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

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Report No. RM608213

PREPARED FOR

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DISTRIBUTION

McMurdo Ltd	Mr R Read	Copy No. 1
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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:	16th May 2001
Start of Test:	6th June 2001
Finish of Test:	9th 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) : ≈ 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

$ERP_{LOSS} = Pt_{ambient} - Pt_{EOL} = -0.52$ dB

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

$ERP_{min\ EOL}$ = **MIN [** ERP_{min} **,** $(ERP_{min} - ERP_{LOSS})$ **]** = 34.36 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 *after open circuit, short circuit, then while VSWR is 3:1, measure:*						
▪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)						See plots on Pages 17-21
▪Soak temperature:			T_{soak}= -8 °C			
▪Measurement temperature:			T_{meas}= +22 °C			
the following parameters are to be met within 15 minutes of beacon turn on and maintained for 2 hours:						
▪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****				See plots on Pages 32-36
▪duration	>24	hours	24 hours at T_{min}=-40°C	
▪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	✓	✓	
11. TEMPERATURE GRADIENT**** (5°C/hr)				See plots on Pages 22-31
▪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	✓	✓	
12. LONG TERM FREQUENCY STABILITY	406.020-406.030 or 406.023-406.030***	MHz		See Annex A
▪data provided		✓	✓	
13. PROTECTION AGAINST CONTINUOUS TRANSMISSION	≤45	Seconds		See Annex A
▪description provided		✓	✓	
14. SATELLITE QUALITATIVE TESTS****				See Annex B
▪results provided	Successfully located by satellites/LUT	✓	✓	

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

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

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

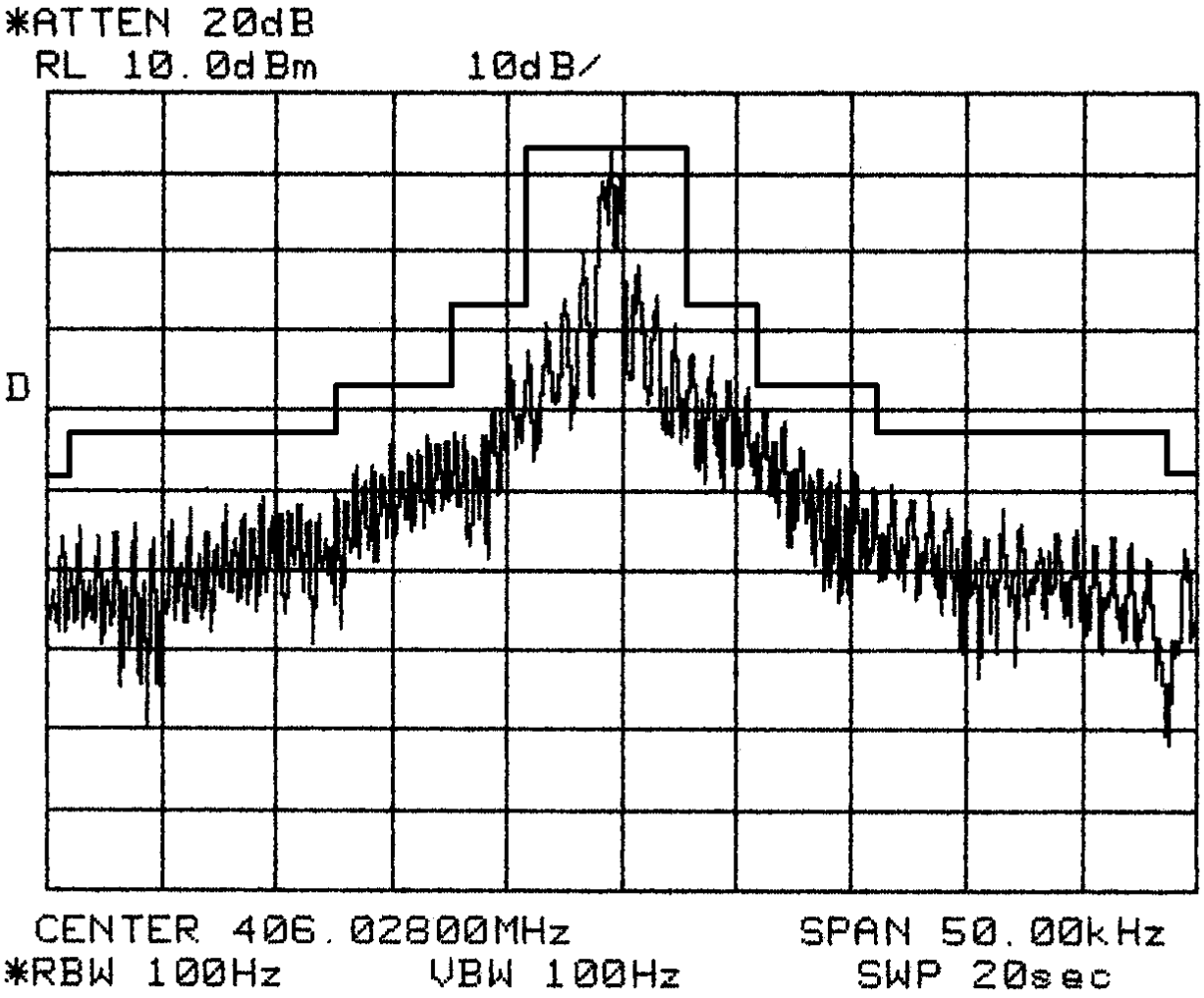
Table 2: SUMMARY OF 406 MHz BEACON TEST RESULTS – continued

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 degredation due to navigation device, interface or signal failure or malfunction	no degradation	✓	✓	

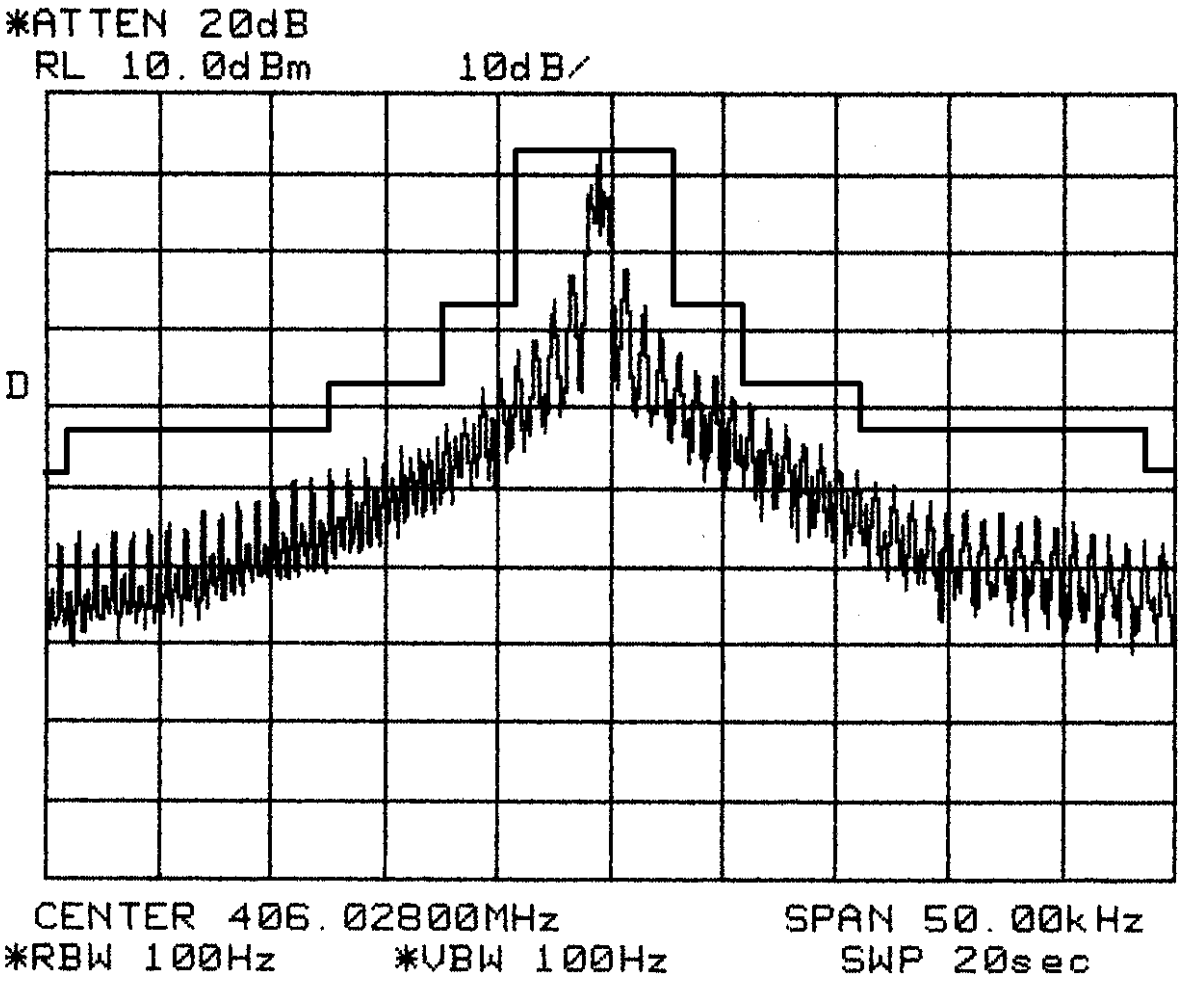
*the tick mark (✓) can be used where indicated to record that the requirement is met (no value needs to be shown)
** if ($T_{R\,max}$ - $T_{R\,min}$) > 1 second, the manufacturer must provide a technical explanation, as described in section A3.1.1
***From 1 January 2000 new 406 MHz beacon models submitted 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
.....

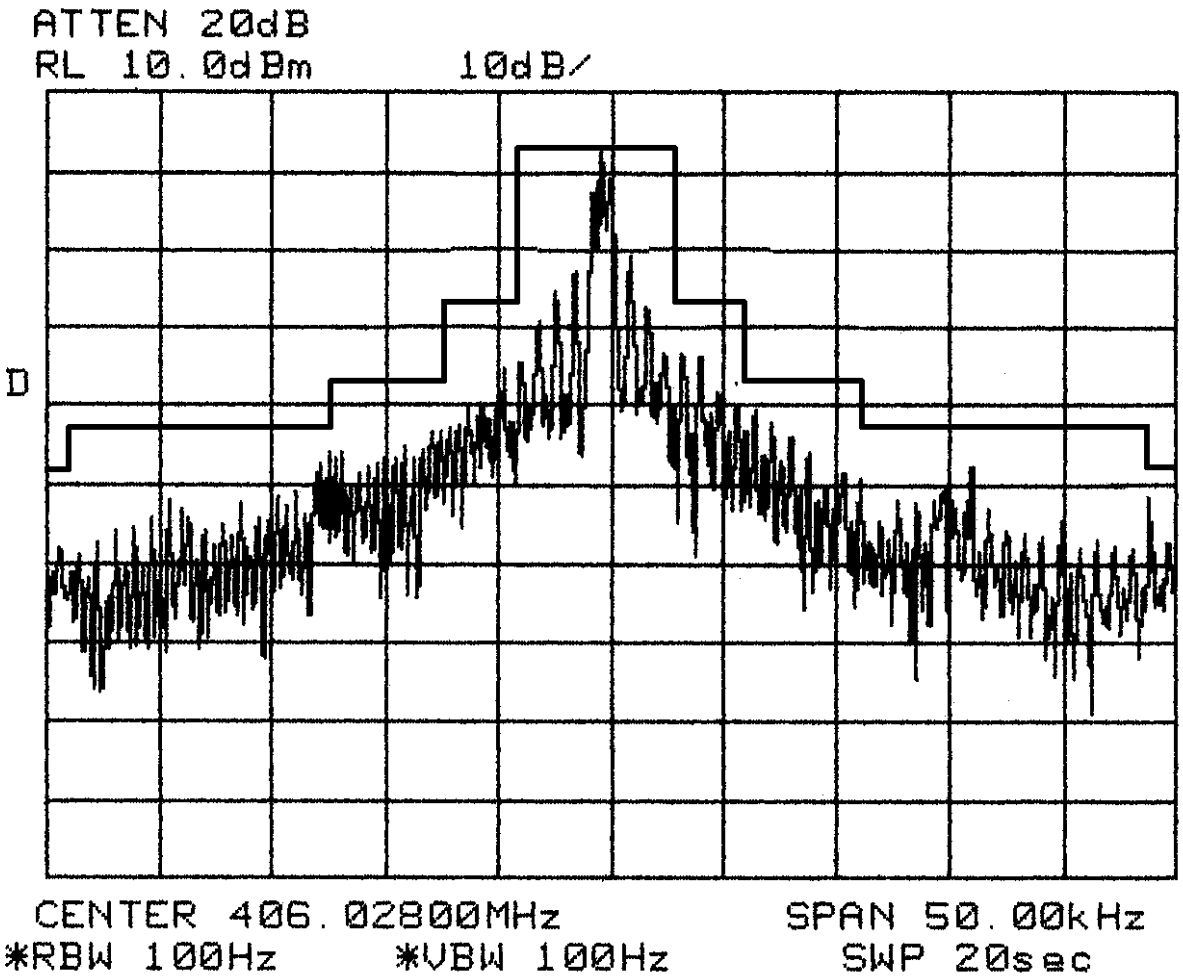
Spurious Emissions – Ambient Temperature +22°C



