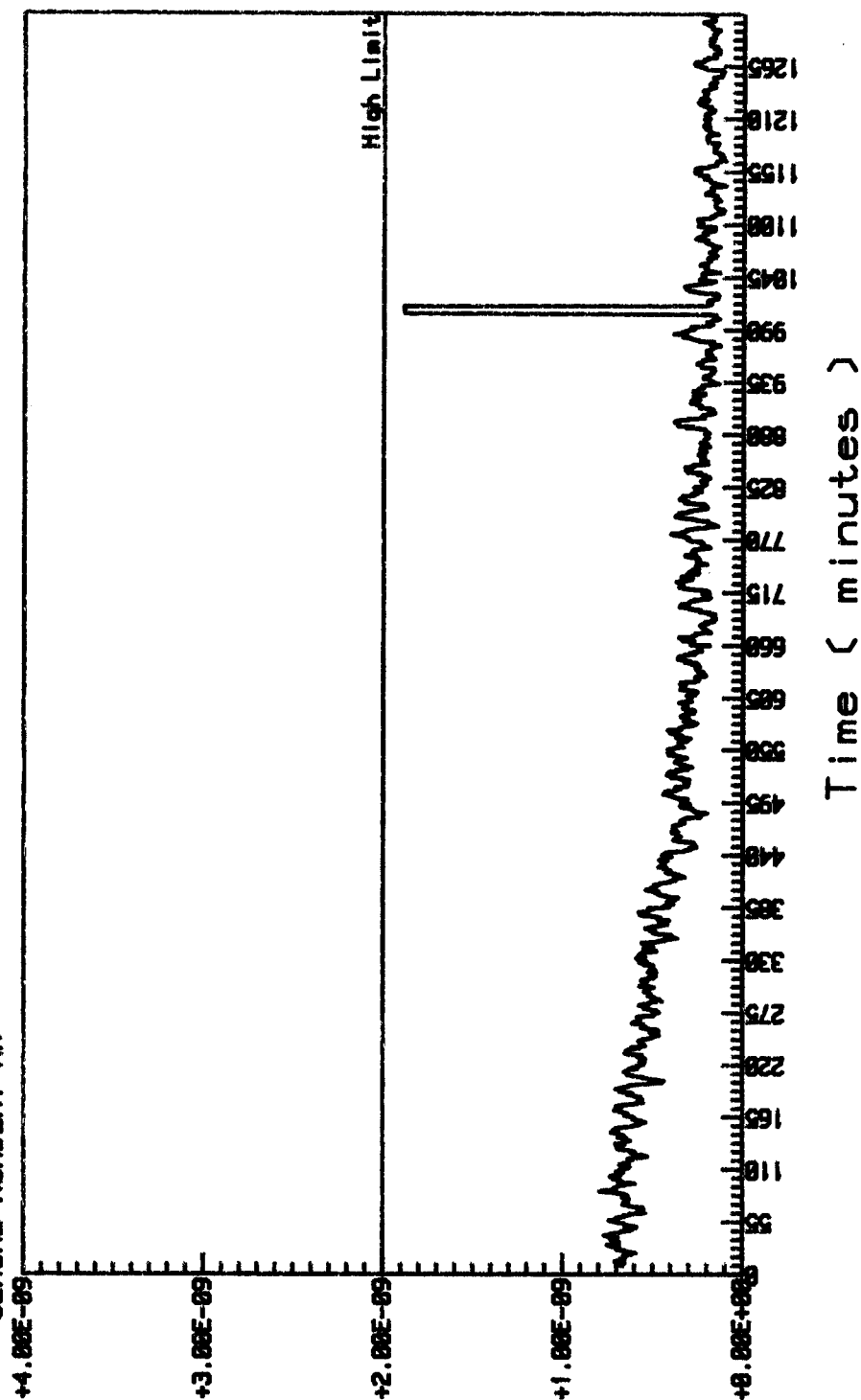
MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 6-7-01
TESTED BY: N. FORSYTH

Short term (part in 10^9)



EPIRB MEDIUM TERM STABILITY

PROJECT: rm608213

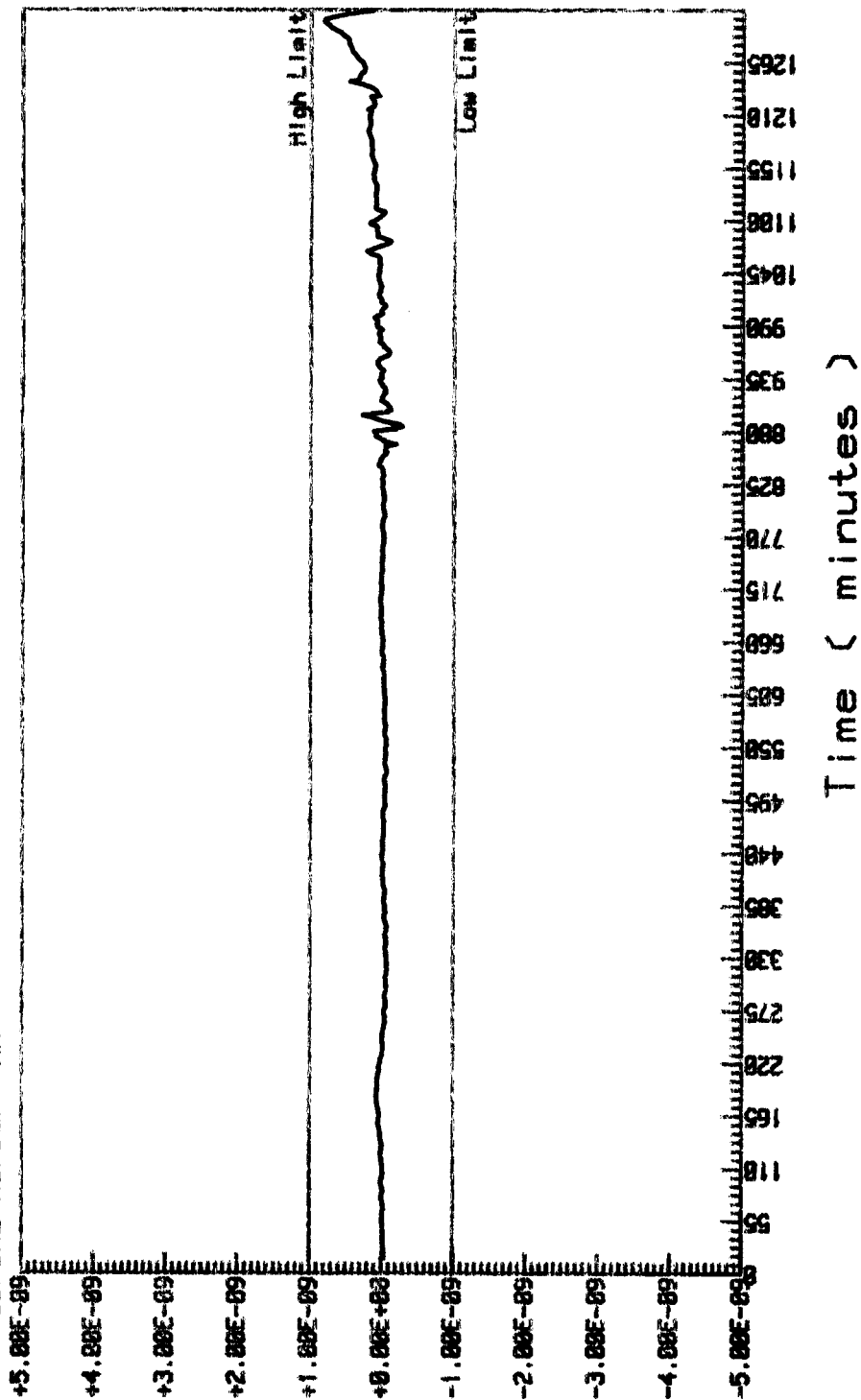
MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 6-7-01
TESTED BY: N. Forsyth

Mean Slope (part in $10^9/\text{min}$)



EPIRB MEDIUM TERM STABILITY

PROJECT: rm608213

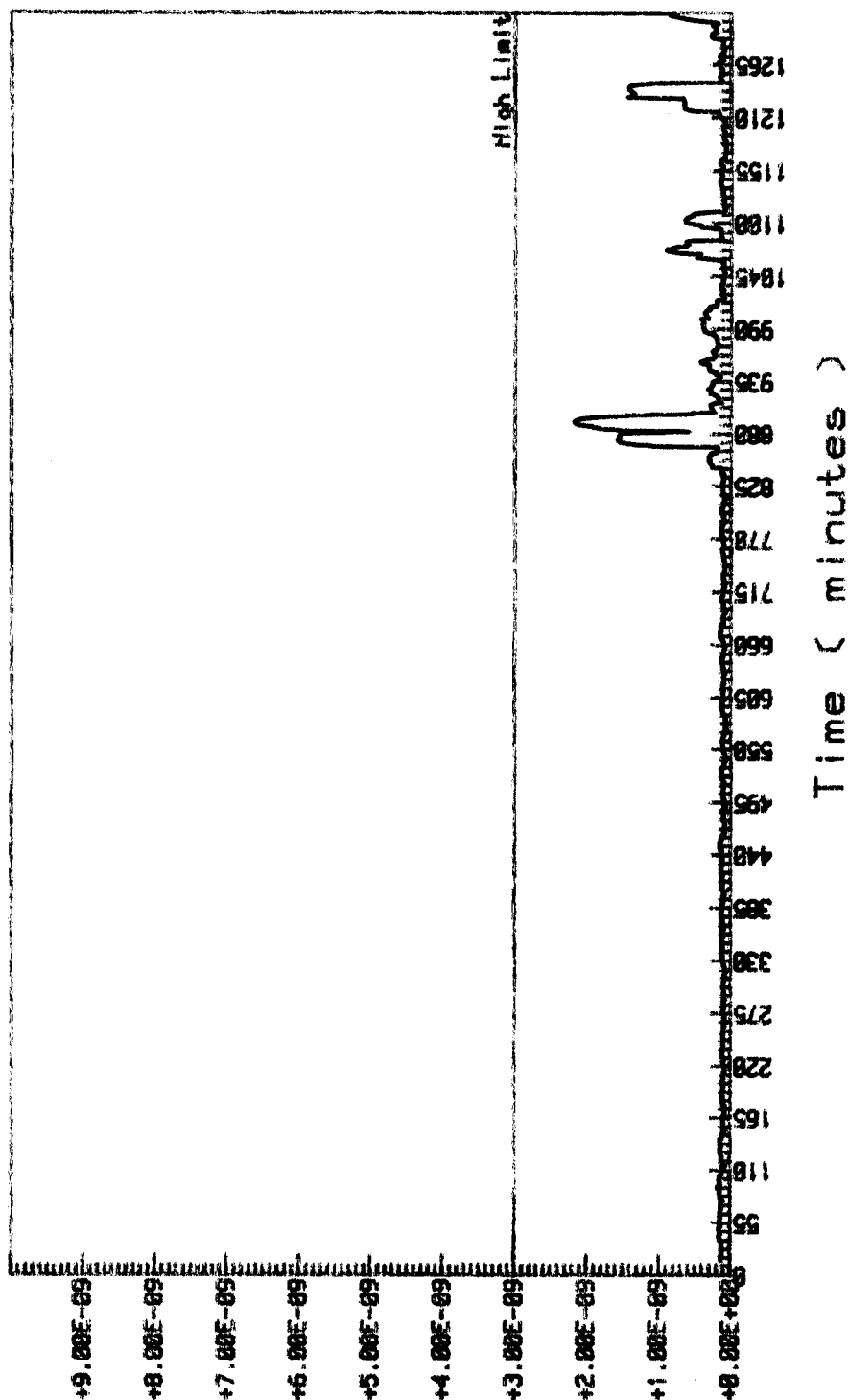
MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 6-7-01
TESTED BY: N. Forsyth

Res. freq. var. (part in 10^9)



406 SIGNAL OUTPUT POWER

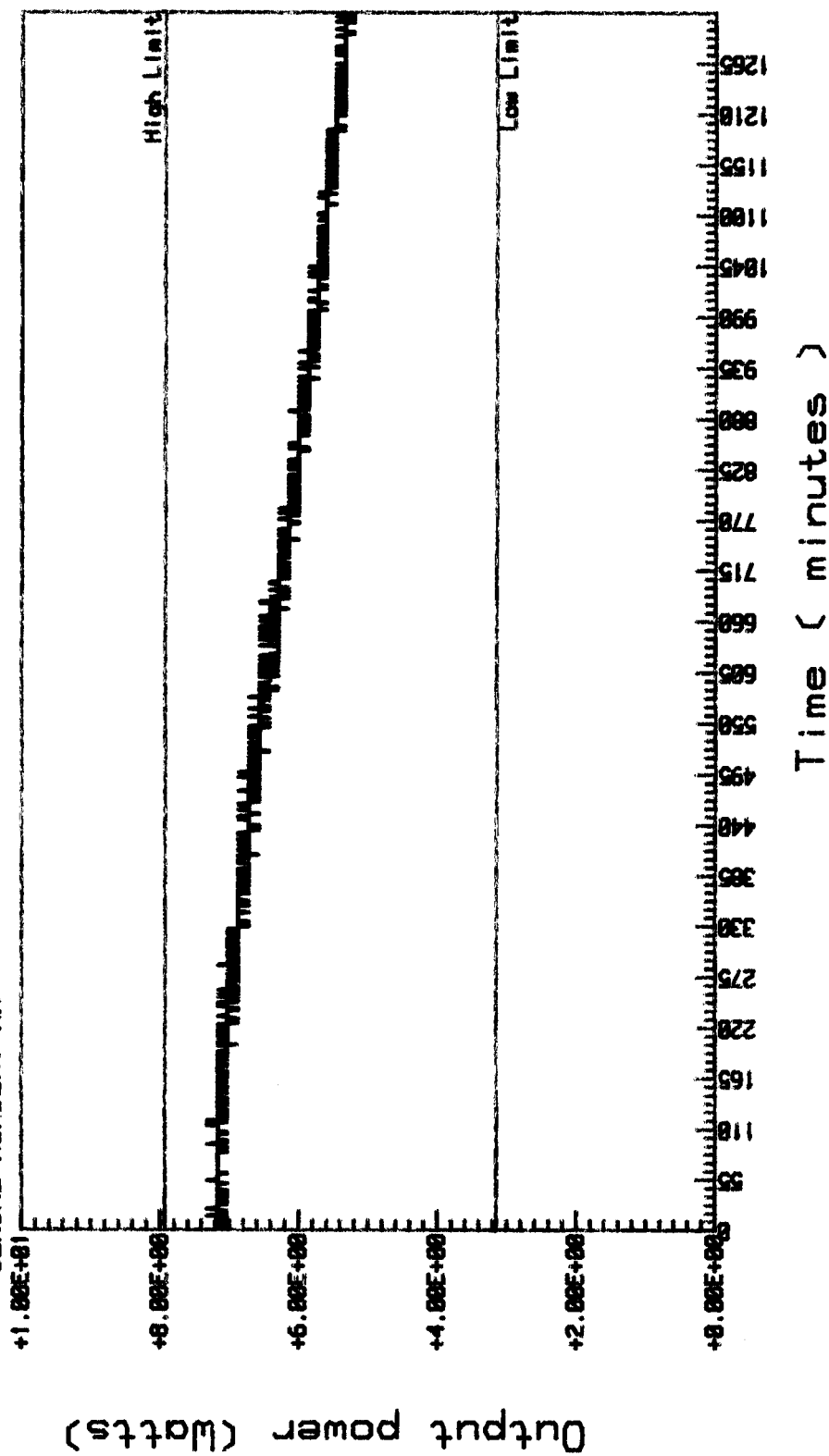
PROJECT: rm608213

MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 6-7-01
TESTED BY: N. FOSYTH