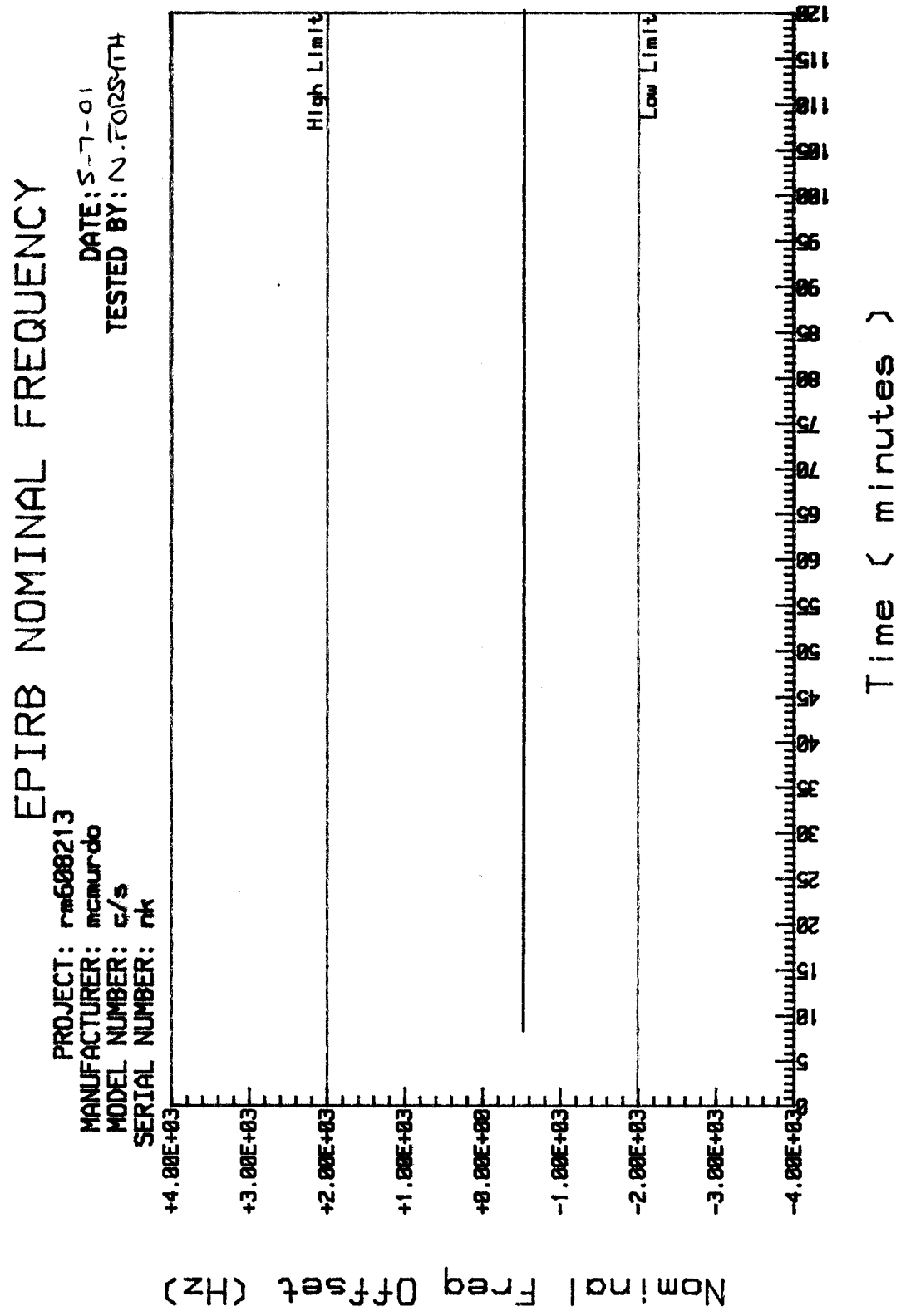
Spurious Emissions – Minimum Temperature -40°C



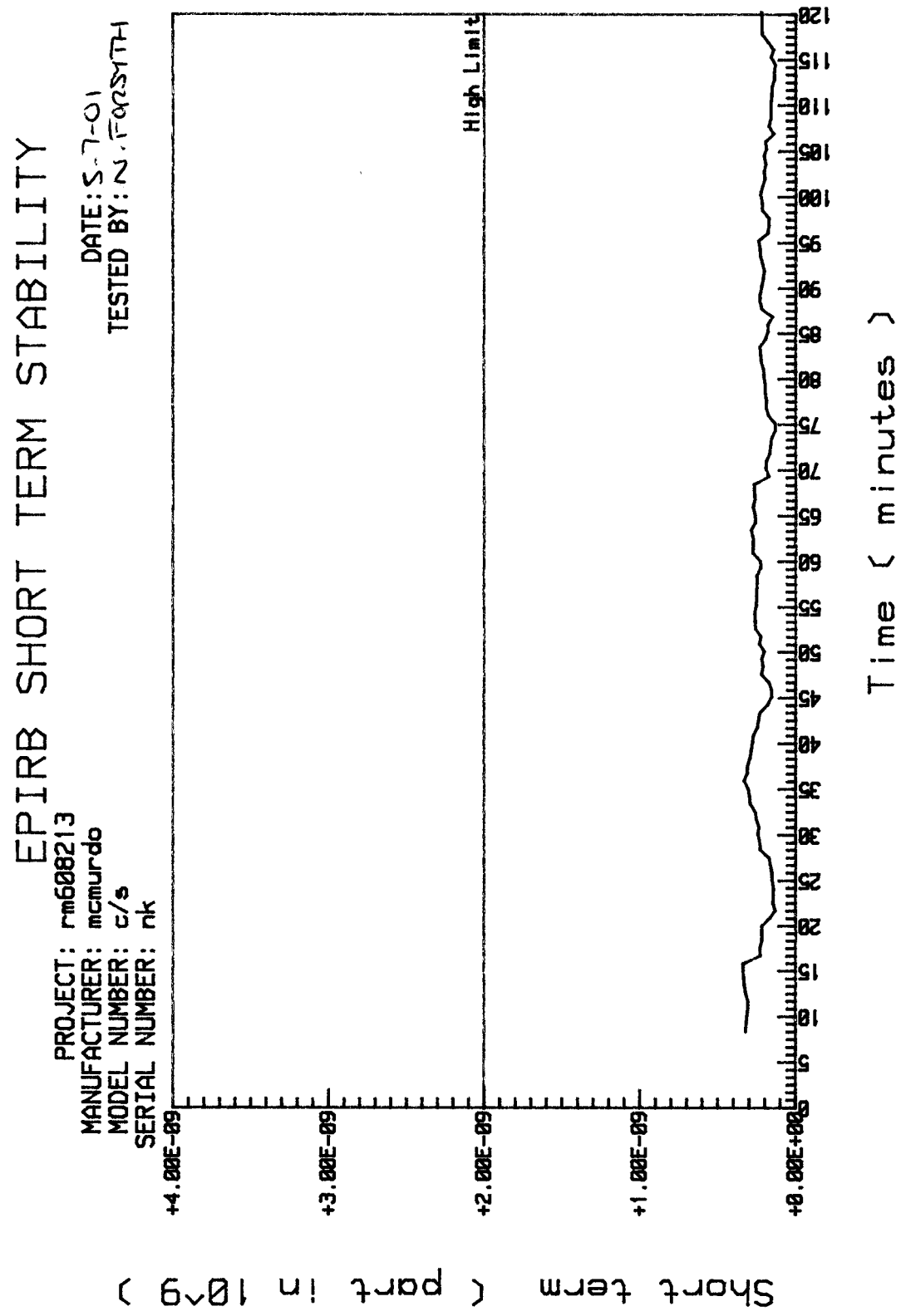
Spurious Emissions – Maximum Temperature +55°C



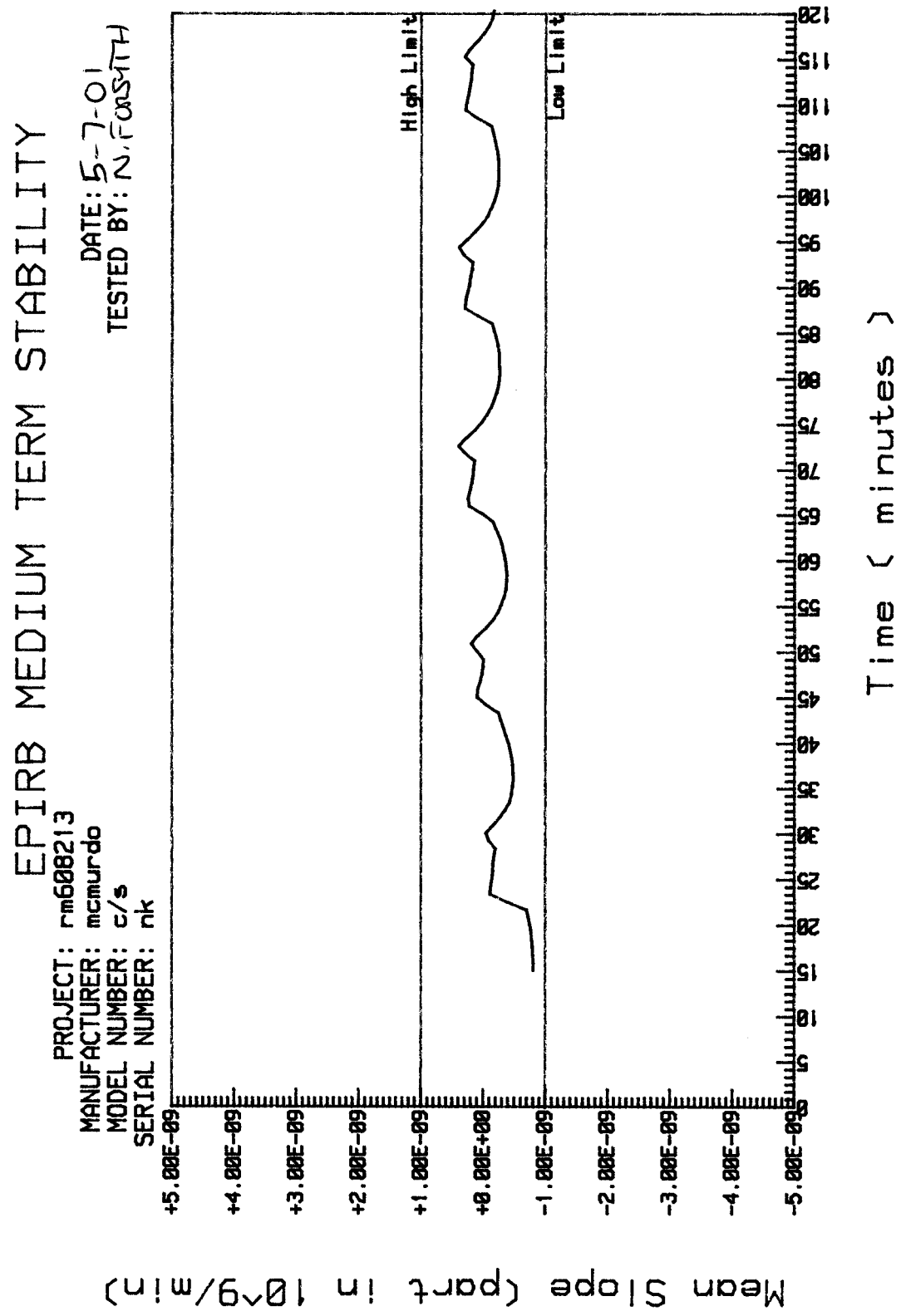
Thermal Shock – Nominal frequency



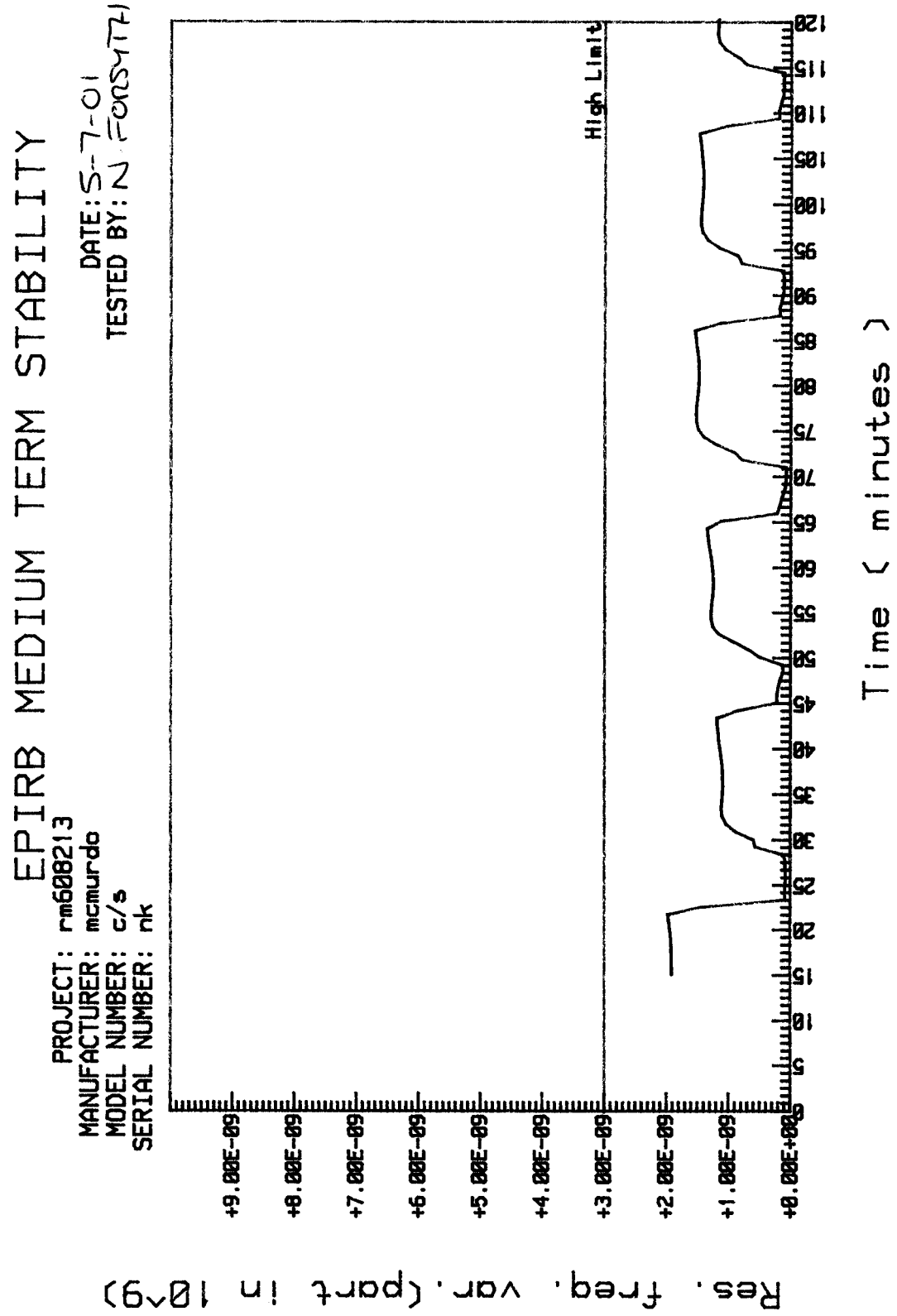
Thermal Shock – Short term stability



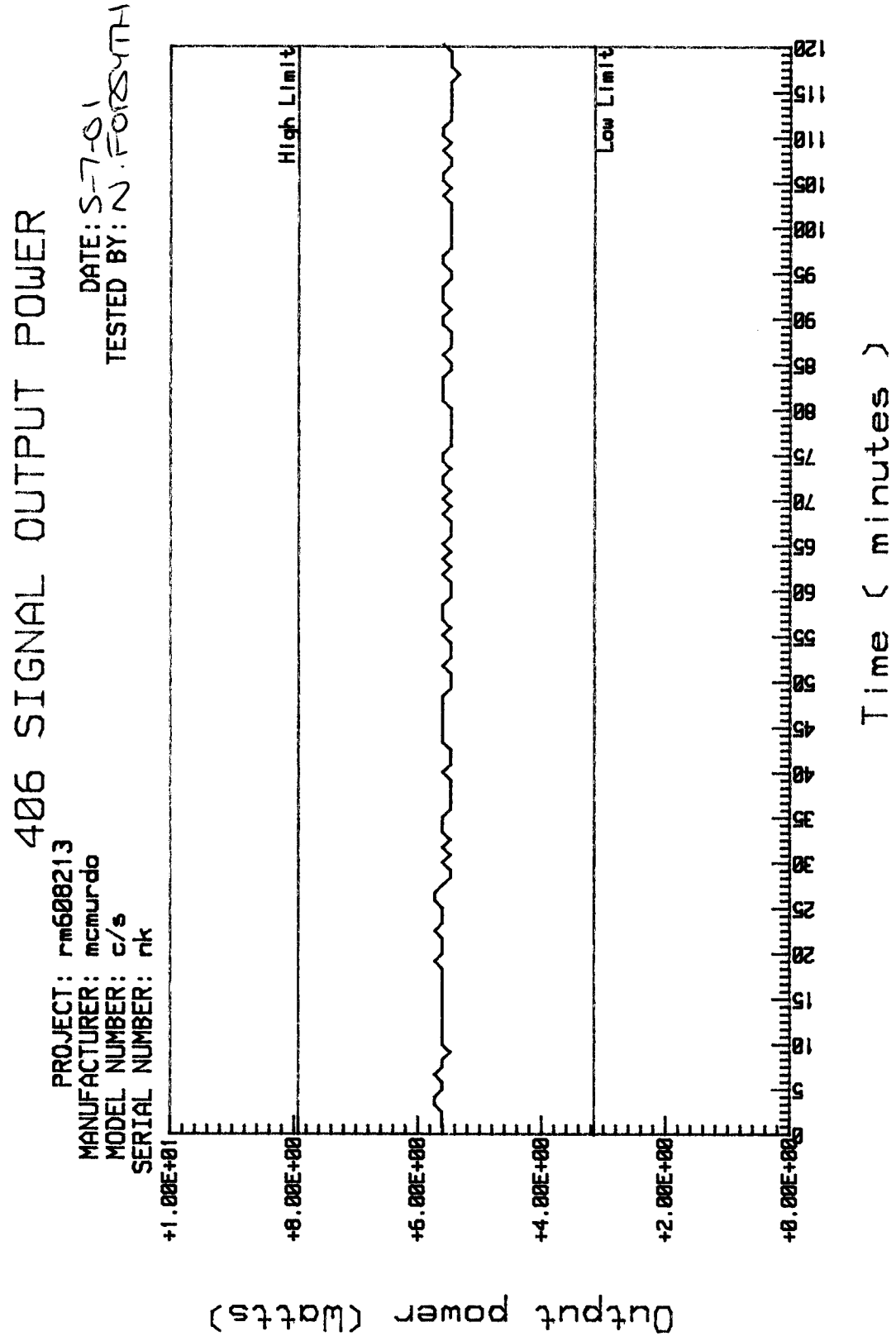
Thermal Shock – Medium term stability - Mean slope



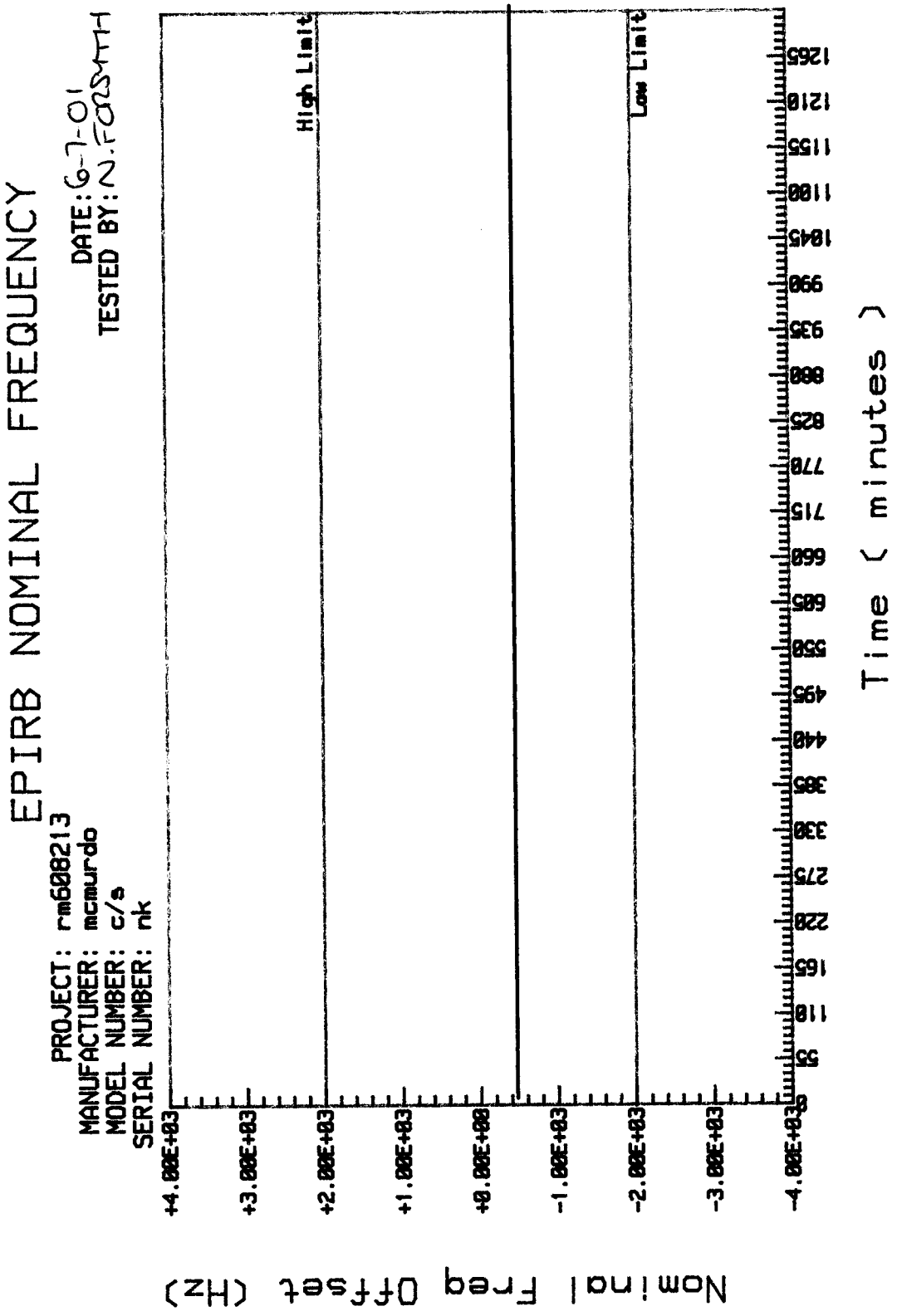
Thermal Shock – Medium term stability – Residual frequency variation