EPIRB NOMINAL FREQUENCY

PROJECT: rm608213

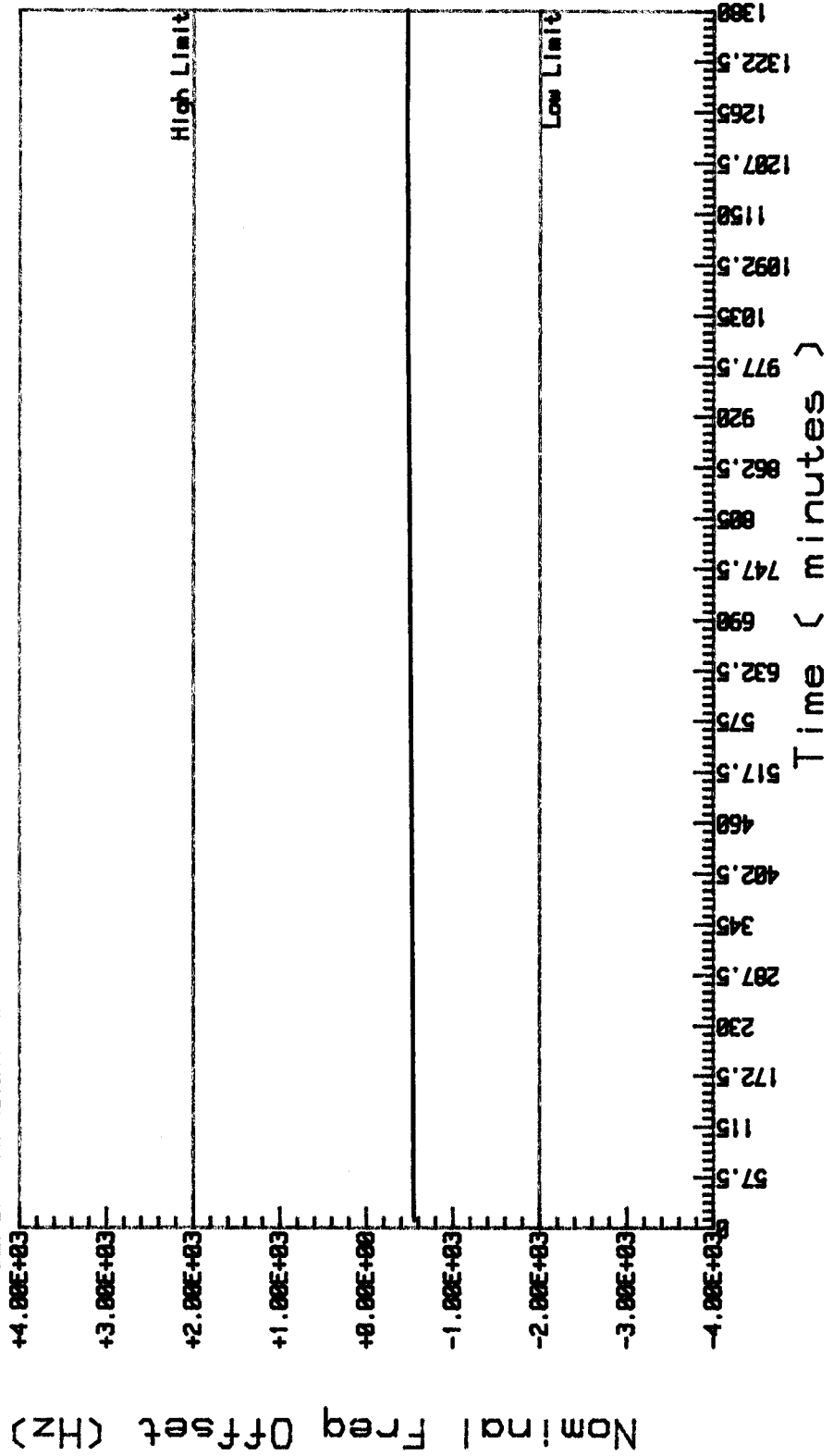
MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 6-7-01

TESTED BY: N. FORSYTH

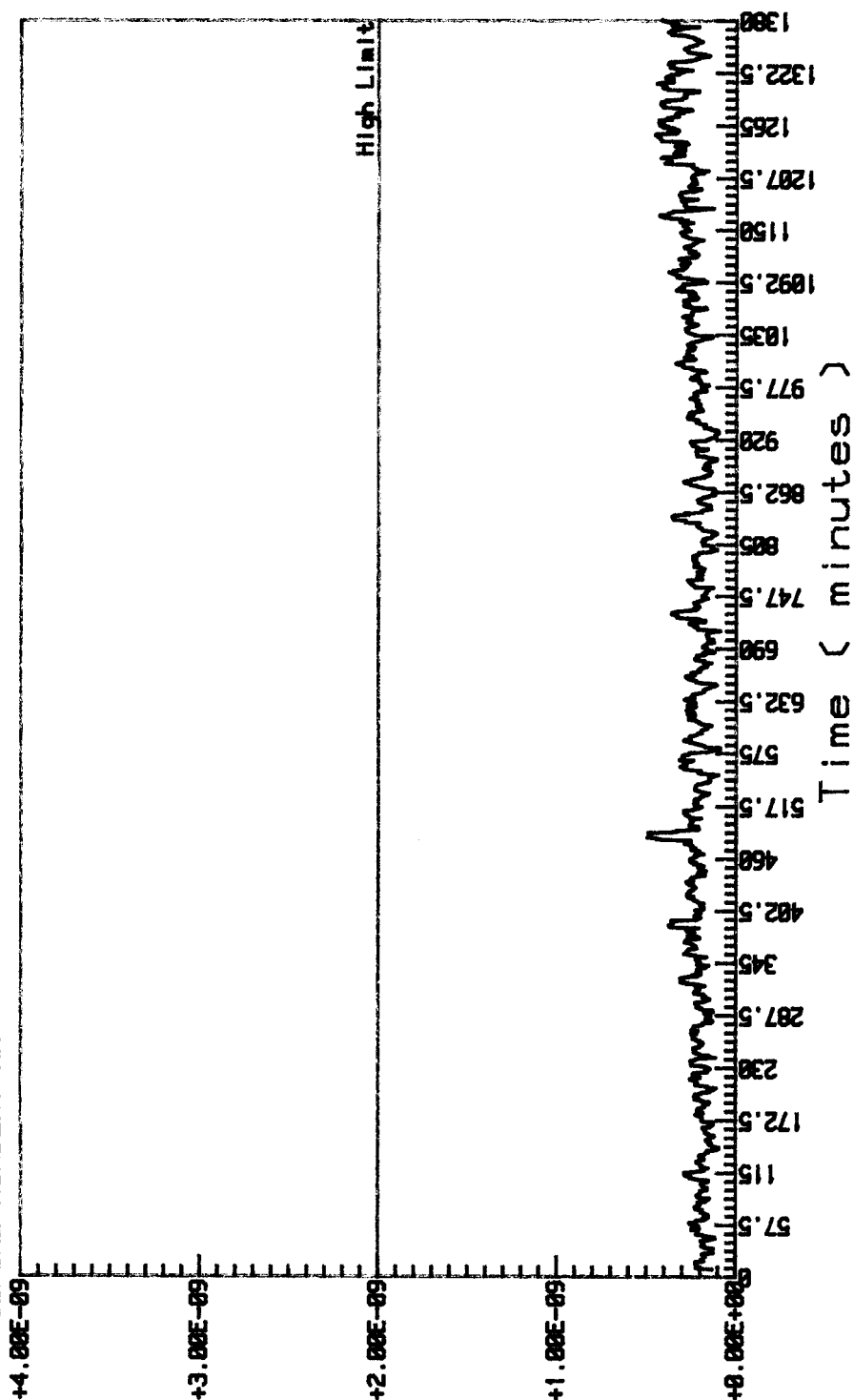


EPIRB SHORT TERM STABILITY

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

DATE:
 TESTED BY:

Short term (part in 10^9)



EPIRB MEDIUM TERM STABILITY

PROJECT: RM608213

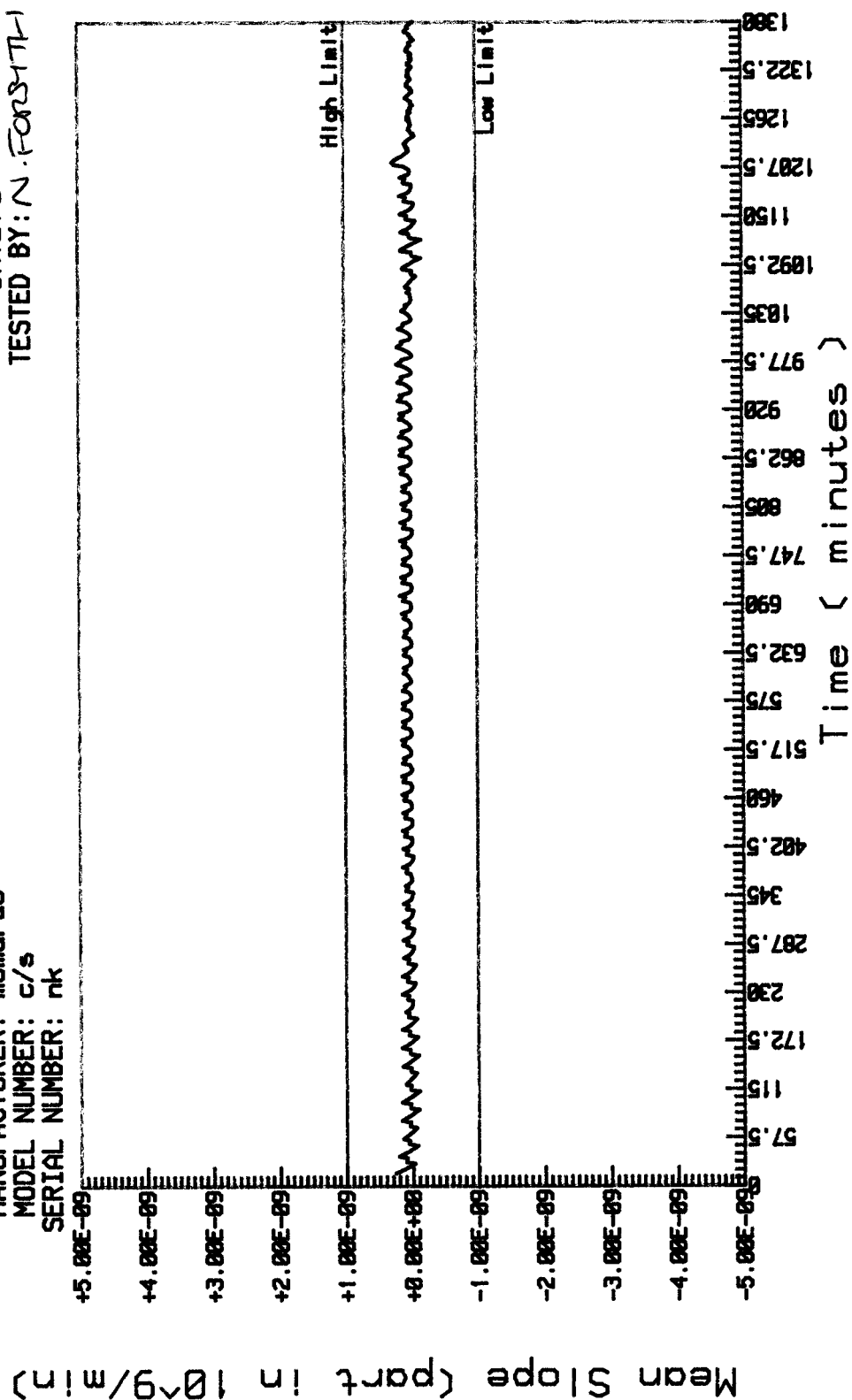
MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 6-7-01