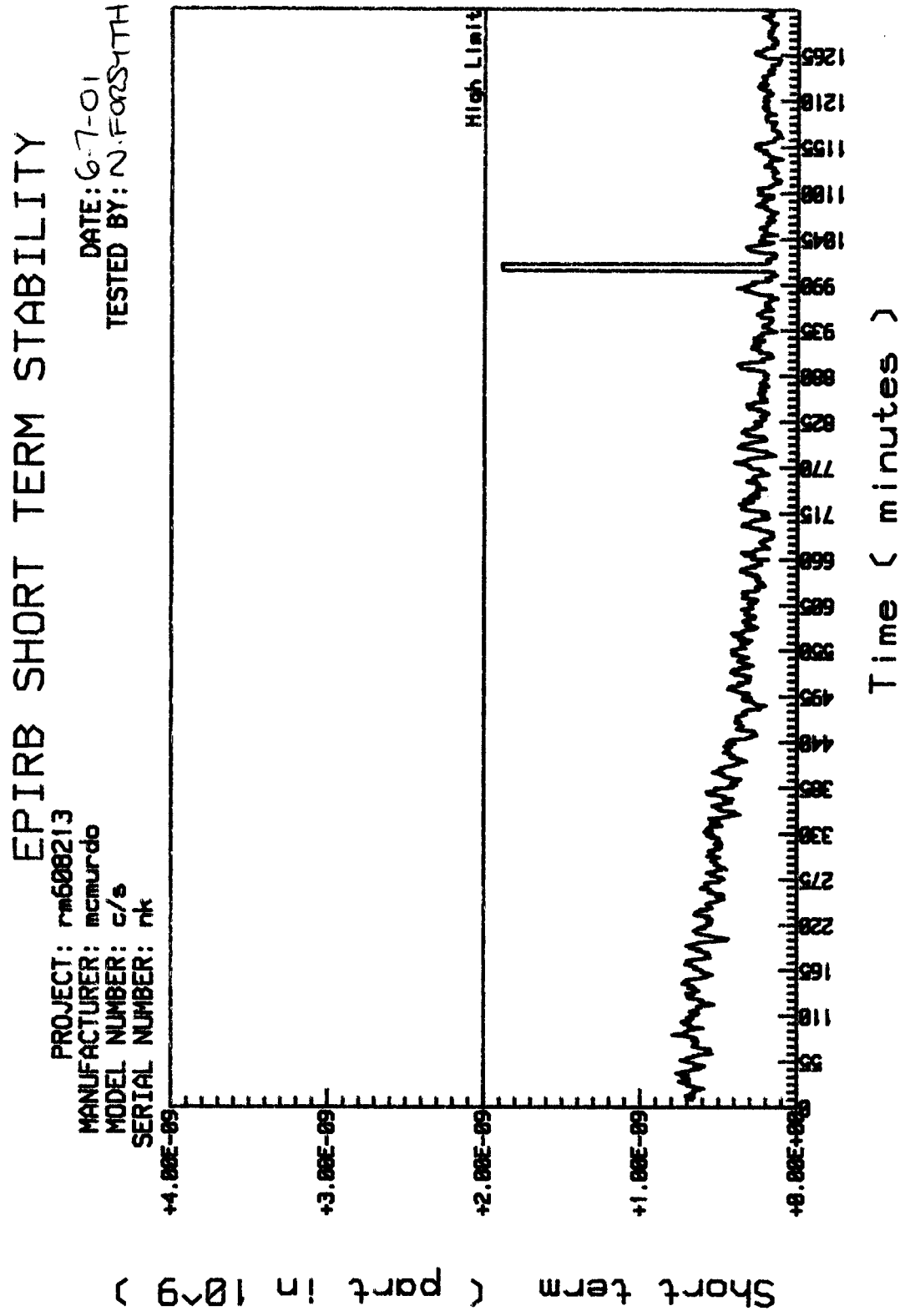
Thermal Shock – Output power



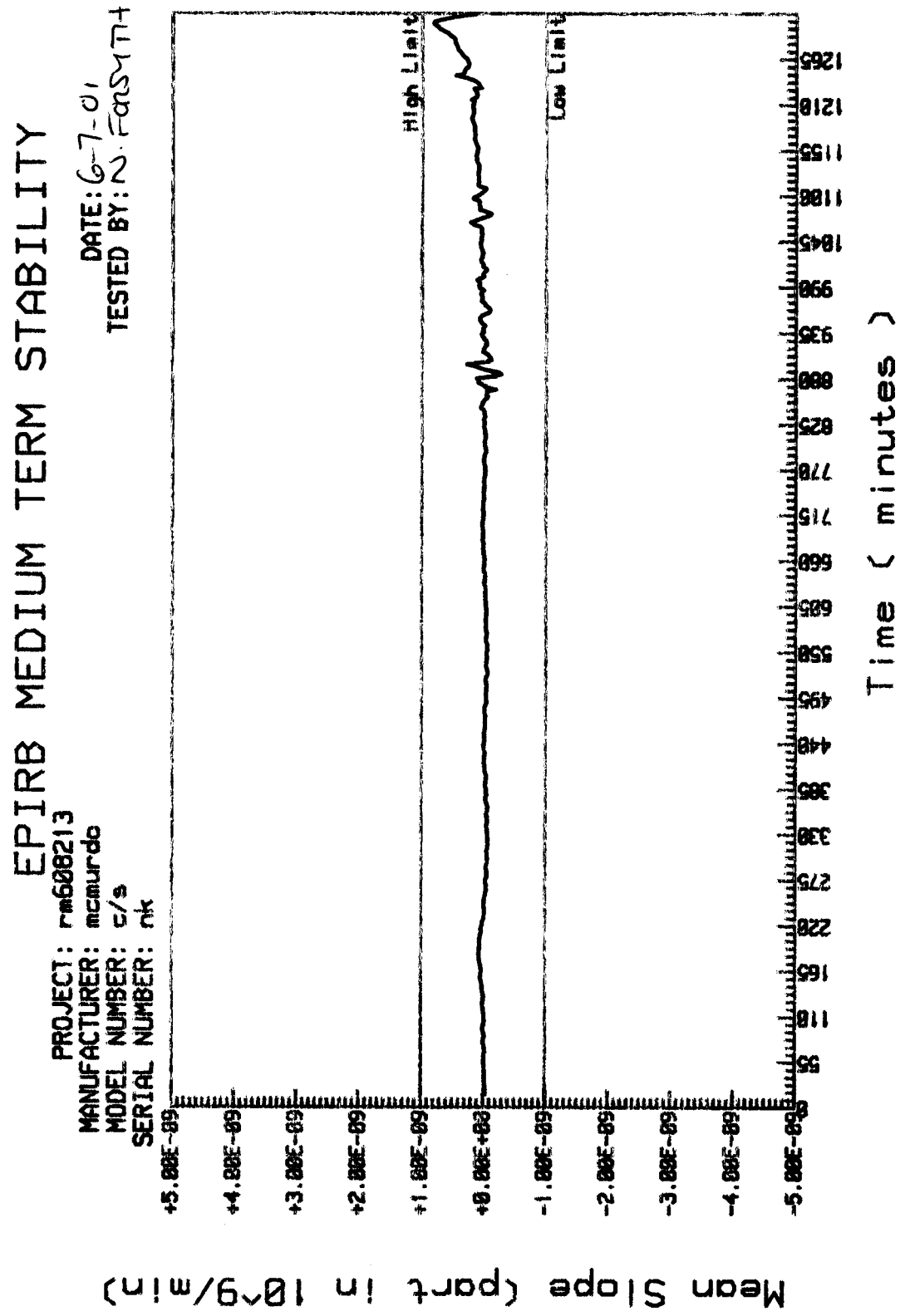
Temperature Gradient - Up – Nominal frequency



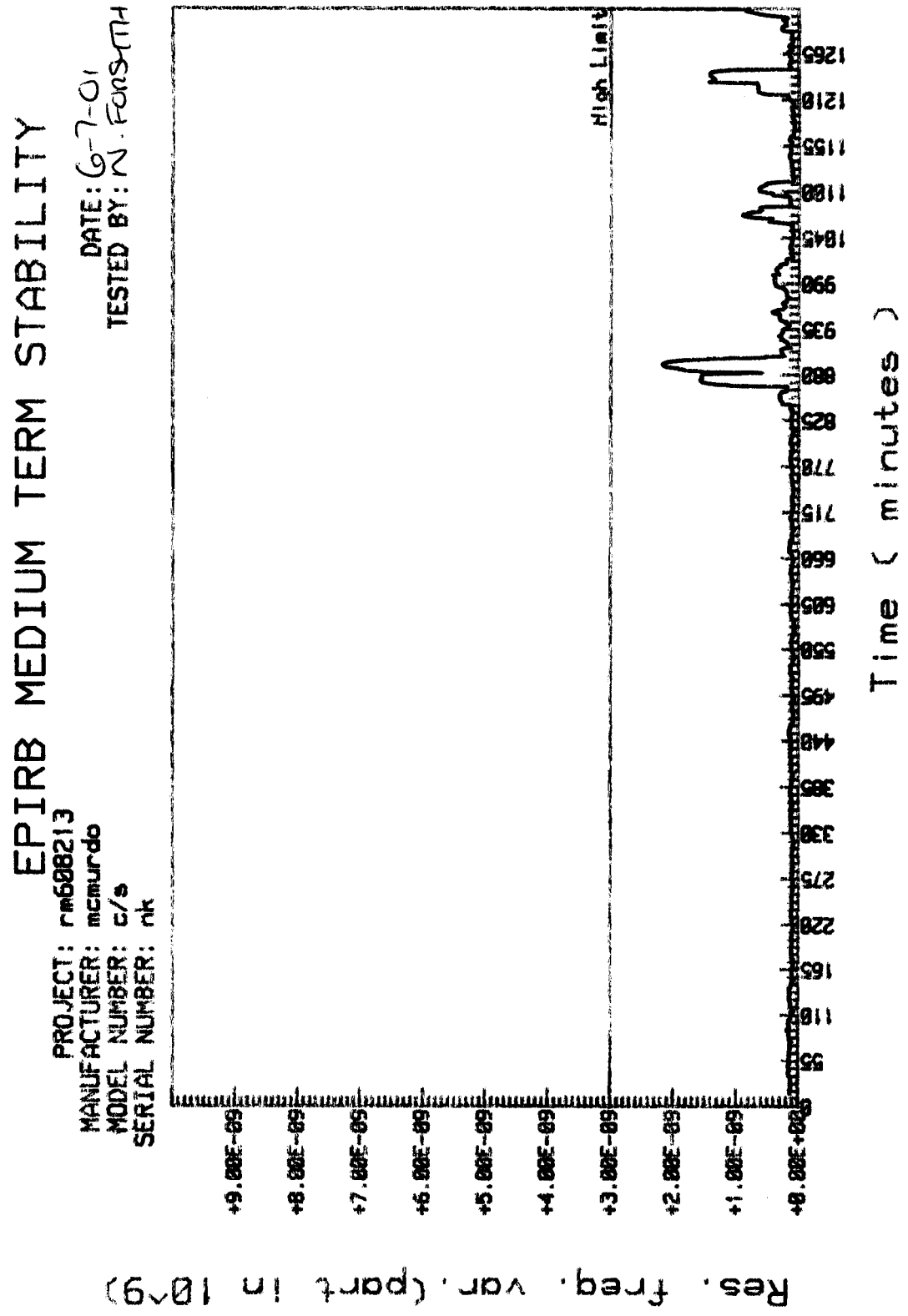
Temperature Gradient - Up – Short term stability