TESTED BY: N. FORSYTH



EPIRB MEDIUM TERM STABILITY

PROJECT: rm608213

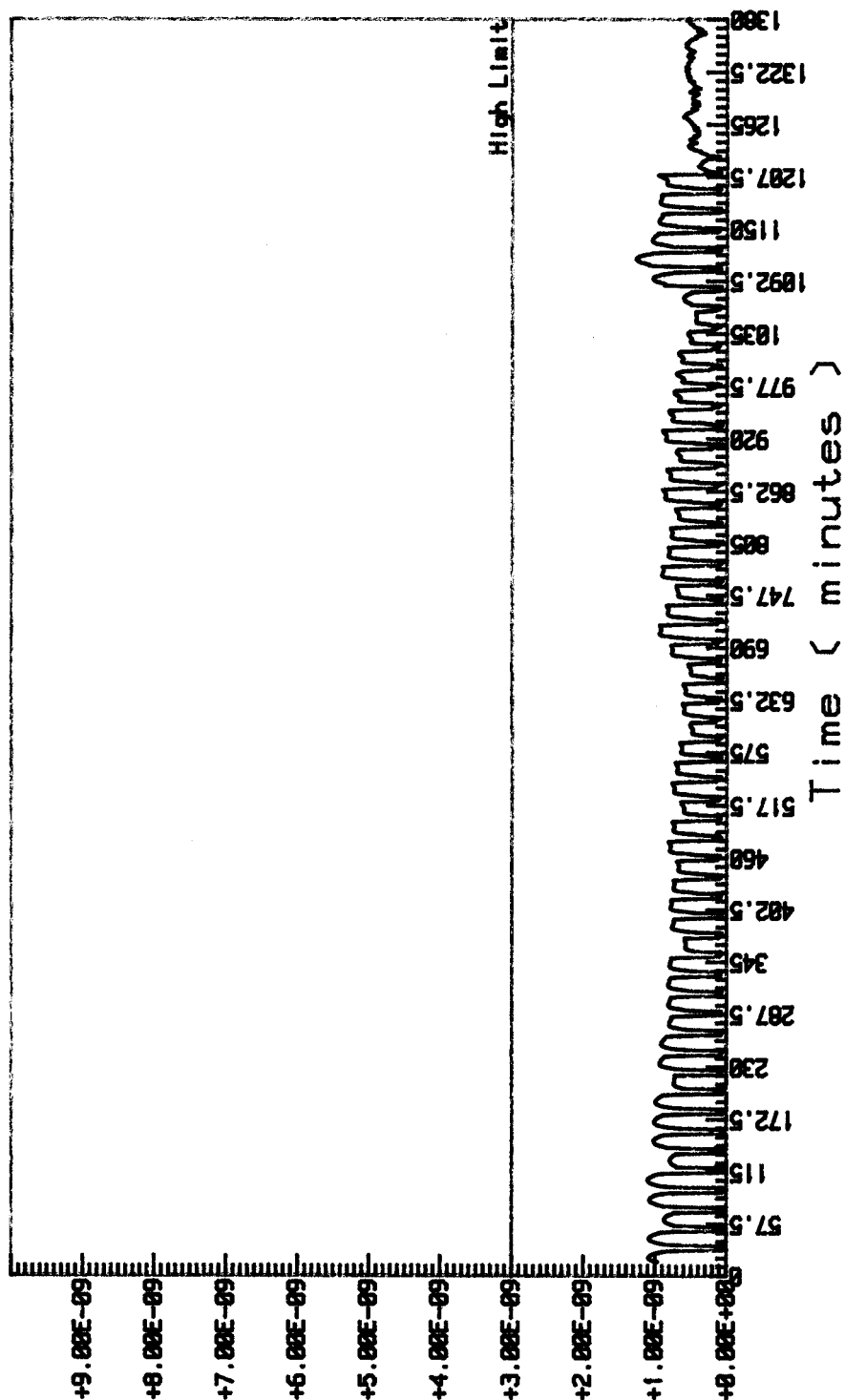
MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 6-7-01
TESTED BY: N. FORSMITH

Res. freq. var. (part in 10^9)



406 SIGNAL OUTPUT POWER

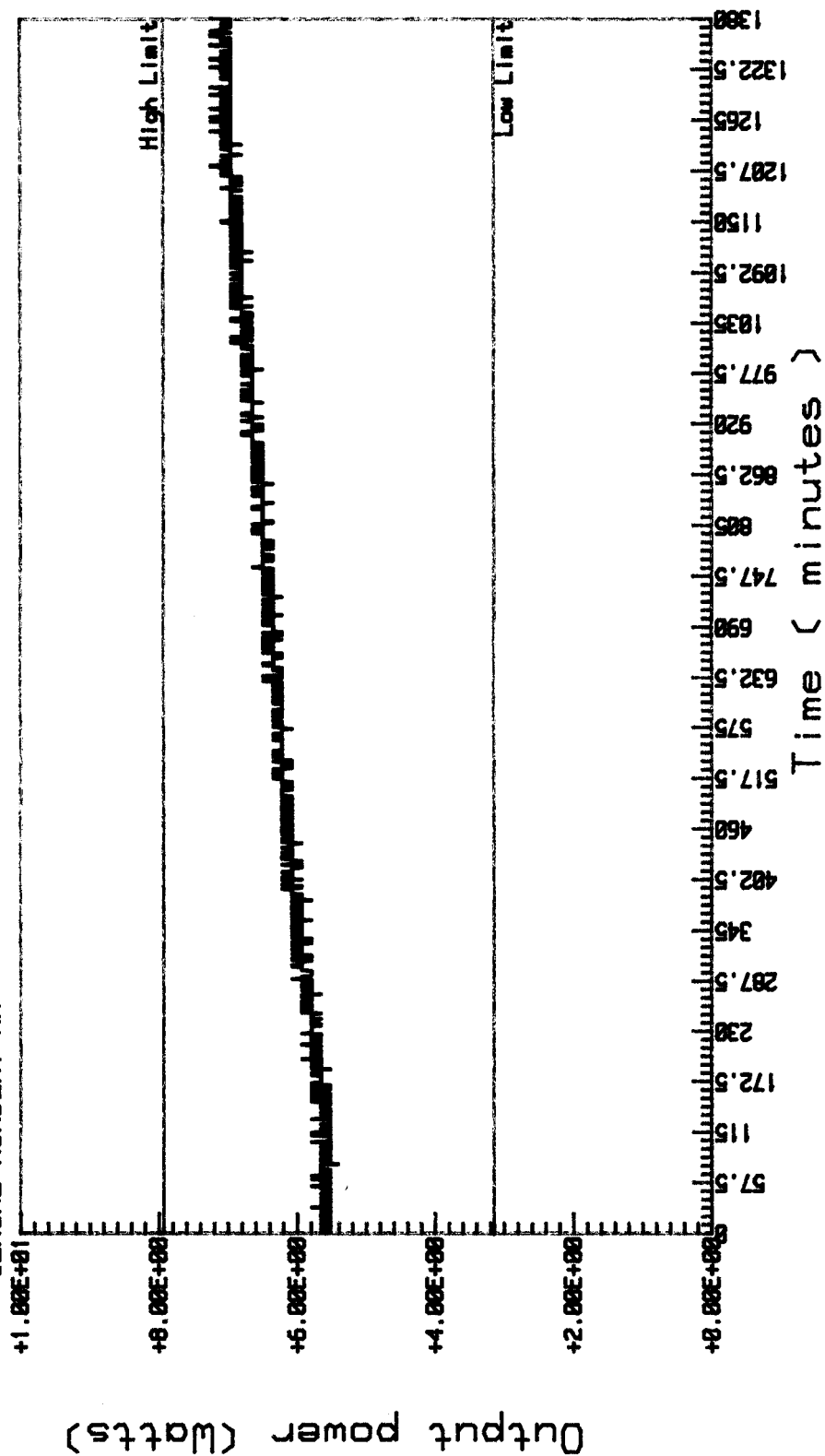
PROJECT: rm608213

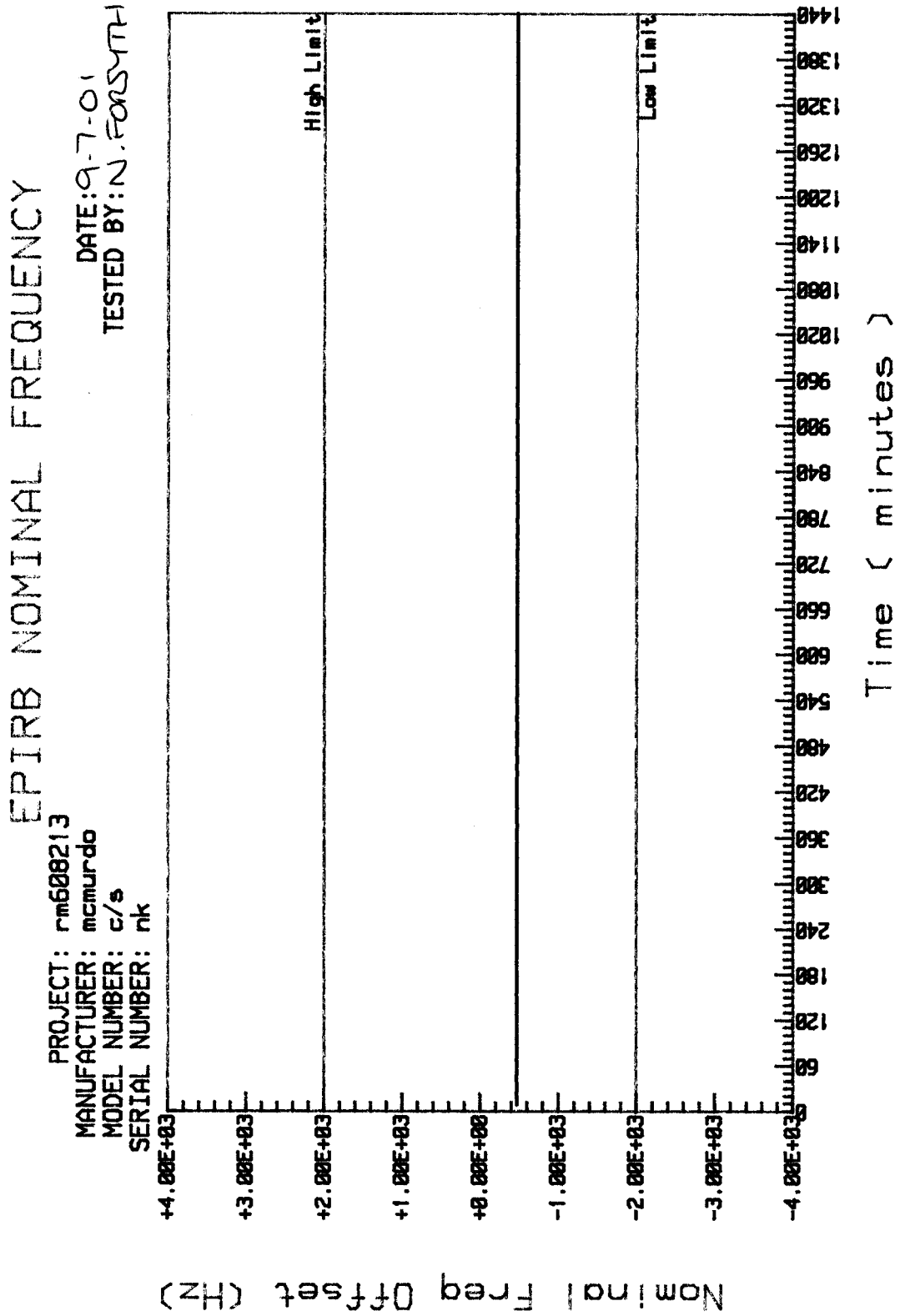
MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

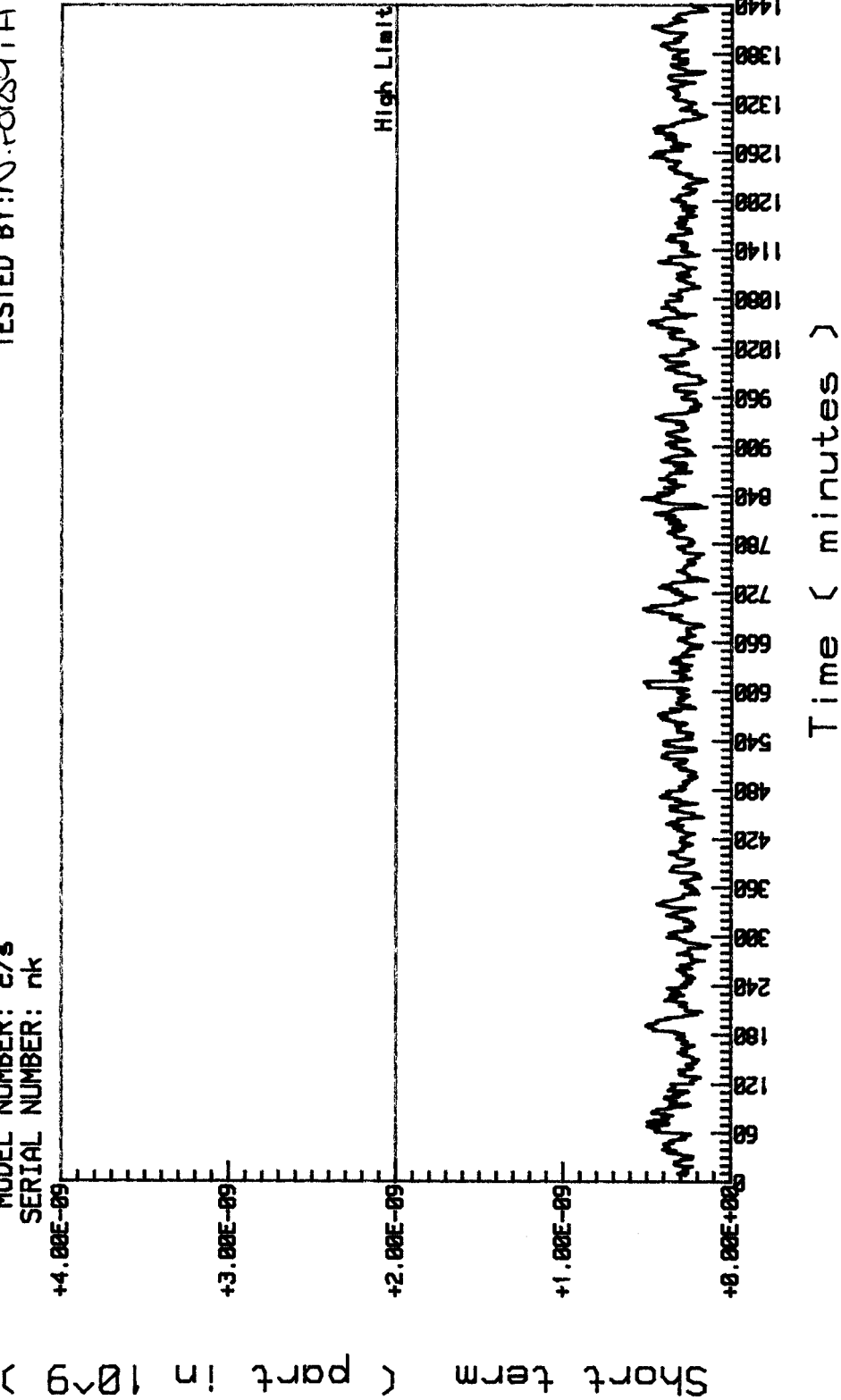
DATE: 6-7-01
TESTED BY: N. Forsyth

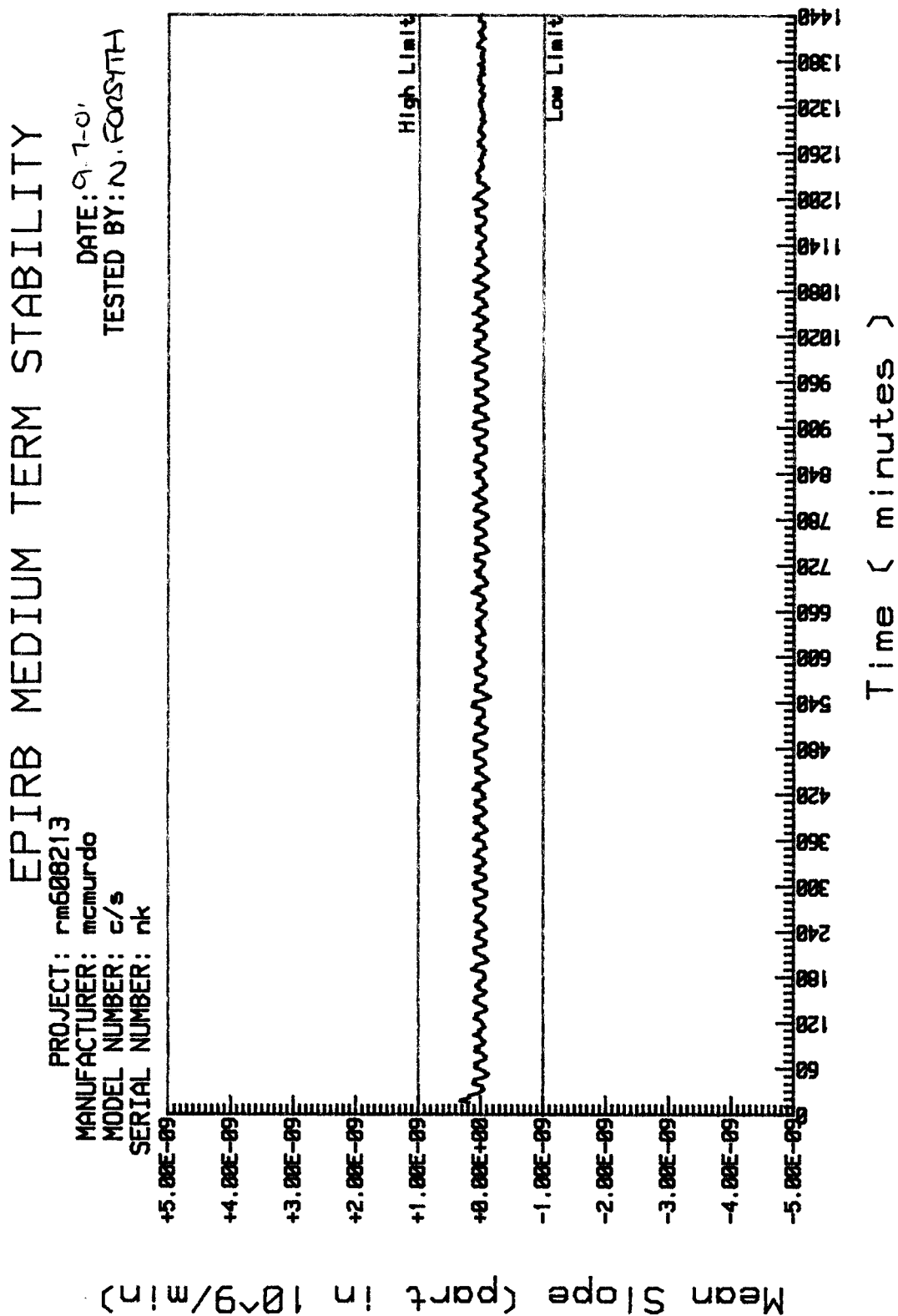




EPIRB SHORT TERM STABILITY

PROJECT: rm608213
MANUFACTURER: mcmurdo
MODEL NUMBER: c/s
SERIAL NUMBER: nk
DATE: 01-7-01
TESTED BY: N. FORDYTH





EPIRB MEDIUM TERM STABILITY

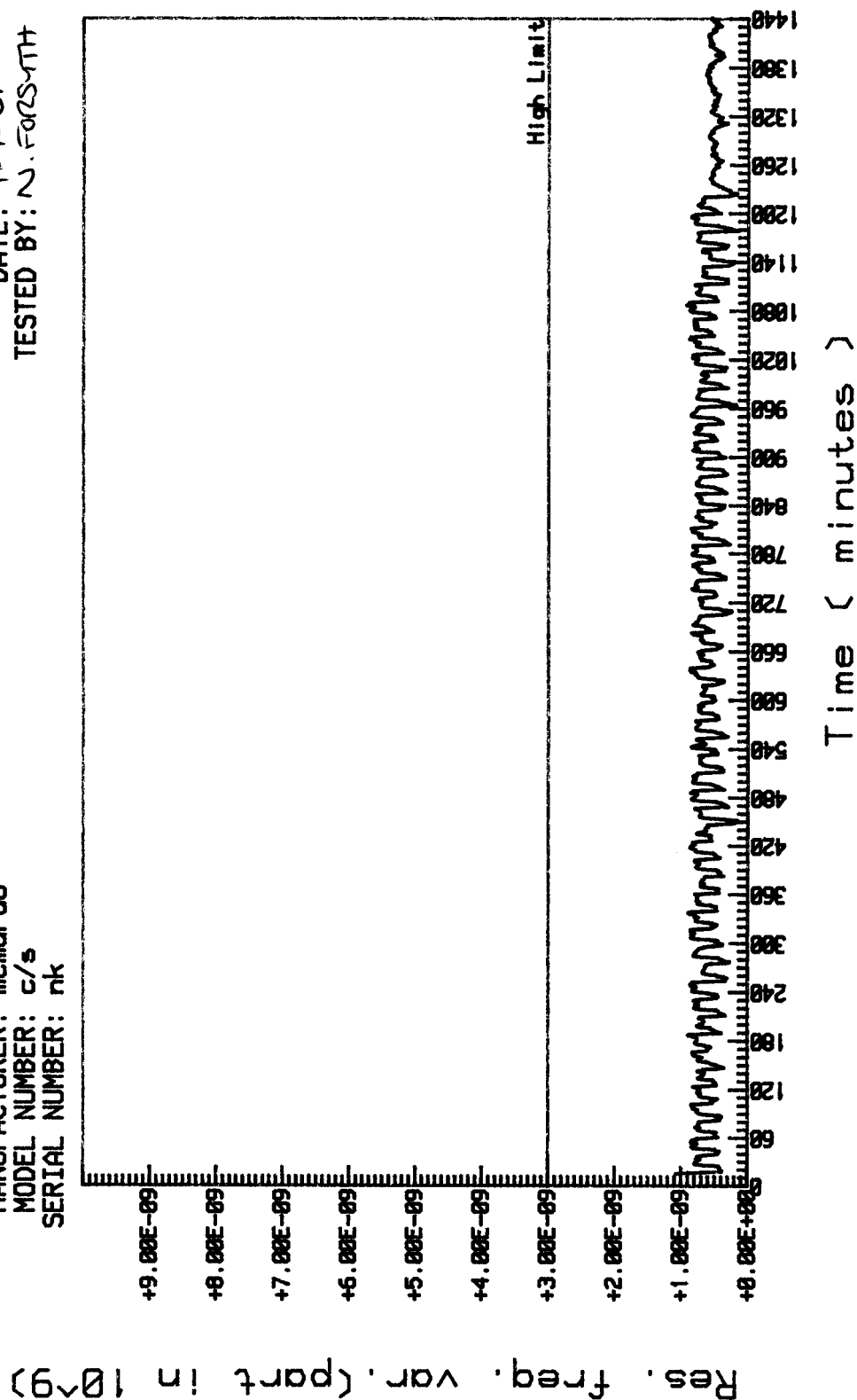
PROJECT: rm608213

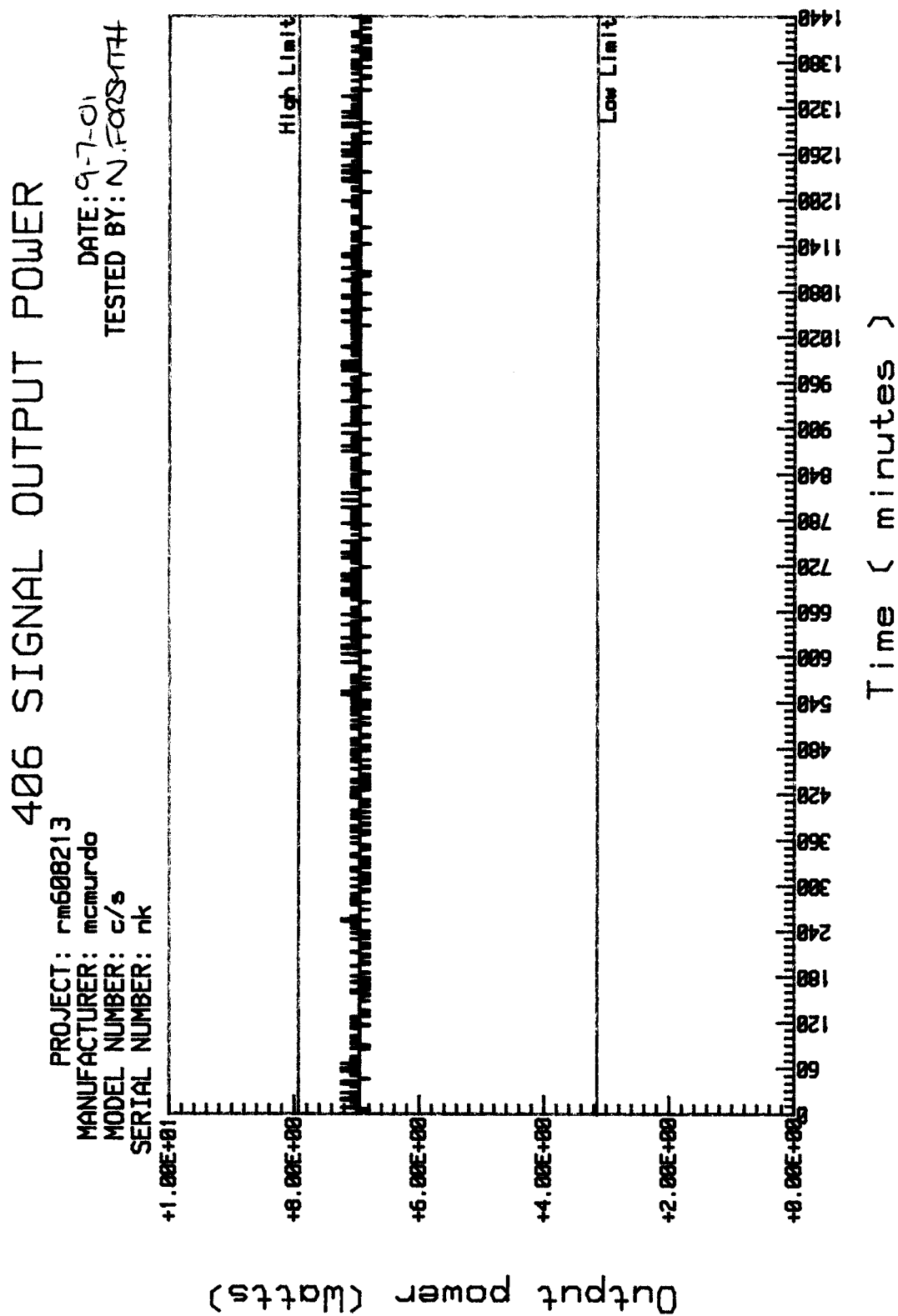
MANUFACTURER: mcmurdo

MODEL NUMBER: c/s

SERIAL NUMBER: nk

DATE: 9-7-01
TESTED BY: N. FORSYTH







Top View



Top View – Cover up



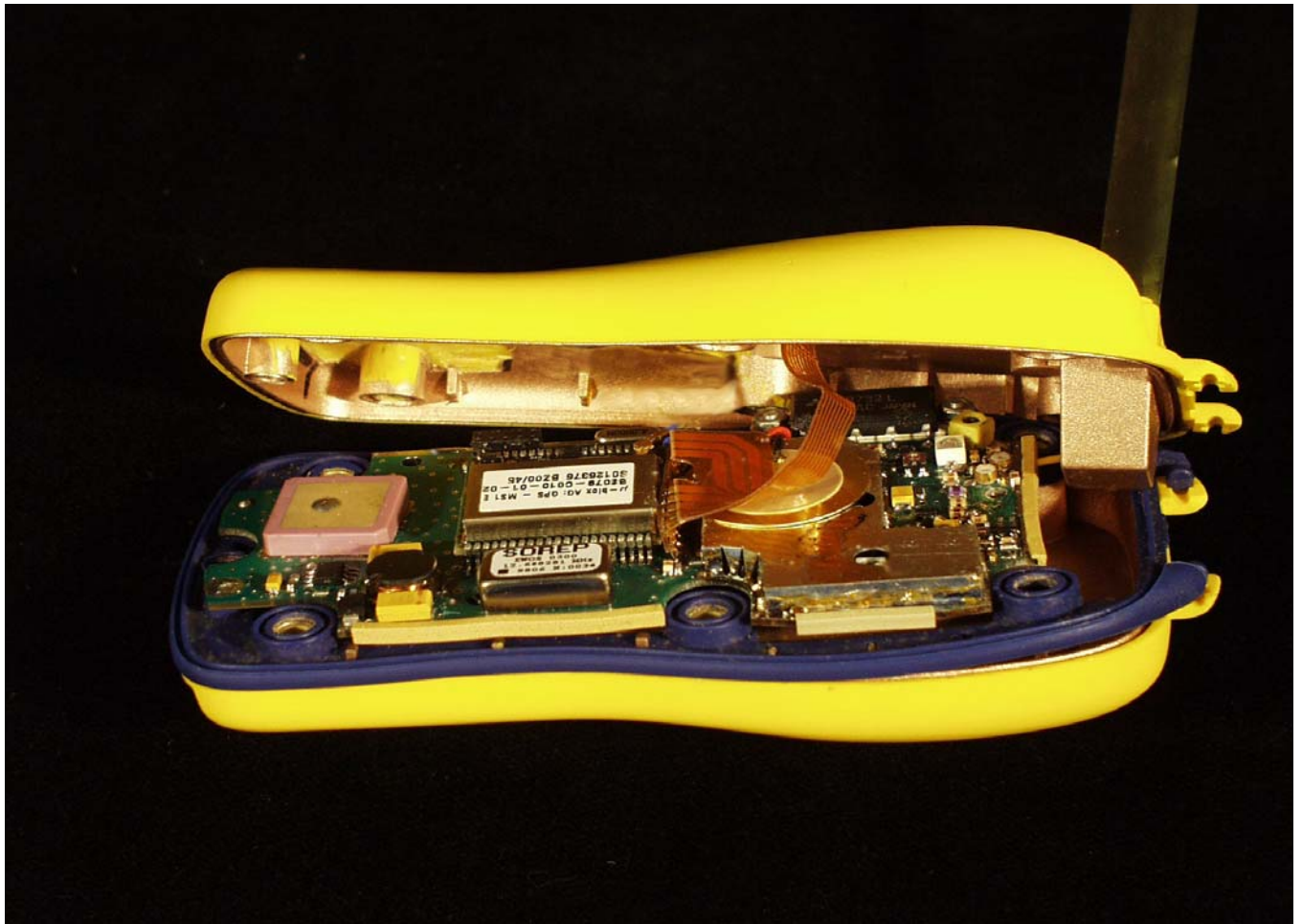
Rear View with -20°C battery label



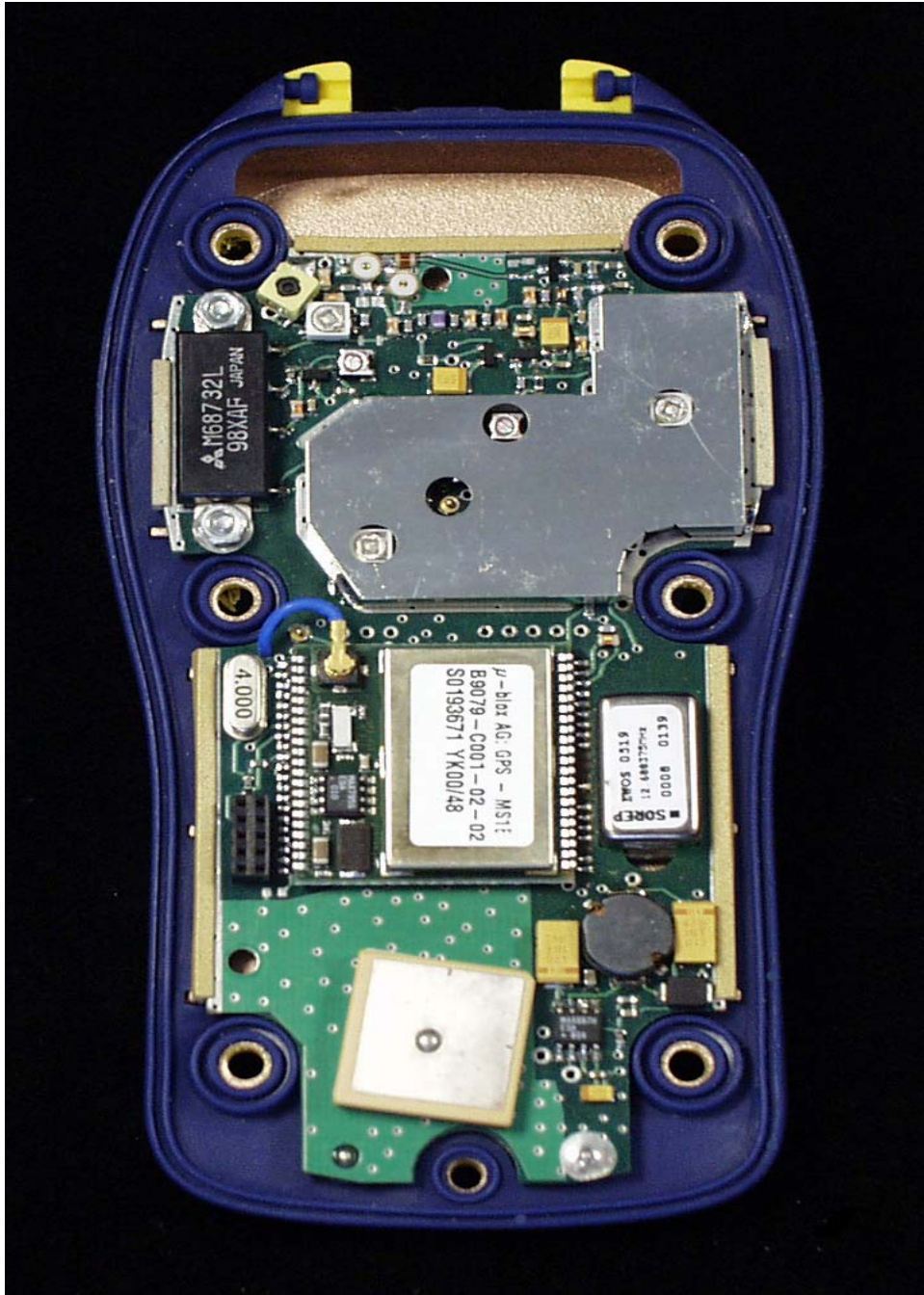
Rear View with battery removed – Blank PLB label



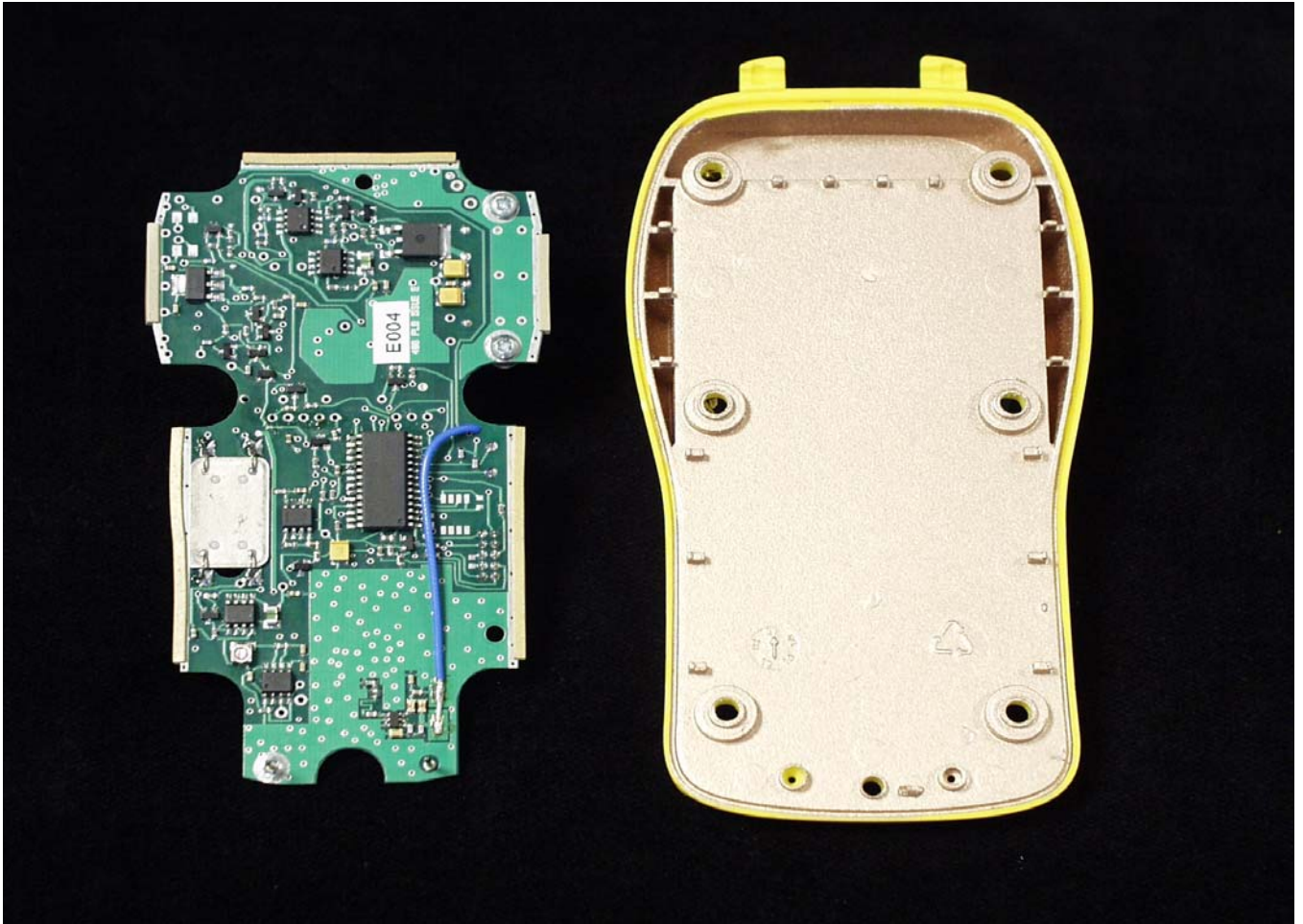
Rear View with battery removed – Completed PLB label



Switch Assembly



Top Internal View



Rear Internal View



Battery Outer FastFind
85-731-024



Battery Outer P1
85-731-021

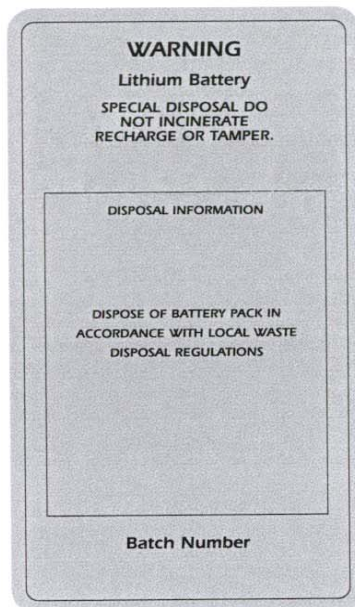


Battery Outer FastFind+
85-731-044

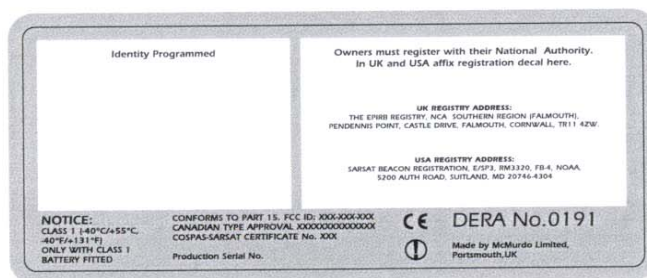


Battery Outer P1+
85-731-041

Battery Labels



Generic Battery Inner



Generic PLB Inner

Generic Battery and PLB Labels

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	2330AI5908
16	Power Sensor	8482A	Hewlett Packard	2349A08833
17	Spectrum Analyser	8566B	Hewlett Packard	1745A00160-00148
18	Quasi Peak Adapter	85650A	Hewlett Packard	2521A00849
19	RF Preselector	85685A	Hewlett Packard	2648A00442
20	Turntable and Controller	1060	Emco	N/S
21	Antenna Mast & Controller	1050	Emco	N/S
22	Dipole	CDI	Roberts 4	1317D



1377