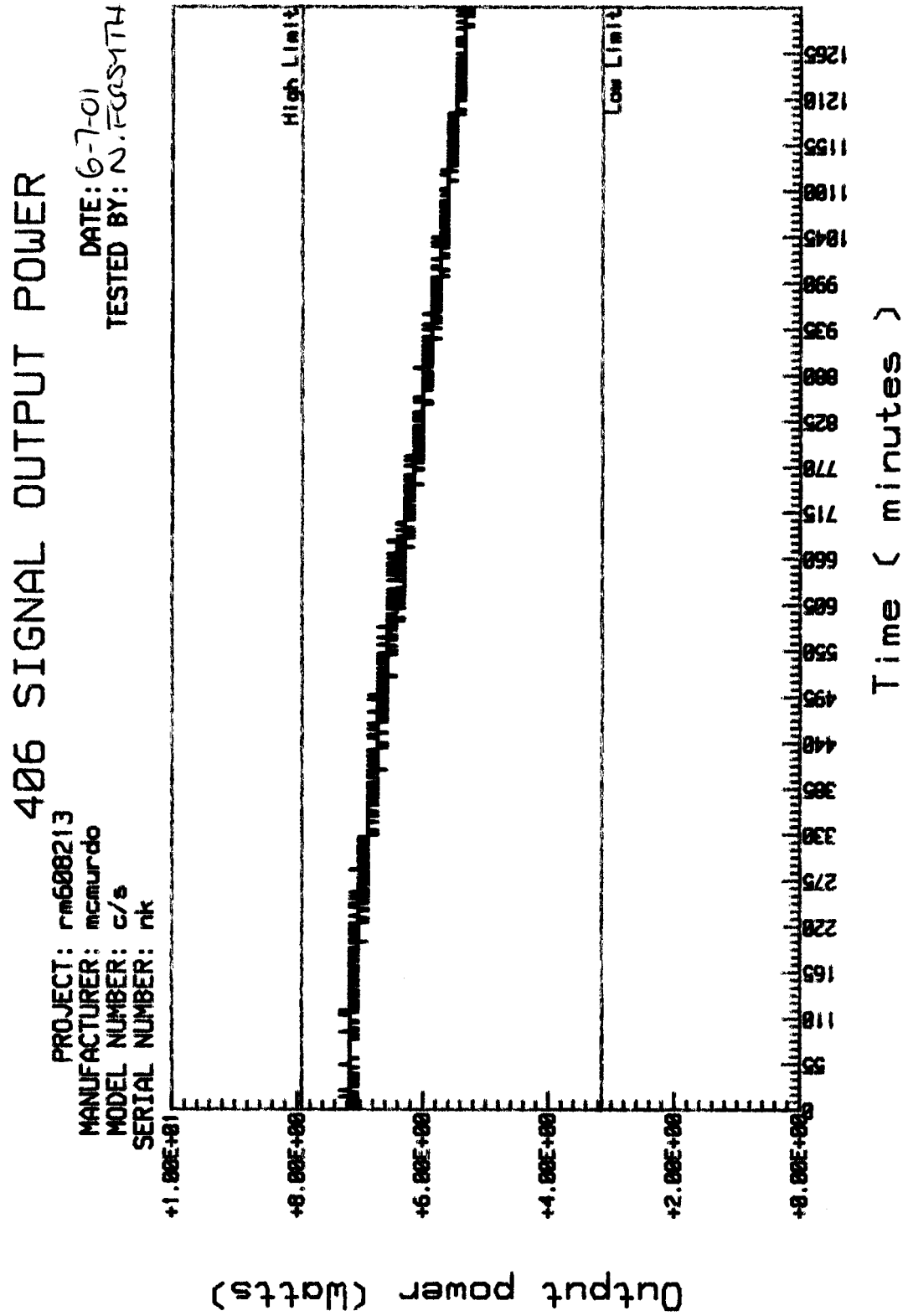
Temperature Gradient - Up – Medium term stability - Mean slope



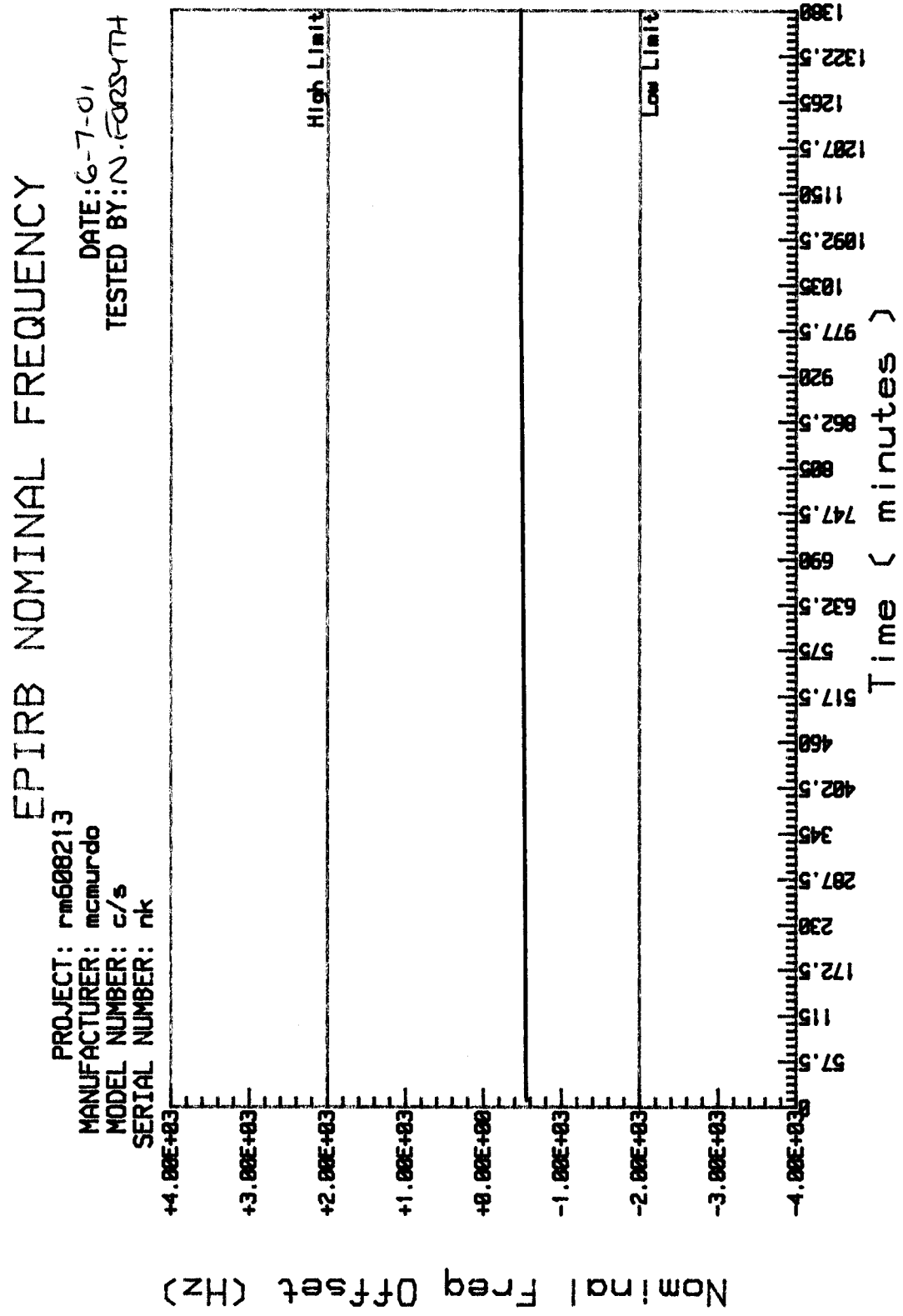
Temperature Gradient - Up – Medium term stability – Residual frequency variation



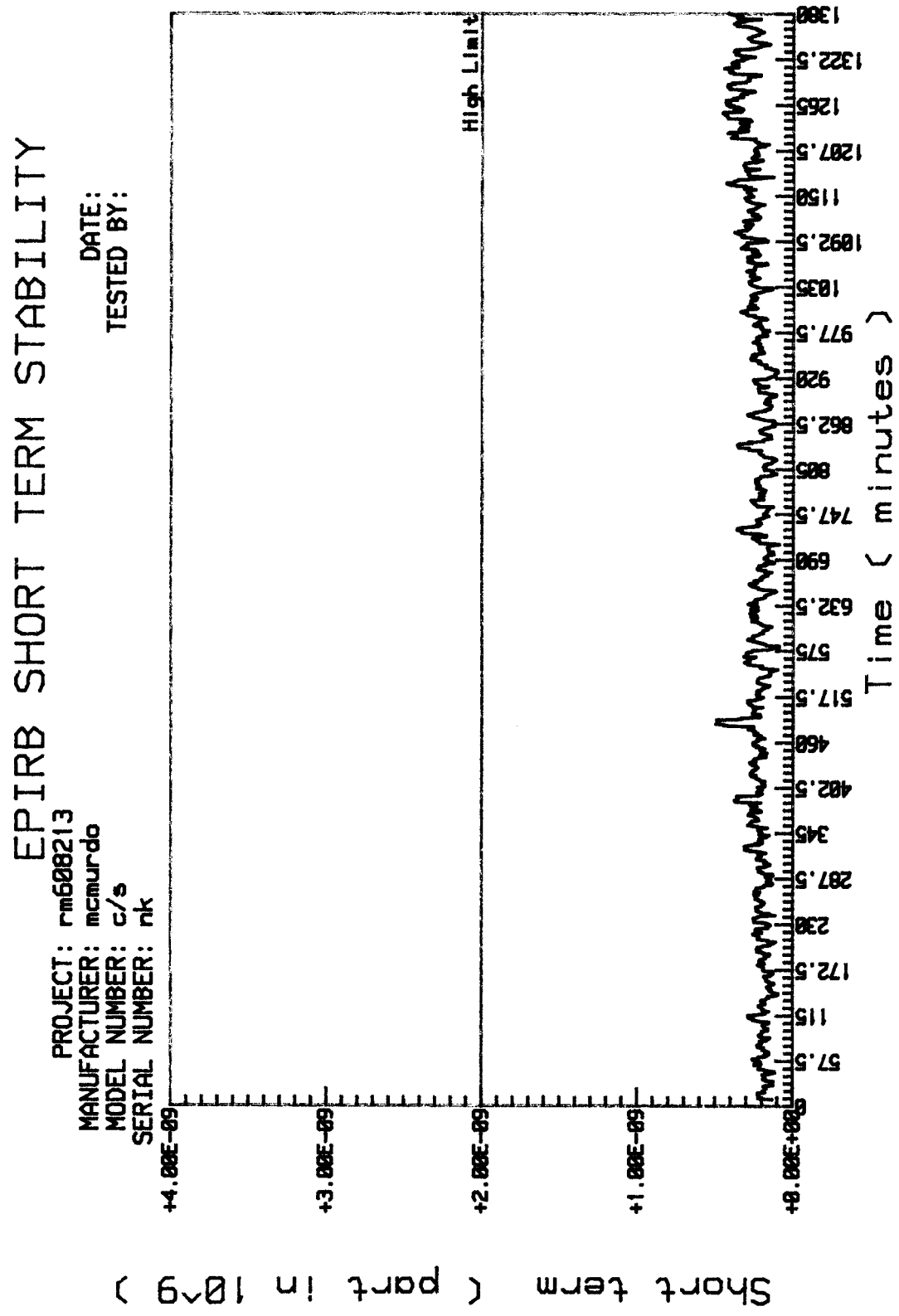
Temperature Gradient - Up – Output power



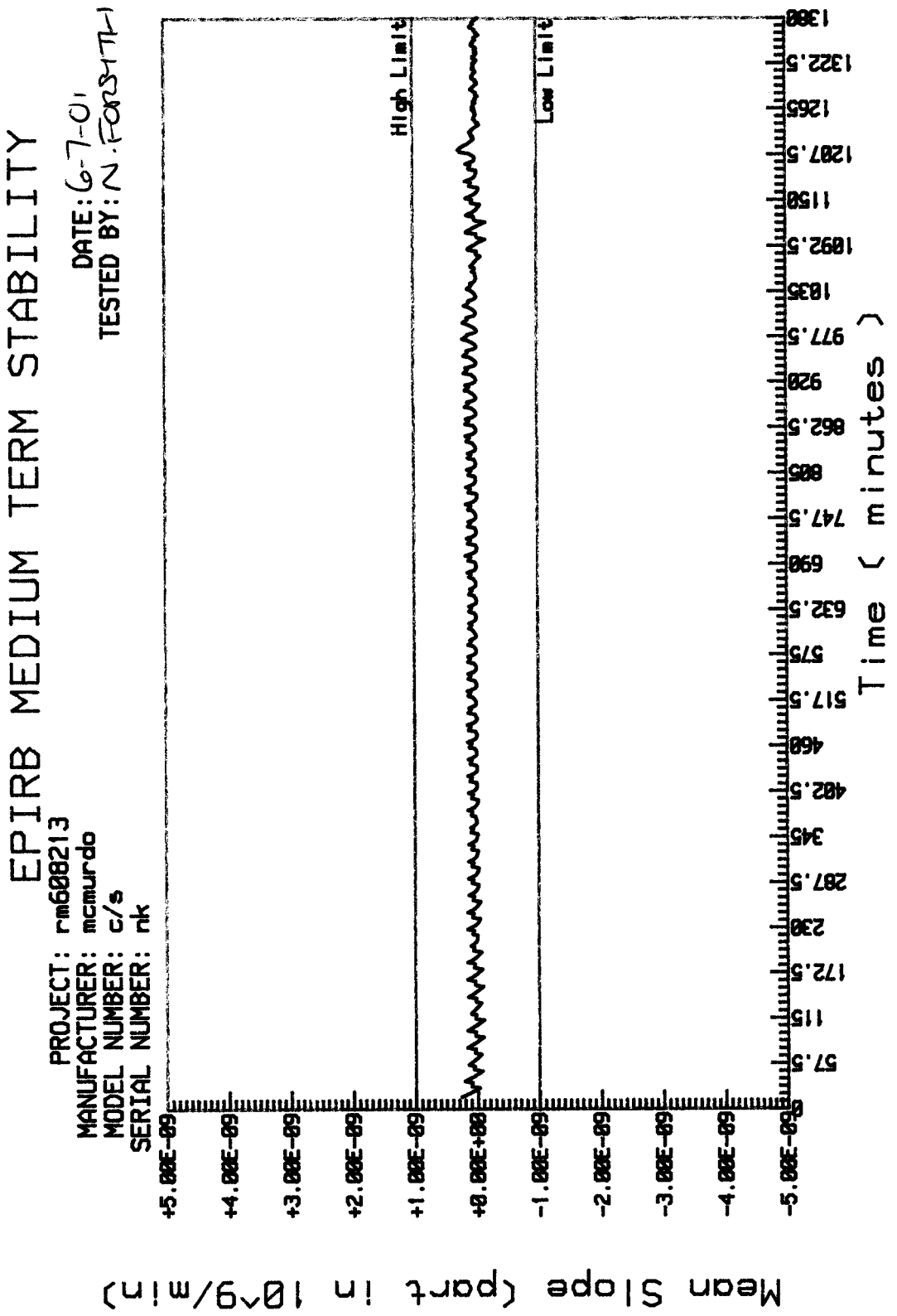
Temperature Gradient - Down – Nominal frequency



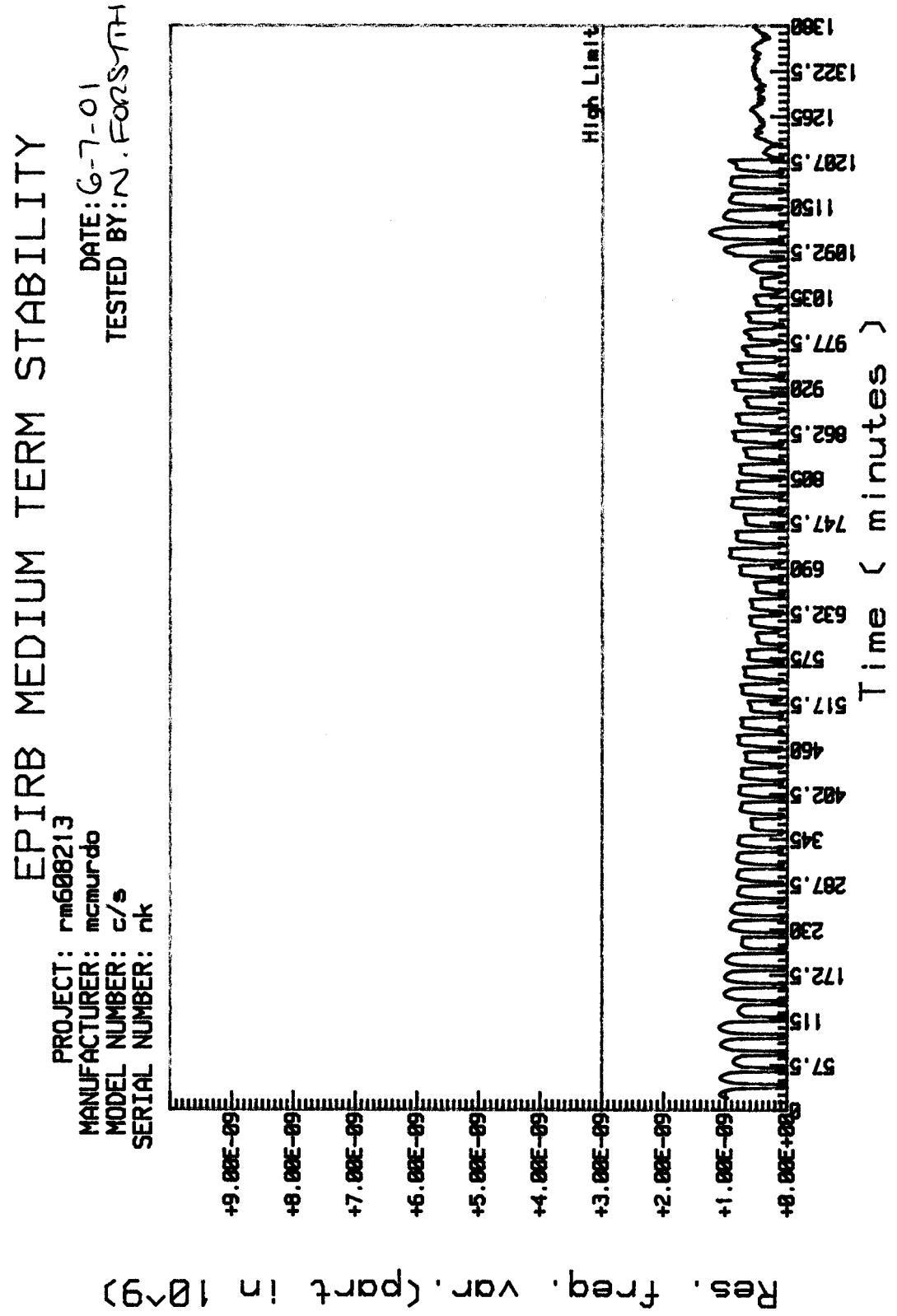
Temperature Gradient - Down – Short term stability



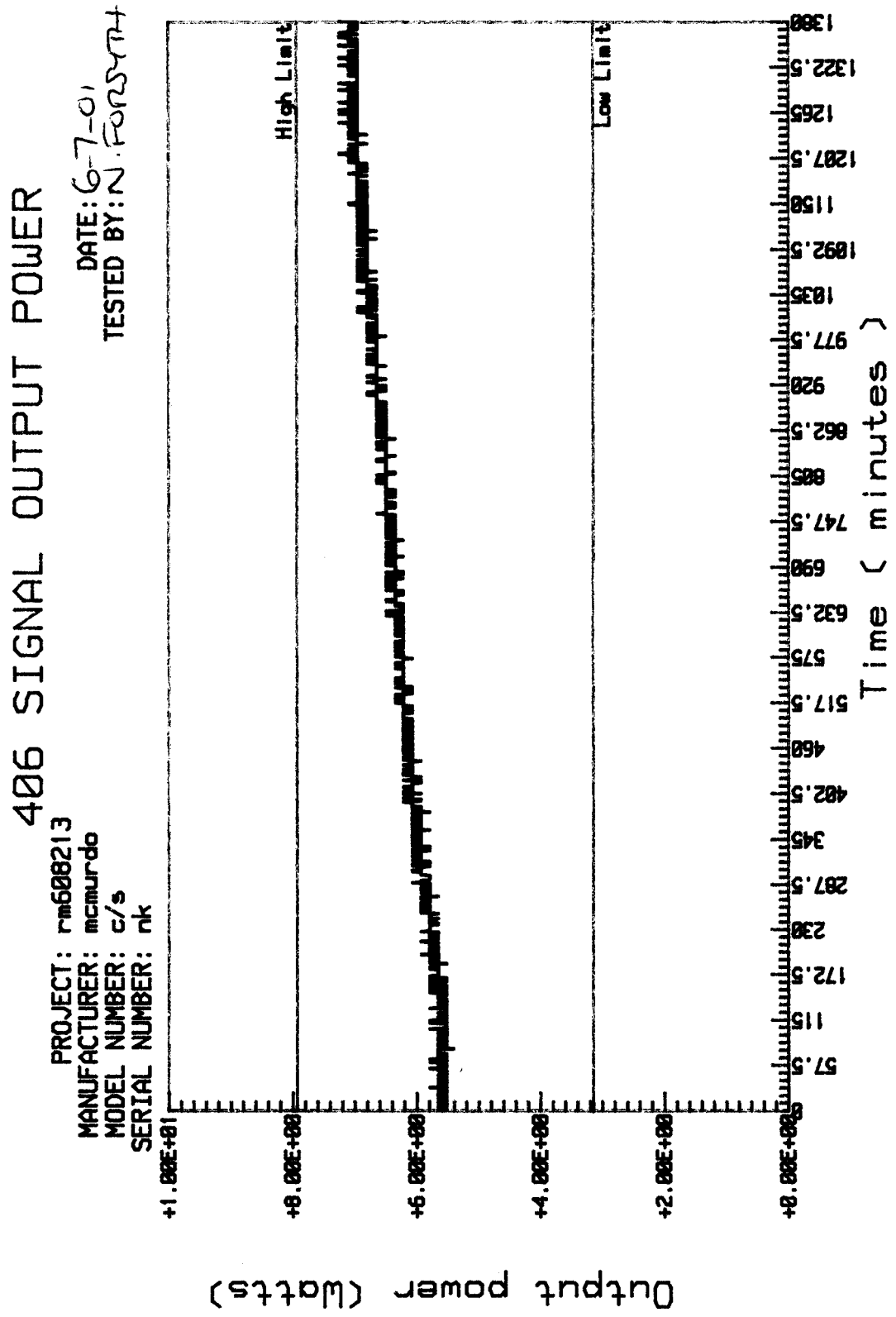
Temperature Gradient - Down – Medium term stability - Mean slope