1377SI

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Results of tests not yet included in our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

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ANNEX A

Technical Data

ANNEX B

Results of Satellite Qualitative Tests and Antenna Characteristics

Results of Antenna Characteristics

Beacon Manufacturer : McMurdo
 Beacon Model Number : Fastfind Plus 406
 Beacon Serial Number : 3
 Antenna Manufacturer : N/A
 Antenna Model Number : N/A
 Antenna Serial Number : N/A

Antenna F actor (dB) = 20.72
 Cable Loss (dB) = 4.50
 P_{trans} (dBm) = 37.89
 P_{rec} (dBm) = 38.41

Vertical Results (dBuV)	0	30	60	90	120	150	180	210	240	270	300	330
10	108.1	108.0	108.0	108.1	108.3	108.8	108.9	108.7	108.8	108.7	108.5	108.0
20	110.6	110.8	110.9	110.9	111.2	111.0	111.0	110.9	111.0	111.1	111.2	110.9
30	109.3	109.4	109.5	109.7	109.6	109.5	109.6	109.6	109.7	109.7	109.6	109.4
40	105.7	105.8	105.8	105.7	105.5	105.2	105.1	105.2	105.3	105.3	105.4	105.5
47	100.6	100.7	100.8	100.8	100.6	100.5	100.6	100.6	100.8	100.8	100.8	100.6
50	96.1	96.3	96.6	96.7	96.8	96.8	97.0	97.2	97.2	97.0	96.8	96.1

Horizontal Results (dBuV)	0	30	60	90	120	150	180	210	240	270	300	330
10	86.2	88.0	89.5	90.4	90.2	90.6	89.8	88.7	86.9	86.0	86.1	86.5
20	79.3	78.3	80.5	83.0	86.1	85.3	82.1	78.9	78.2	77.8	80.0	81.9
30	86.2	86.3	88.2	90.2	91.6	91.2	90.0	88.0	86.6	85.8	86.3	87.0
40	84.1	79.7	80.2	83.7	85.9	85.4	82.1	73.1	82.7	82.7	85.7	85.7
47	86.7	83.1	78.7	77.2	79.3	78.7	77.1	80.4	84.6	87.5	88.7	88.5
50	83.3	77.8	66.3	72.6	77.8	77.2	70.1	74.7	81.6	84.7	85.5	85.1