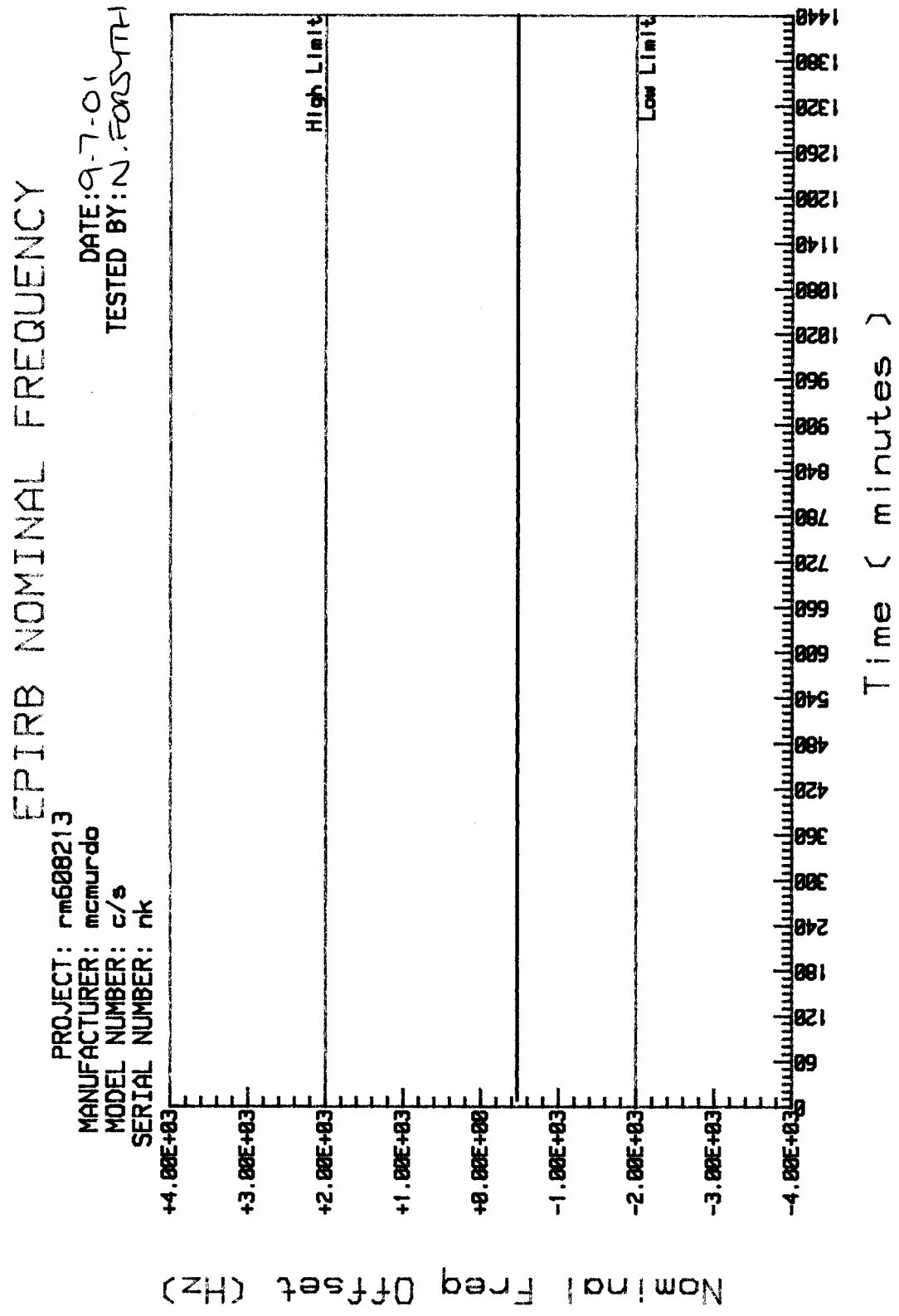
Temperature Gradient - Down – Medium term stability – Residual frequency variation



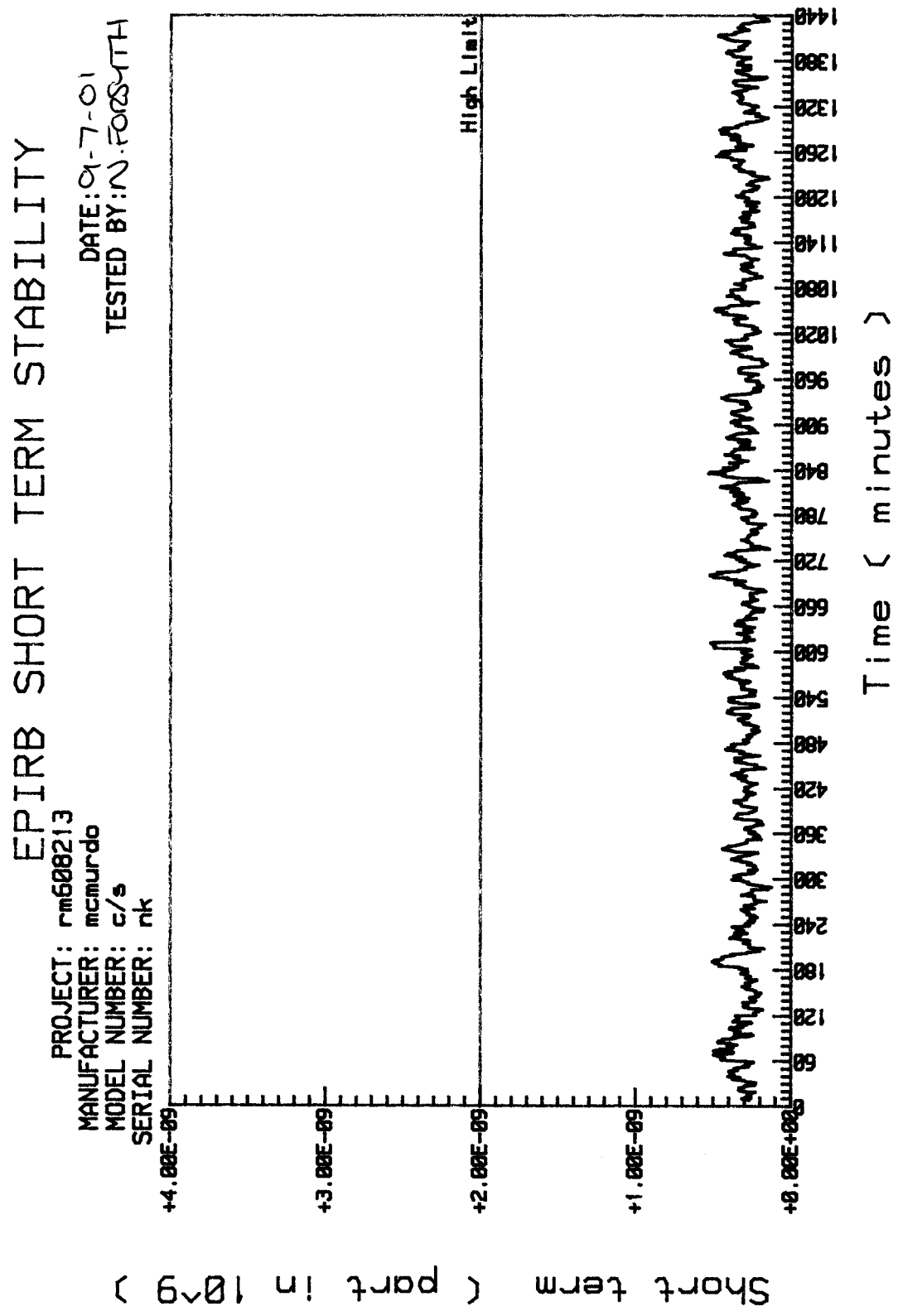
Temperature Gradient - Down – Output power



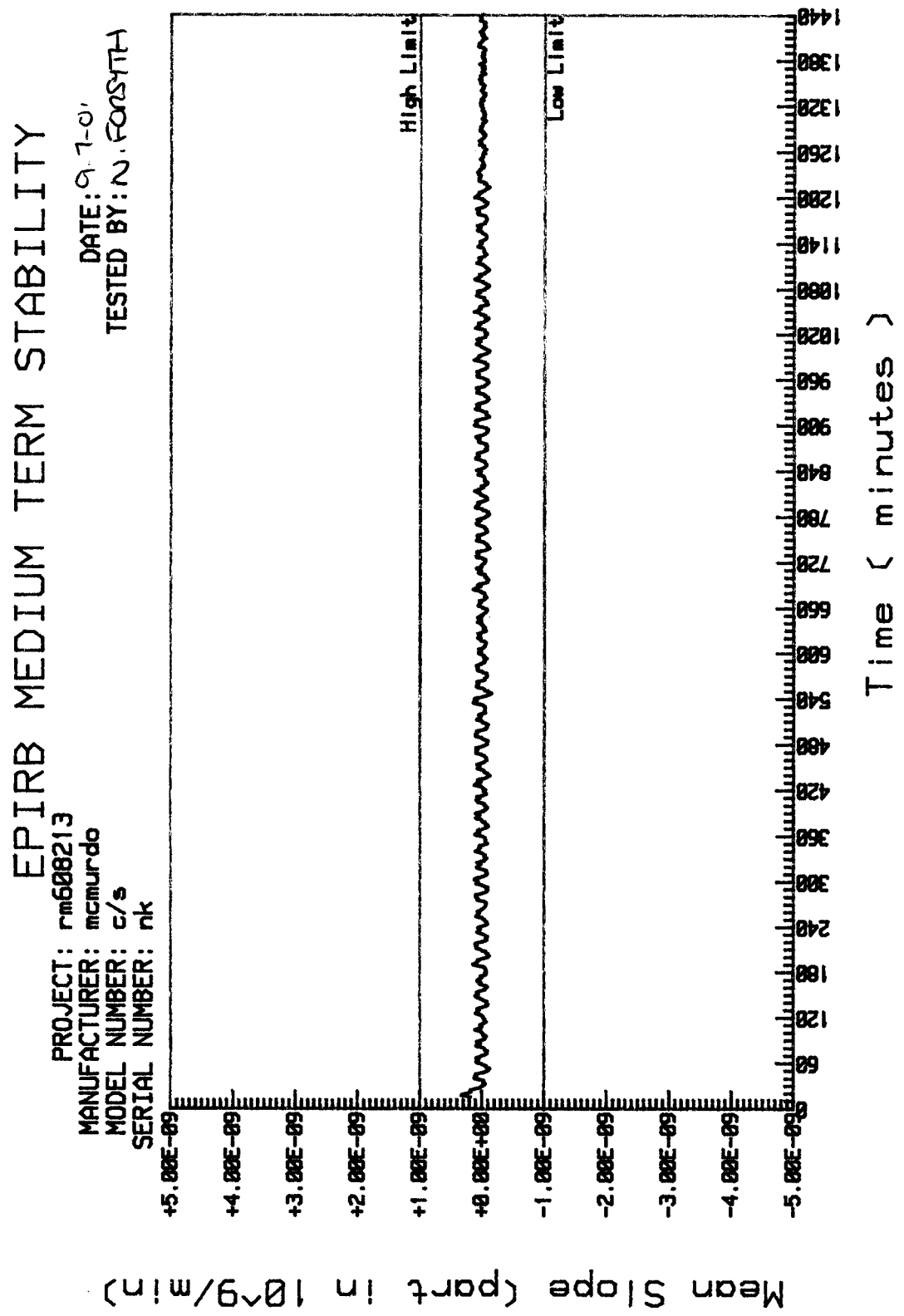
Operating Lifetime at Minimum Temperature – Nominal frequency