ERP (dBm)	0	30	60	90	120	150	180	210	240	270	300	330
10	38.25	38.17	38.18	38.30	38.49	38.99	39.08	38.87	38.95	38.85	38.65	38.15
20	41.13	41.33	41.43	41.44	41.74	41.54	41.54	41.43	41.53	41.63	41.73	41.44
30	40.56	40.66	40.77	40.99	40.91	40.80	40.89	40.87	40.96	40.96	40.86	40.67
40	38.04	38.12	38.12	38.03	37.85	37.55	37.43	37.51	37.63	37.63	37.75	37.85
47	34.09	34.09	34.14	34.13	33.95	33.84	33.94	33.96	34.22	34.31	34.38	34.18
50	30.15	30.19	30.43	30.55	30.68	30.68	30.84	31.05	31.15	31.08	30.94	30.26

Antenna Gain (dBi)	0	30	60	90	120	150	180	210	240	270	300	330
10	0.36	0.28	0.29	0.41	0.60	1.10	1.19	0.98	1.06	0.96	0.76	0.26
20	3.24	3.44	3.54	3.55	3.85	3.65	3.65	3.54	3.64	3.74	3.84	3.55
30	2.67	2.77	2.88	3.10	3.02	2.91	3.00	2.98	3.07	3.07	2.97	2.78
40	0.15	0.23	0.23	0.14	-0.04	-0.34	-0.46	-0.38	-0.26	-0.26	-0.14	-0.04
47	-3.80	-3.80	-3.75	-3.76	-3.94	-4.05	-3.95	-3.93	-3.67	-3.58	-3.51	-3.71
50	-7.74	-7.70	-7.46	-7.34	-7.21	-7.21	-7.05	-6.84	-6.74	-6.81	-6.95	-7.63

ANNEX C

Beacon Coding Software Sample Messages

Serial User Protocol – Self-test Message

TOTAL HEX MESSAGE = FFFED04DC7A000F600002F591300

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 9B8F4001EC00005          9B8F4001EC00005 Default_Id
30 Hex (Bits 25-144) = 4DC7A000F600002F591300000000000

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |   |   |   |   |   |   |   |   |   |   |   |   |
0 1001 1011 1000 1111 0100 0000 0000 0001 1110 1100 0000 0000 0000 0101
    1110 1011 0010 0010 0110 0000 0000 0000 0000 0000 0000 0000 0000 000
    |   |   |   |   |   |   |   |   |   |   |   |   |
    86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos   Value Decode      Bits
-----
Format Flag     25        0 Short Message      0
Protocol Flag   26        1 User                1
MID             27- 36    220 Unallocated NON-SPEC 0011 0111 00
User Protocol   37- 39    3 Serialized          011
Beacon type     40- 42    6 Personal/ PLB        110
Certification type 43     1 Cospas-Sarsat        1
Serial Number    44- 63   123                    0000 0000 0000 0111 1011
Cosp-Sar Spare  64- 73    0                      0000 0000 00
Cosp-Sar Cert # 74- 83    1                      0000 0000 01
Homing          84- 85    1 121.5                01
BCH Encoded     86-106    Errors=0             1110 1011 0010 0010 0110 0
BCH Generated   86-106    1110 1011 0010 0010 0110 0
Emergency Cd Flag 107     0 National Use        0
Beacon Activation 108     0 Manual only        0
National Use    109-112   0000

=====
```

Serial User Protocol – Normal Message

TOTAL HEX MESSAGE = FFFE2F4DC7A000F600002F591300

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 9B8F4001EC00005          9B8F4001EC00005 Default_Id
30 Hex (Bits 25-144) = 4DC7A000F600002F5913000000000000
=====
```

	26	30	34	38	42	46	50	54	58	62	66	70	74	78	82
0	1001 1110	1011 1011	1000 0010	1111 0010	0100 0110	0000 0000	0000 0000	0001 0000	1110 0000	1100 0000	0000 0000	0000 0000	0000 0000	0000 0000	0101 000
	86	90	94	98	102	106	110	114	118	122	126	130	134	138	142

Field Name	Bit Pos	Value	Decode	Bits
-----	-----	-----	-----	----
Format Flag	25	0	Short Message	0
Protocol Flag	26	1	User	1
MID	27- 36	220	Unallocated NON-SPEC	0011 0111 00
User Protocol	37- 39	3	Serialized	011
Beacon type	40- 42	6	Personal/ PLB	110
Certification type	43	1	Cospas-Sarsat	1
Serial Number	44- 63	123		0000 0000 0000 0111 1011
Cosp-Sar Spare	64- 73	0		0000 0000 00
Cosp-Sar Cert #	74- 83	1		0000 0000 01
Homing	84- 85	1	121.5	01
BCH Encoded	86-106		Errors=0	1110 1011 0010 0010 0110 0
BCH Generated	86-106			1110 1011 0010 0010 0110 0
Emergency Cd Flag	107	0	National Use	0
Beacon Activation	108	0	Manual only	0
National Use	109-112			0000

User Location Protocol – Self-test Message

TOTAL HEX MESSAGE = FFFED0CDC7A000F600002CA1B02F

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 9B8F4001EC00005          9B8F4001EC00005 Default_Id
30 Hex (Bits 25-144) = CDC7A000F600002CA1B02F00000000

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |   |   |   |   |   |   |   |   |   |   |   |   |
1 1001 1011 1000 1111 0100 0000 0000 0001 1110 1100 0000 0000 0000 0101
   1001 0100 0011 0110 0000 0101 1110 0000 0000 0000 0000 0000 0000 000
   |   |   |   |   |   |   |   |   |   |   |   |   |
   86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos   Value Decode                                Bits
-----
Format Flag      25         1 Long Message: bcn entered Short Non-Spec    1
Protocol Flag    26         1 User                                         1
MID              27- 36     220 Unallocated NON-SPEC                      0011 0111 00
User Protocol    37- 39     3 Serialized                                   011
Beacon type      40- 42     6 Personal/ PLB                                110
Certification type 43        1 Cospas-Sarsat                               1
Serial Number    44- 63     123                                           0000 0000 0000 0111 1011
Cosp-Sar Spare   64- 73     0                                           0000 0000 00
Cosp-Sar Cert #  74- 83     1                                           0000 0000 01
Homing           84- 85     1 121.5                                         01
BCH Encoded      86-106     Errors=0                                     1001 0100 0011 0110 0000 0
BCH Generated    86-106     1001 0100 0011 0110 0000 0
Emergency Cd Flag 107        1 Emergency Code present                      1
Beacon Activation 108        0 Manual only                                0
Fire flag        109        1 Fire                                           1
Medical help flag 110        1 Medical help needed                      1
Disabled flag     111        1 Someone is disabled                      1
Emergency Spare   112        1 NON-SPEC                                     1
=====
```

User Location Protocol – Normal Message : No GPS data

TOTAL HEX MESSAGE = FFFE2FCDC7A000F600002CA1B02FE0FF0146

Field Name	Bit Pos	Value	Decode	Bits
Beacon Id Format	25-30	30 Hex	Id, Long Message	Bits 25-144
15 Hex	(Bits 26- 85)	= 9B8F4001EC000005		9B8F4001EC000005 Default_Id
30 Hex	(Bits 25-144)	= CDC7A000F600002CA1B02FE0FF0146		
	26 30 34 38 42 46 50 54 58 62 66 70 74 78 82			
1	1001 1011 1000 1111 0100 0000 0000 0001 1110 1100 0000 0000 0000 0000 0101			
	1001 0100 0011 0110 0000 0101 1111 1100 0001 1111 1110 0000 0010 1000 110			
	86 90 94 98 102 106 110 114 118 122 126 130 134 138 142			
Format Flag	25	1	Long Message	1
Protocol Flag	26	1	User	1
MID	27- 36	220	Unallocated NON-SPEC	0011 0111 00
User Protocol	37- 39	3	Serialized	011
Beacon type	40- 42	6	Personal/ PLB	110
Certification type	43	1	Cospas-Sarsat	1
Serial Number	44- 63	123		0000 0000 0000 0111 1011
Cosp-Sar Spare	64- 73	0		0000 0000 00
Cosp-Sar Cert #	74- 83	1		0000 0000 01
Homing	84- 85	1	121.5	01
BCH Encoded	86-106		Errors=0	1001 0100 0011 0110 0000 0
BCH Generated	86-106			1001 0100 0011 0110 0000 0
Long Message	107-144		Data Present	
Encode Pos Device	107	1	Internal	1
Encoded Position	108-132		DEFAULT	0111 1111 0000 0111 1111 1000 0
BCH Encoded	133-144		Errors=0	0001 0100 0110
BCH Generated	133-144			0001 0100 0110

User Location Protocol – Normal Message : GPS Position N 51°0'0" W 1°0'0"

TOTAL HEX MESSAGE = FFFE2FCDC7A000F600002CA1B02661010C43

```
=====
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 9B8F4001EC00005          9B8F4001EC00005 Default_Id
30 Hex (Bits 25-144) = CDC7A000F600002CA1B02661010C43

    26    30    34    38    42    46    50    54    58    62    66    70    74    78    82
    |     |     |     |     |     |     |     |     |     |     |     |     |
1 1001 1011 1000 1111 0100 0000 0000 0001 1110 1100 0000 0000 0000 0101
   1001 0100 0011 0110 0000 0100 1100 1100 0010 0000 0010 0001 1000 1000 011
   |     |     |     |     |     |     |     |     |     |     |     |
   86    90    94    98   102   106   110   114   118   122   126   130   134   138   142

Field Name      Bit Pos    Value Decode      Bits
-----
Format Flag     25         1 Long Message      1
Protocol Flag   26         1 User                1
MID             27- 36     220 Unallocated NON-SPEC 0011 0111 00
User Protocol    37- 39     3 Serialized          011
Beacon type     40- 42     6 Personal/ PLB        110
Certification type 43       1 Cospas-Sarsat      1
Serial Number   44- 63     123                   0000 0000 0000 0111 1011
Cosp-Sar Spare  64- 73     0                   0000 0000 00
Cosp-Sar Cert # 74- 83     1                   0000 0000 01
Homing          84- 85     1 121.5              01
BCH Encoded     86-106     Errors=0          1001 0100 0011 0110 0000 0
BCH Generated   86-106     1001 0100 0011 0110 0000 0
Long Message    107-144    Data Present
Encode Pos Device 107      1 Internal                1
Encoded Position 108-132    Data Present
Latitude Flag    108       0 North:                0
Latitude Degrees 109-115    51 51 deg              0110 011
Lat. Minutes /4  116-119    0 0 min                0000
Longitude Flag   120       1 West:                1
Longitude Degrees 121-128    1 1 deg              0000 0001
Long. Minutes /4 129-132    0 0 min                0000
Resultant Position --> 51.00000 LAT, -1.00000 LONG
                   51 deg 0 min 0 sec N, 1 deg 0 min 0 sec W
BCH Encoded     133-144    Errors=0          1100 0100 0011
BCH Generated   133-144    1100 0100 0011
=====
```

User Location Protocol – Normal Message : GPS Position N 51°19'22" W 1°22'33"

TOTAL HEX MESSAGE = FFFE2FCDC7A000F600002CA1B0266B016EEF

```
=====
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 9B8F4001EC00005          9B8F4001EC00005 Default_Id
30 Hex (Bits 25-144) = CDC7A000F600002CA1B0266B016EEF

    26    30    34    38    42    46    50    54    58    62    66    70    74    78    82
    |     |     |     |     |     |     |     |     |     |     |     |     |
1 1001 1011 1000 1111 0100 0000 0000 0001 1110 1100 0000 0000 0000 0101
    1001 0100 0011 0110 0000 0100 1100 1101 0110 0000 0010 1101 1101 111
    |     |     |     |     |     |     |     |     |     |     |     |
    86    90    94    98   102   106   110   114   118   122   126   130   134   138   142

Field Name      Bit Pos    Value Decode      Bits
-----
Format Flag     25         1 Long Message      1
Protocol Flag   26         1 User                1
MID             27- 36     220 Unallocated NON-SPEC 0011 0111 00
User Protocol   37- 39     3 Serialized          011
Beacon type     40- 42     6 Personal/ PLB        110
Certification type 43       1 Cospas-Sarsat      1
Serial Number   44- 63     123                   0000 0000 0000 0111 1011
Cosp-Sar Spare  64- 73     0                   0000 0000 00
Cosp-Sar Cert # 74- 83     1                   0000 0000 01
Homing          84- 85     1 121.5              01
BCH Encoded     86-106     Errors=0          1001 0100 0011 0110 0000 0
BCH Generated   86-106     1001 0100 0011 0110 0000 0
Long Message    107-144    Data Present
Encode Pos Device 107      1 Internal                1
Encoded Position 108-132    Data Present
Latitude Flag   108       0 North:                0
Latitude Degrees 109-115   51 51 deg              0110 011
Lat. Minutes /4 116-119   5 20 min              0101
Longitude Flag  120       1 West:                1
Longitude Degrees 121-128 1 1 deg              0000 0001
Long. Minutes /4 129-132 6 24 min              0110
Resultant Position --> 51.33333 LAT, -1.40000 LONG
                    51 deg 20 min 0 sec N, 1 deg 24 min 0 sec W
BCH Encoded     133-144    Errors=0          1110 1110 1111
BCH Generated   133-144    1110 1110 1111
=====
```

Standard Location Protocol – Self-test Message

TOTAL HEX MESSAGE = FFFED08DC700407B7FDFFA359EB7

```
=====
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 1B8E0080F6FFBFF      1B8E0080F6FFBFF Default_Id
30 Hex (Bits 25-144) = 8DC700407B7FDFFA359EB700000000

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |   |   |   |   |   |   |   |   |   |   |   |   |
1 0001 1011 1000 1110 0000 0000 1000 0000 1111 0110 1111 1111 1011 1111 1111
   0100 0110 1011 0011 1101 0110 1110 0000 0000 0000 0000 0000 0000 0000 000
   |   |   |   |   |   |   |   |   |   |   |   |   |
   86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos   Value Decode      Bits
-----
Format Flag      25         1 Long Message      1
Protocol Flag    26         0 Location NEW      0
MID              27- 36    220 Unallocated NON-SPEC    0011 0111 00
Protocol Code     37- 40     7 PLB - Serial (Standard)    0111
CSTA Number       41- 50     1                   0000 0000 01
Serial Number     51- 64    123                   0000 0001 1110 11
Coarse Position   65- 85      DEFAULT          0111 1111 1101 1111 111 1
BCH Encoded       86-106     Errors=0          0100 0110 1011 0011 1101 0
BCH Generated     86-106     0100 0110 1011 0011 1101 0
Long Message      107-144    Data Present
Fixed Bits        107-109
Fixed Bit         110         1                   110
Encode Pos Device 111         1 Internal          1
121.5 Homing      112         1 YES              1
Position Change   113-132    Data Present Non-Spec
Lat. Change Sign  113         0 Minus:          0
Lat. Chg. Minutes 114-118    0 0 min          0000 0
Lat. Chg. Secs /4 119-122    0 0 sec          0000
Long Change Sign  123         0 Minus:          0
Long Chg. Minutes 124-128    0 0 min          0000 0
Long Chg. Secs /4 129-132    0 0 sec          0000
Resultant Position --> Not Defined Non-Spec
BCH Encoded       133-144    Errors=9 Non-Spec    0000 0000 0000
BCH Generated     133-144    0101 1011 1111
=====
```

Standard Location Protocol – Normal Message : No GPS data

TOTAL HEX MESSAGE = FFFE2F8DC700407B7FDFFA359EB783E0F66C

```
=====
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 1B8E0080F6FFBFF      1B8E0080F6FFBFF Default_Id
30 Hex (Bits 25-144) = 8DC700407B7FDFFA359EB783E0F66C

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |   |   |   |   |   |   |   |   |   |   |   |   |
1 0001 1011 1000 1110 0000 0000 1000 0000 1111 0110 1111 1111 1011 1111 1111
   0100 0110 1011 0011 1101 0110 1111 0000 0111 1100 0001 1110 1100 1101 100
   |   |   |   |   |   |   |   |   |   |   |   |   |
   86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos   Value Decode                                Bits
-----
Format Flag      25         1 Long Message                                1
Protocol Flag    26         0 Location NEW                                0
MID              27- 36    220 Unallocated NON-SPEC                    0011 0111 00
Protocol Code    37- 40     7 PLB - Serial (Standard)                    0111
CSTA Number      41- 50     1                                           0000 0000 01
Serial Number    51- 64    123                                           0000 0001 1110 11
Coarse Position  65- 85     DEFAULT                                0111 1111 1101 1111 1111 1
BCH Encoded      86-106    Errors=0                                0100 0110 1011 0011 1101 0
BCH Generated    86-106    Errors=0                                0100 0110 1011 0011 1101 0
Long Message     107-144    Data Present
Fixed Bits       107-109
Fixed Bit        110         1                                           110
Encode Pos Device 111         1 Internal                                           1
121.5 Homing     112         1 YES                                           1
Position Change  113-132    DEFAULT                                1000 0011 1110 0000 1111
Resultant Position 133-144    --> Not Defined
BCH Encoded      133-144    Errors=0                                0110 0110 1100
BCH Generated    133-144    Errors=0                                0110 0110 1100
=====
```

Standard Location Protocol – Normal Message : GPS Position N 51°0'0" W 1°0'0"

TOTAL HEX MESSAGE = FFFE2F8DC700407B332025D941B78020001B

```
=====
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 1B8E0080F666404          1B8E0080F6FFBFF Default_Id
30 Hex (Bits 25-144) = 8DC700407B332025D941B78020001B

    26    30    34    38    42    46    50    54    58    62    66    70    74    78    82
    |     |     |     |     |     |     |     |     |     |     |     |     |
1 0001 1011 1000 1110 0000 0000 1000 0000 1111 0110 0110 0110 0100 0000 0100
    1011 1011 0010 1000 0011 0110 1111 0000 0000 0100 0000 0000 0000 0011 011
    |     |     |     |     |     |     |     |     |     |     |     |     |
    86    90    94    98   102   106   110   114   118   122   126   130   134   138   142

Field Name      Bit Pos  Value Decode                                Bits
-----
Format Flag     25       1 Long Message                                1
Protocol Flag   26       0 Location NEW                                0
MID             27- 36   220 Unallocated NON-SPEC                    0011 0111 00
Protocol Code    37- 40   7 PLB - Serial (Standard)                   0111
CSTA Number     41- 50   1                                           0000 0000 01
Serial Number    51- 64   123                                           0000 0001 1110 11
Coarse Position  65- 85   Data Present
Latitude Flag    65       0 North:                                    0
Latitude Degrees 66- 72   51 51 deg                                    0110 011
Latitude Min /15 73- 74   0 0 min                                     00
Longitude Flag   75       1 West:                                     1
Longitude Degrees 76- 83   1 1 deg                                    0000 0001
Longitude Min /15 84- 85   0 0 min                                     00
BCH Encoded      86-106   Errors=0                                1011 1011 0010 1000 0011 0
BCH Generated     86-106   1011 1011 0010 1000 0011 0
Long Message     107-144   Data Present
Fixed Bits       107-109   110
Fixed Bit        110       1                                           1
Encode Pos Device 111     1 Internal                                   1
121.5 Homing     112     1 YES                                       1
Position Change  113-132   Data Present
Lat. Change Sign 113     1 Plus:                                       1
Lat. Chg. Minutes 114-118 0 0 min                                    0000 0
Lat. Chg. Secs /4 119-122 0 0 sec                                    0000
Long Change Sign 123     1 Plus:                                       1
Long Chg. Minutes 124-128 0 0 min                                    0000 0
Long Chg. Secs /4 129-132 0 0 sec                                    0000
Resultant Position --> 51.00000 LAT, -1.00000 LONG
                    51 deg 0 min 0 sec N, 1 deg 0 min 0 sec W
BCH Encoded      133-144   Errors=0                                0000 0001 1011
BCH Generated     133-144   0000 0001 1011
=====
```

Standard Location Protocol – Normal Message : GPS Position N 51°19'22" W 1°22'33"

TOTAL HEX MESSAGE = FFFE2F8DC700407B332025D941B7CD768FB9

```
=====
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 1B8E0080F666404          1B8E0080F6FFBFF Default_Id
30 Hex (Bits 25-144) = 8DC700407B332025D941B7CD768FB9

    26    30    34    38    42    46    50    54    58    62    66    70    74    78    82
    |     |     |     |     |     |     |     |     |     |     |     |     |
1 0001 1011 1000 1110 0000 0000 1000 0000 1111 0110 0110 0110 0100 0000 0100
    1011 1011 0010 1000 0011 0110 1111 1001 1010 1110 1101 0001 1111 0111 001
    |     |     |     |     |     |     |     |     |     |     |     |     |
    86    90    94    98   102   106   110   114   118   122   126   130   134   138   142

Field Name      Bit Pos    Value Decode      Bits
-----
Format Flag     25         1 Long Message      1
Protocol Flag   26         0 Location NEW      0
MID             27- 36     220 Unallocated NON-SPEC 0011 0111 00
Protocol Code    37- 40     7 PLB - Serial (Standard) 0111
CSTA Number     41- 50     1                     0000 0000 01
Serial Number    51- 64    123                     0000 0001 1110 11
Coarse Position  65- 85     Data Present
Latitude Flag    65         0 North:          0
Latitude Degrees 66- 72    51 51 deg          0110 011
Latitude Min /15 73- 74    0 0 min           00
Longitude Flag   75         1 West:          1
Longitude Degrees 76- 83    1 1 deg          0000 0001
Longitude Min /15 84- 85    0 0 min           00
BCH Encoded      86-106    Errors=0          1011 1011 0010 1000 0011 0
BCH Generated    86-106    1011 1011 0010 1000 0011 0
Long Message     107-144    Data Present
Fixed Bits       107-109
Fixed Bit        110         1                     110
Encode Pos Device 111         1 Internal          1
121.5 Homing     112         1 YES              1
Position Change  113-132    Data Present
Lat. Change Sign 113         1 Plus:          1
Lat. Chg. Minutes 114-118 19 19 min        1001 1
Lat. Chg. Secs /4 119-122 5 20 sec          0101
Long Change Sign 123         1 Plus:          1
Long Chg. Minutes 124-128 22 22 min        1011 0
Long Chg. Secs /4 129-132 8 32 sec          1000
Resultant Position --> 51.32222 LAT, -1.37556 LONG
                    51 deg 19 min 20 sec N, 1 deg 22 min 32 sec W
BCH Encoded     133-144    Errors=0          1111 1011 1001
BCH Generated    133-144    1111 1011 1001
=====
```

Standard Short Location Protocol – Self-test Message

TOTAL HEX MESSAGE = FFFED00DC700407B7FDFF9CD3DB7

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 1B8E0080F6FFBFF      1B8E0080F6FFBFF Default_Id
30 Hex (Bits 25-144) = 0DC700407B7FDFF9CD3DB7000000000

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |   |   |   |   |   |   |   |   |   |   |   |   |
0 0001 1011 1000 1110 0000 0000 1000 0000 1111 0110 1111 1111 1011 1111 1111
    0011 1001 1010 0111 1011 0110 1110 0000 0000 0000 0000 0000 0000 0000 000
    |   |   |   |   |   |   |   |   |   |   |   |   |
    86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos  Value Decode      Bits
-----
Format Flag     25       0 Short Message      0
Protocol Flag   26       0 Location NEW        0
MID             27- 36   220 Unallocated NON-SPEC 0011 0111 00
Protocol Code    37- 40    7 PLB - Serial (Standard) 0111
CSTA Number     41- 50    1                   0000 0000 01
Serial Number    51- 64   123                   0000 0001 1110 11
Coarse Position  65- 85   DEFAULT             0111 1111 1101 1111 1111 1
BCH Encoded      86-106   Errors=0           0011 1001 1010 0111 1011 0
BCH Generated    86-106   0011 1001 1010 0111 1011 0
Fixed Bits      107-109   110
Fixed Bit       110      1                      1
Encode Pos Device 111     1 Internal          1
121.5 Homing     112     1 YES                1
Resultant Position --> Not Defined

=====
```

Standard Short Location Protocol – Normal Message : No GPS data

TOTAL HEX MESSAGE = FFFE2F0DC700407B7FDFF9CD3DB7

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 1B8E0080F6FFBFF      1B8E0080F6FFBFF Default_Id
30 Hex (Bits 25-144) = 0DC700407B7FDFF9CD3DB7000000000

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |   |   |   |   |   |   |   |   |   |   |   |   |
0 0001 1011 1000 1110 0000 0000 1000 0000 1111 0110 1111 1111 1011 1111 1111
    0011 1001 1010 0111 1011 0110 1110 0000 0000 0000 0000 0000 0000 0000 000
    |   |   |   |   |   |   |   |   |   |   |   |   |
    86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos    Value Decode                                Bits
-----
Format Flag     25         0 Short Message                                0
Protocol Flag   26         0 Location NEW                                0
MID             27- 36     220 Unallocated NON-SPEC                    0011 0111 00
Protocol Code   37- 40     7 PLB - Serial (Standard)                    0111
CSTA Number     41- 50     1                                           0000 0000 01
Serial Number   51- 64     123                                           0000 0001 1110 11
Coarse Position 65- 85     DEFAULT                                0111 1111 1101 1111 1111 1
BCH Encoded     86-106     Errors=0                                0011 1001 1010 0111 1011 0
BCH Generated   86-106     0011 1001 1010 0111 1011 0
Fixed Bits      107-109                                         110
Fixed Bit       110         1                                           1
Encode Pos Device 111       1 Internal                                1
121.5 Homing    112       1 YES                                           1
Resultant Position --> Not Defined

=====
```

Standard Short Location Protocol – Normal Message : GPS Position N 51°0'0" W 1°0'0"

TOTAL HEX MESSAGE = FFFE2F0DC700407B33202621E2B7

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 1B8E0080F666404          1B8E0080F6FFBFF Default_Id
30 Hex (Bits 25-144) = 0DC700407B33202621E2B7000000000

    26    30    34    38    42    46    50    54    58    62    66    70    74    78    82
    |     |     |     |     |     |     |     |     |     |     |     |     |
0 0001 1011 1000 1110 0000 0000 1000 0000 1111 0110 0110 0110 0100 0000 0100
   1100 0100 0011 1100 0101 0110 1110 0000 0000 0000 0000 0000 0000 0000 000
   |     |     |     |     |     |     |     |     |     |     |     |     |
   86    90    94    98   102   106   110   114   118   122   126   130   134   138   142

Field Name      Bit Pos    Value Decode                                Bits
-----
Format Flag     25         0 Short Message                                0
Protocol Flag   26         0 Location NEW                                0
MID             27- 36     220 Unallocated NON-SPEC                    0011 0111 00
Protocol Code   37- 40     7 PLB - Serial (Standard)                    0111
CSTA Number     41- 50     1                                           0000 0000 01
Serial Number   51- 64     123                                           0000 0001 1110 11
Coarse Position 65- 85     Data Present
Latitude Flag   65         0 North:                                    0
Latitude Degrees 66- 72     51 51 deg                                    0110 011
Latitude Min /15 73- 74     0 0 min                                     00
Longitude Flag  75         1 West:                                       1
Longitude Degrees 76- 83     1 1 deg                                    0000 0001
Longitude Min /15 84- 85     0 0 min                                     00
BCH Encoded     86-106     Errors=0                                1100 0100 0011 1100 0101 0
BCH Generated   86-106     1100 0100 0011 1100 0101 0
Fixed Bits      107-109                                         110
Fixed Bit       110         1                                           1
Encode Pos Device 111       1 Internal                                   1
121.5 Homing    112       1 YES                                           1
Resultant Position --> 51.00000 LAT, -1.00000 LONG
                    51 deg 0 min 0 sec N, 1 deg 0 min 0 sec W
=====
```

Field Name	Bit Pos	Value	Decode	Bits
Format Flag	25	0	Short Message	0
Protocol Flag	26	0	Location NEW	0
MID	27- 36	220	Unallocated NON-SPEC	0011 0111 00
Protocol Code	37- 40	7	PLB - Serial (Standard)	0111
CSTA Number	41- 50	1		0000 0000 01
Serial Number	51- 64	123		0000 0001 1110 11
Coarse Position	65- 85		Data Present	
Latitude Flag	65	0	North:	0
Latitude Degrees	66- 72	51	51 deg	0110 011
Latitude Min /15	73- 74	1	15 min	01
Longitude Flag	75	1	West:	1
Longitude Degrees	76- 83	1	1 deg	0000 0001
Longitude Min /15	84- 85	2	30 min	10
BCH Encoded	86-106		Errors=0	1001 0101 1011 0000 0011 1
BCH Generated	86-106			1001 0101 1011 0000 0011 1
Fixed Bits	107-109			110
Fixed Bit	110	1		1
Encode Pos Device	111	1	Internal	1
121.5 Homing	112	1	YES	1
Resultant Position		-->	51.25000 LAT, -1.50000 LONG	
			51 deg 15 min 0 sec N, 1 deg 30 min 0 sec W	

National Location Protocol – Self-test Message

TOTAL HEX MESSAGE = FFFED00DCB001EDFC0FF063A64B7

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 1B96003DBF81FE0      1B96003DBF81FE0 Default_Id
30 Hex (Bits 25-144) = 0DCB001EDFC0FF063A64B7000000000

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |   |   |   |   |   |   |   |   |   |   |   |   |
0 0001 1011 1001 0110 0000 0000 0011 1101 1011 1111 1000 0001 1111 1110 0000
    1100 0111 0100 1100 1001 0110 1110 0000 0000 0000 0000 0000 0000 0000 0000
    |   |   |   |   |   |   |   |   |   |   |   |   |
    86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos      Value Decode      Bits
-----
Format Flag      25           0 Short Message      0
Protocol Flag    26           0 Location NEW        0
MID              27- 36      220 Unallocated NON-SPEC 0011 0111 00
Protocol Code     37- 40      11 PLB Serial (National) 1011
Serial Number     41- 58      123           0000 0000 0001 1110 11
Medium Position   59- 85      DEFAULT      0111 1111 0000 0011 1111 1100 000
BCH Encoded       86-106      Errors=0      1100 0111 0100 1100 1001 0
BCH Generated     86-106      1100 0111 0100 1100 1001 0
Fixed Bits       107-109
Fixed Bit        110          1                  1
Encode Pos Device 111          1 Internal          1
121.5 Homing     112          1 YES                  1
=====
```

National Location Protocol – Normal Message : No GPS data

TOTAL HEX MESSAGE = FFFE2F8DCB001EDFC0FF05C2C7B79F3C0010

```
=====
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 1B96003DBF81FE0      1B96003DBF81FE0 Default_Id
30 Hex (Bits 25-144) = 8DCB001EDFC0FF05C2C7B79F3C0010

    26    30    34    38    42    46    50    54    58    62    66    70    74    78    82
    |     |     |     |     |     |     |     |     |     |     |     |     |
1 0001 1011 1001 0110 0000 0000 0011 1101 1011 1111 1000 0001 1111 1110 0000
    1011 1000 0101 1000 1111 0110 1111 0011 1110 0111 1000 0000 0000 0010 000
    |     |     |     |     |     |     |     |     |     |     |     |     |
    86    90    94    98   102   106   110   114   118   122   126   130   134   138   142

Field Name      Bit Pos   Value Decode                                     Bits
-----
Format Flag     25        1 Long Message                                     1
Protocol Flag   26        0 Location NEW                                     0
MID             27- 36     220 Unallocated NON-SPEC                      0011 0111 00
Protocol Code    37- 40     11 PLB Serial (National)                      1011
Serial Number    41- 58     123                                           0000 0000 0001 1110 11
Medium Position  59- 85     DEFAULT 0111 1111 0000 0011 1111 1100 000
BCH Encoded      86-106     Errors=0 1011 1000 0101 1000 1111 0
BCH Generated    86-106     1011 1000 0101 1000 1111 0
Long Message     107-144    Data Present
Fixed Bits       107-109
More Data Flag   110        1 Position Data in bits 113-132              110
Encode Pos Device 111        1 Internal                                  1
121.5 Homing     112        1 YES                                       1
Position Change  113-126    DEFAULT 1001 1111 0011 11
Resultant Position --> Not Defined
National Use     127-132    0 Default 0000 00
BCH Encoded      133-144    Errors=0 0000 0001 0000
BCH Generated    133-144    0000 0001 0000
=====
```

TOTAL HEX MESSAGE = FFFED08DCB001ECCC1010728D5F781000D6D

	26	30	34	38	42	46	50	54	58	62	66	70	74	78	82
1	0001 1110	1011 0101	1001 0001	0110 1010	0000 1011	0000 1110	0011 1111	1101 0000	1001 0010	1001 0000	1000 0000	0010 0001	0000 1010	0010 1101	0000 101
	86	90	94	98	102	106	110	114	118	122	126	130	134	138	142

Field Name	Bit Pos	Value	Decode	Bits
Format Flag	25	1	Long Message	1
Protocol Flag	26	0	Location NEW	0
MID	27- 36	220	Unallocated NON-SPEC	0011 0111 00
Protocol Code	37- 40	11	PLB Serial (National)	1011
Serial Number	41- 58	123		0000 0000 0001 1110 11
Medium Position	59- 85		Data Present	
Latitude Flag	59	0	North:	0
Latitude Degrees	60- 66	51	51 deg	0110 011
Lat. Minutes /2	67- 71	0	0 min	0000 0
Longitude Flag	72	1	West:	1
Long. Degrees	73- 80	1	1 deg	0000 0001
Long. Minutes /2	81- 85	0	0 min	0000 0
BCH Encoded	86-106		Errors=0	1110 0101 0001 1010 1011 1
BCH Generated	86-106			1110 0101 0001 1010 1011 1
Long Message	107-144		Data Present	
Fixed Bits	107-109			110
More Data Flag	110	1	Position Data in bits 113-132	1
Encode Pos Device	111	1	Internal	1
121.5 Homing	112	1	YES	1
Position Change	113-126		Data Present	
Lat. Change Sign	113	1	Plus:	1
Lat. Chg. Minutes	114-115	0	0 min	00
Lat. Chg. Secs /4	116-119	0	0 sec	0000
Long Change Sign	120	1	Plus:	1
Long Chg. Minutes	121-122	0	0 min	00
Long Chg. Secs /4	123-126	0	0 sec	0000
Resultant Position		-->	51.00000 LAT, -1.00000 LONG	
	51 deg	0 min	0 sec N, 1 deg 0 min 0 sec W	
National Use	127-132	0	Default	0000 00
BCH Encoded	133-144		Errors=0	1101 0110 1101
BCH Generated	133-144			1101 0110 1101

TOTAL HEX MESSAGE = FFFE2F8DCB001ECCD5015D0623B7132008F7

Field Name	Bit Pos	Value	Decode	Bits
Format Flag	25	1	Long Message	1
Protocol Flag	26	0	Location NEW	0
MID	27- 36	220	Unallocated NON-SPEC	0011 0111 00
Protocol Code	37- 40	11	PLB Serial (National)	1011
Serial Number	41- 58	123		0000 0000 0001 1110 11
Medium Position	59- 85		Data Present	
Latitude Flag	59	0	North:	0
Latitude Degrees	60- 66	51	51 deg	0110 011
Lat. Minutes /2	67- 71	10	20 min	0101 0
Longitude Flag	72	1	West:	1
Long. Degrees	73- 80	1	1 deg	0000 0001
Long. Minutes /2	81- 85	11	22 min	0101 1
BCH Encoded	86-106		Errors=0	1010 0000 1100 0100 0111 0
BCH Generated	86-106			1010 0000 1100 0100 0111 0
Long Message	107-144		Data Present	
Fixed Bits	107-109			110
More Data Flag	110	1	Position Data in bits 113-132	1
Encode Pos Device	111	1	Internal	1
121.5 Homing	112	1	YES	1
Position Change	113-126		Data Present	
Lat. Change Sign	113	0	Minus:	0
Lat. Chg. Minutes	114-115	0	0 min	00
Lat. Chg. Secs /4	116-119	9	36 sec	1001
Long Change Sign	120	1	Plus:	1
Long Chg. Minutes	121-122	0	0 min	00
Long Chg. Secs /4	123-126	8	32 sec	1000
Resultant Position		-->	51.32333 LAT, -1.37556 LONG	
	51 deg 19 min 24 sec N,		1 deg 22 min 32 sec W	
National Use	127-132	0	Default	0000 00
BCH Encoded	133-144		Errors=0	1000 1111 0111
BCH Generated	133-144			1000 1111 0111

National Short Location Protocol – Self-test Message

TOTAL HEX MESSAGE = FFFED00DCB001EDFC0FF063A64B7

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 1B96003DBF81FE0      1B96003DBF81FE0 Default_Id
30 Hex (Bits 25-144) = 0DCB001EDFC0FF063A64B7000000000

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |   |   |   |   |   |   |   |   |   |   |   |   |
0 0001 1011 1001 0110 0000 0000 0011 1101 1011 1111 1000 0001 1111 1110 0000
    1100 0111 0100 1100 1001 0110 1110 0000 0000 0000 0000 0000 0000 0000 0000
    |   |   |   |   |   |   |   |   |   |   |   |   |
    86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos      Value Decode      Bits
-----
Format Flag      25           0 Short Message      0
Protocol Flag    26           0 Location NEW        0
MID              27- 36      220 Unallocated NON-SPEC 0011 0111 00
Protocol Code     37- 40      11 PLB Serial (National) 1011
Serial Number     41- 58      123           0000 0000 0001 1110 11
Medium Position   59- 85      DEFAULT      0111 1111 0000 0011 1111 1100 000
BCH Encoded       86-106      Errors=0      1100 0111 0100 1100 1001 0
BCH Generated     86-106      1100 0111 0100 1100 1001 0
Fixed Bits       107-109
Fixed Bit        110          1                  1
Encode Pos Device 111          1 Internal          1
121.5 Homing     112          1 YES                  1
=====
```

National Short Location Protocol – Normal Message : No GPS data

TOTAL HEX MESSAGE = FFFE2F0DCB001EDFC0FF063A64B7

```
=====
Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 1B96003DBF81FE0      1B96003DBF81FE0 Default_Id
30 Hex (Bits 25-144) = 0DCB001EDFC0FF063A64B7000000000

    26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
    |    |    |    |    |    |    |    |    |    |    |    |    |
0 0001 1011 1001 0110 0000 0000 0011 1101 1011 1111 1000 0001 1111 1110 0000
    1100 0111 0100 1100 1001 0110 1110 0000 0000 0000 0000 0000 0000 0000 0000
    |    |    |    |    |    |    |    |    |    |    |    |    |
    86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name      Bit Pos      Value Decode      Bits
-----
Format Flag      25           0 Short Message      0
Protocol Flag    26           0 Location NEW        0
MID              27- 36      220 Unallocated NON-SPEC 0011 0111 00
Protocol Code     37- 40      11 PLB Serial (National) 1011
Serial Number     41- 58      123           0000 0000 0001 1110 11
Medium Position   59- 85      DEFAULT      0111 1111 0000 0011 1111 1100 000
BCH Encoded       86-106      Errors=0      1100 0111 0100 1100 1001 0
BCH Generated     86-106      1100 0111 0100 1100 1001 0
Fixed Bits       107-109
Fixed Bit        110          1                  1
Encode Pos Device 111          1 Internal          1
121.5 Homing     112          1 YES                  1
=====
```

Field Name	Bit Pos	Value	Decode	Bits
-----	-----	-----	-----	----
Format Flag	25	0	Short Message	0
Protocol Flag	26	0	Location NEW	0
MID	27- 36	220	Unallocated NON-SPEC	0011 0111 00
Protocol Code	37- 40	11	PLB Serial (National)	1011
Serial Number	41- 58	123		0000 0000 0001 1110 11
Medium Position	59- 85		Data Present	
Latitude Flag	59	0	North:	0
Latitude Degrees	60- 66	51	51 deg	0110 011
Lat. Minutes /2	67- 71	0	0 min	0000 0
Longitude Flag	72	1	West:	1
Long. Degrees	73- 80	1	1 deg	0000 0001
Long. Minutes /2	81- 85	0	0 min	0000 0
BCH Encoded	86-106		Errors=0	1001 1010 0000 1110 1101 1
BCH Generated	86-106			1001 1010 0000 1110 1101 1
Fixed Bits	107-109			110
Fixed Bit	110	1		1
Encode Pos Device	111	1	Internal	1
121.5 Homing	112	1	YES	1

	26	30	34	38	42	46	50	54	58	62	66	70	74	78	82
0	0001	1011	1001	0110	0000	0000	0011	1101	1001	1001	1010	1010	0000	0010	1011
	1101	1111	1101	0000	0001	0110	1110	0000	0000	0000	0000	0000	0000	0000	000
	86	90	94	98	102	106	110	114	118	122	126	130	134	138	142

Field Name	Bit Pos	Value	Decode	Bits
Format Flag	25	0	Short Message	0
Protocol Flag	26	0	Location NEW	0
MID	27- 36	220	Unallocated NON-SPEC	0011 0111 00
Protocol Code	37- 40	11	PLB Serial (National)	1011
Serial Number	41- 58	123		0000 0000 0001 1110 11
Medium Position	59- 85		Data Present	
Latitude Flag	59	0	North:	0
Latitude Degrees	60- 66	51	51 deg	0110 011
Lat. Minutes /2	67- 71	10	20 min	0101 0
Longitude Flag	72	1	West:	1
Long. Degrees	73- 80	1	1 deg	0000 0001
Long. Minutes /2	81- 85	11	22 min	0101 1
BCH Encoded	86-106		Errors=0	1101 1111 1101 0000 0001 0
BCH Generated	86-106			1101 1111 1101 0000 0001 0
Fixed Bits	107-109			110
Fixed Bit	110	1		1
Encode Pos Device	111	1	Internal	1
121.5 Homing	112	1	YES	1