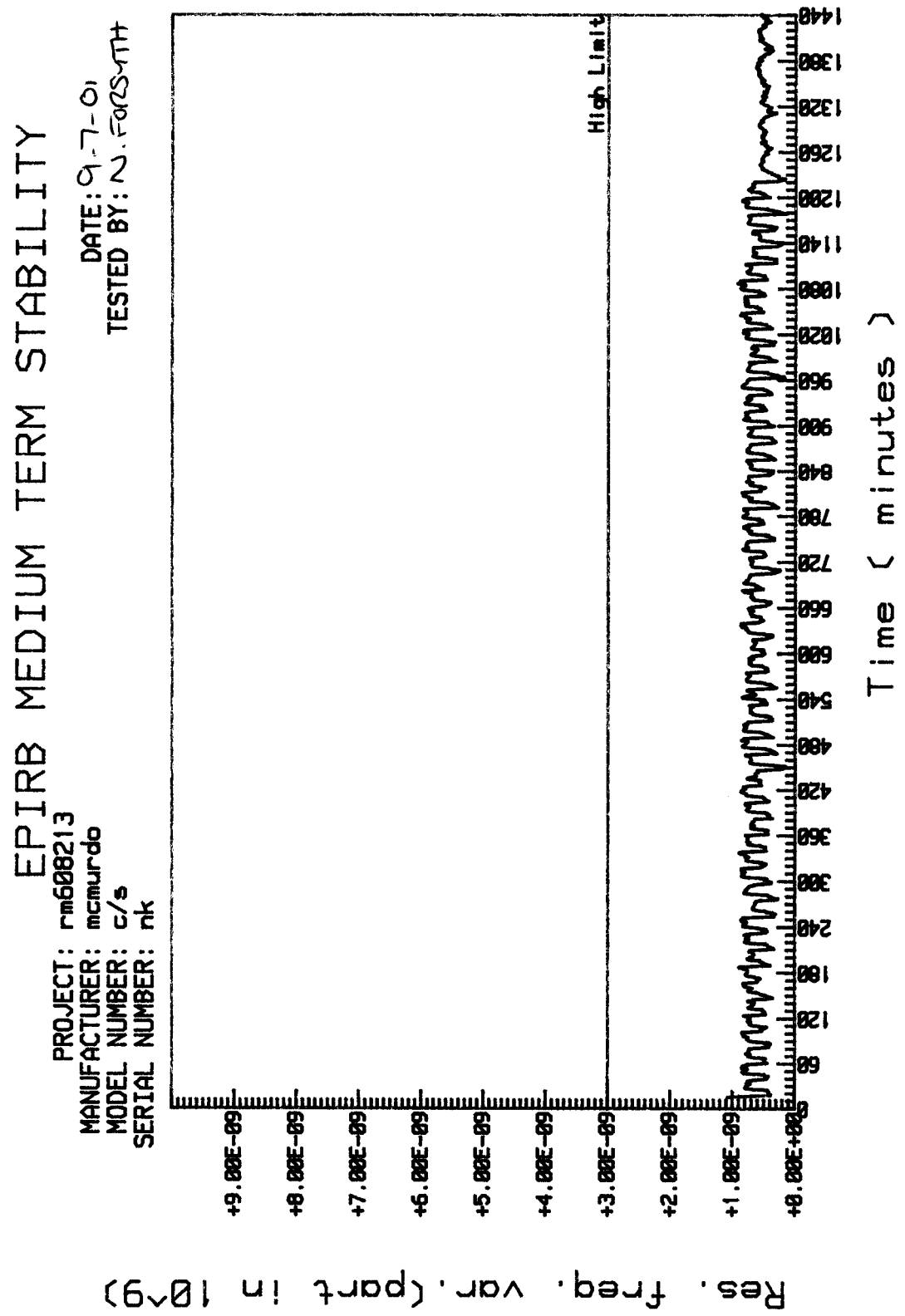


Operating Lifetime at Minimum Temperature – Short term stability

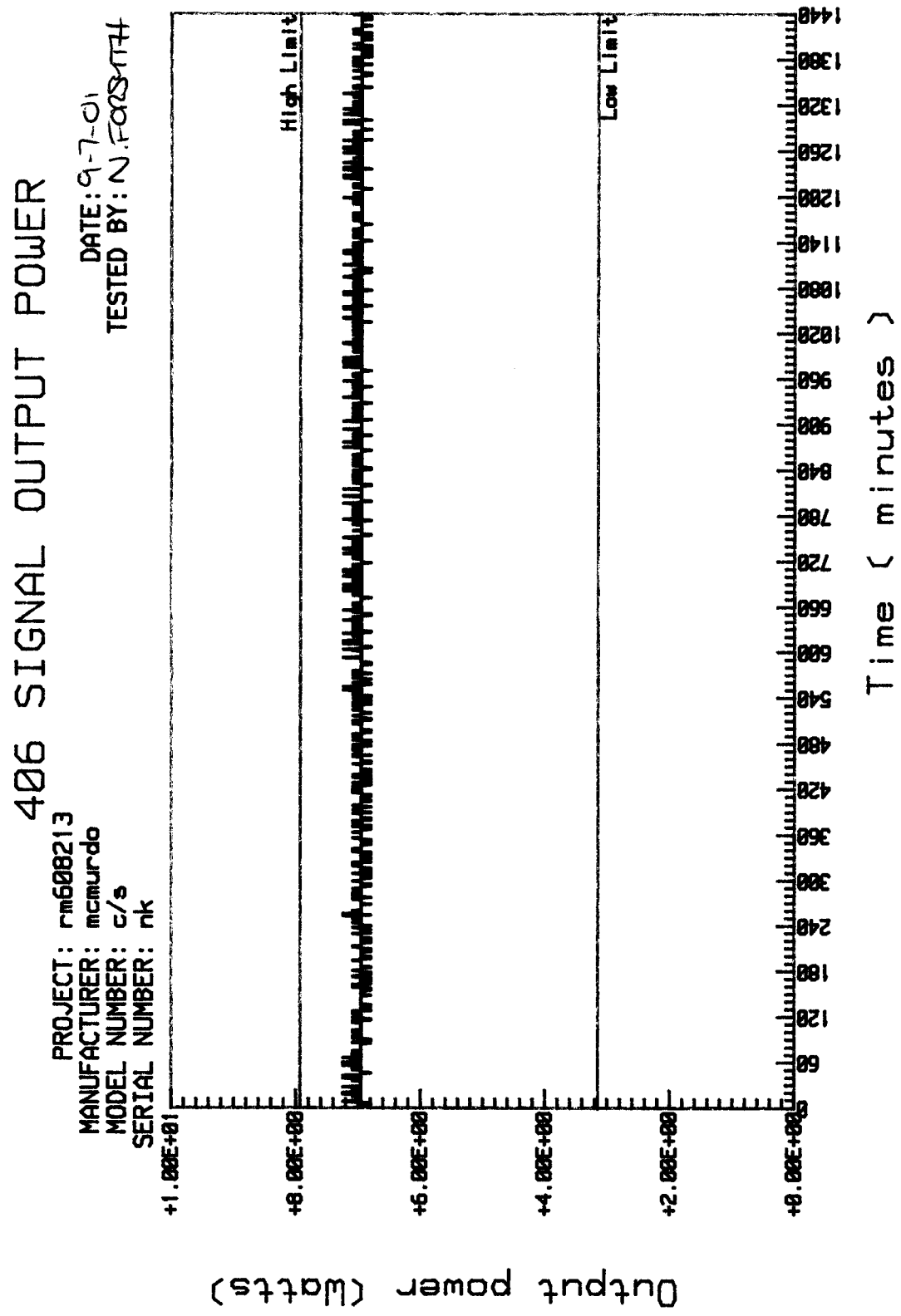


Operating Lifetime at Minimum Temperature – Medium term stability - Mean slope




EPIRB MEDIUM TERM STABILITY
PROJECT: rm608213
MANUFACTURER: mcmurdo
MODEL NUMBER: c/s
SERIAL NUMBER: nk
DATE: 9-7-01
TESTED BY: N. Forsyth
High Limit
Res. freq. var.(part in 10^9)
+9.00E-09
+8.00E-09
+7.00E-09
+6.00E-09
+5.00E-09
+4.00E-09
+3.00E-09
+2.00E-09
+1.00E-09
+0.00E+00
Time (minutes)
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
1140
1200
1260
1320
1380
1440

Operating Lifetime at Minimum Temperature – Output power



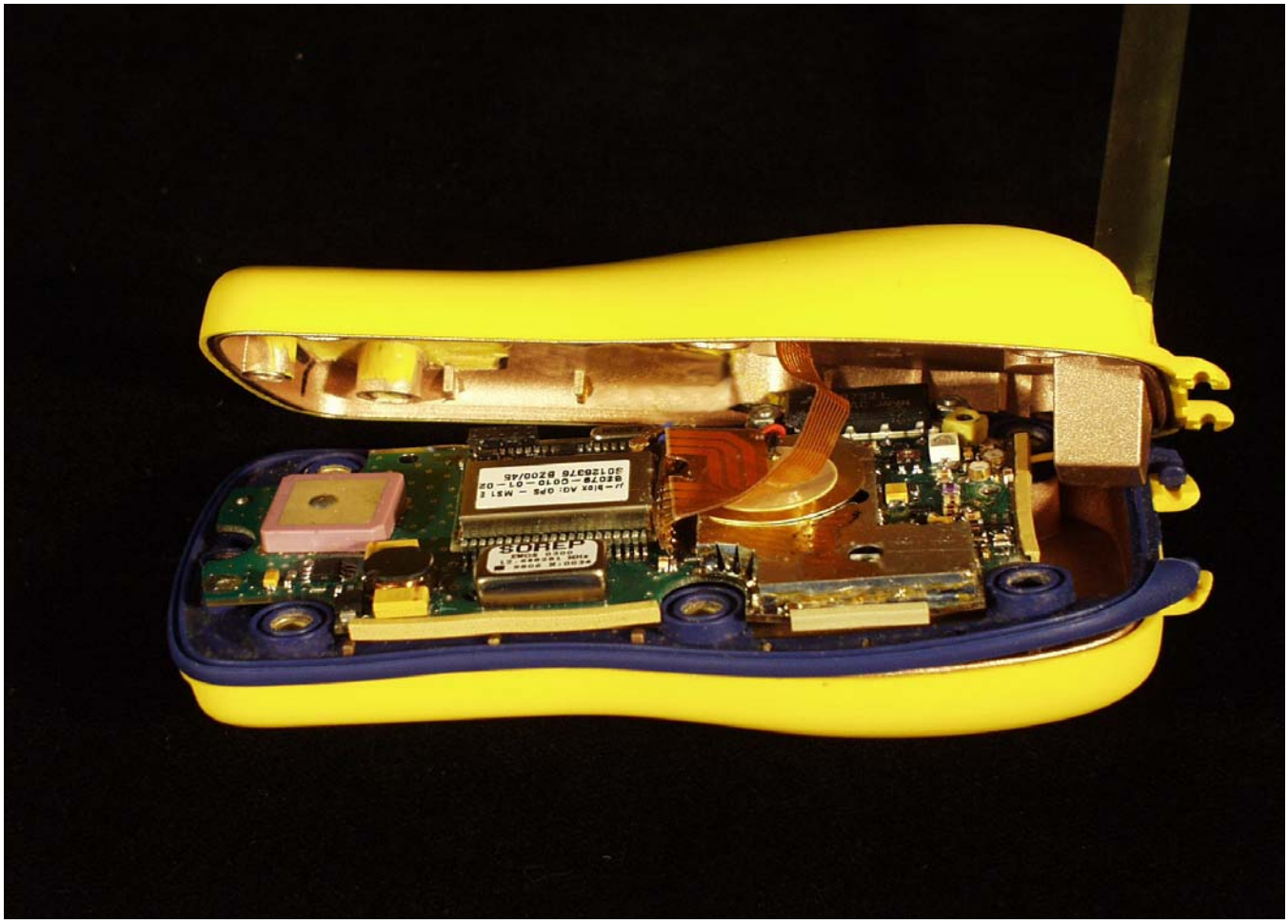
Top View

Top View – Cover up

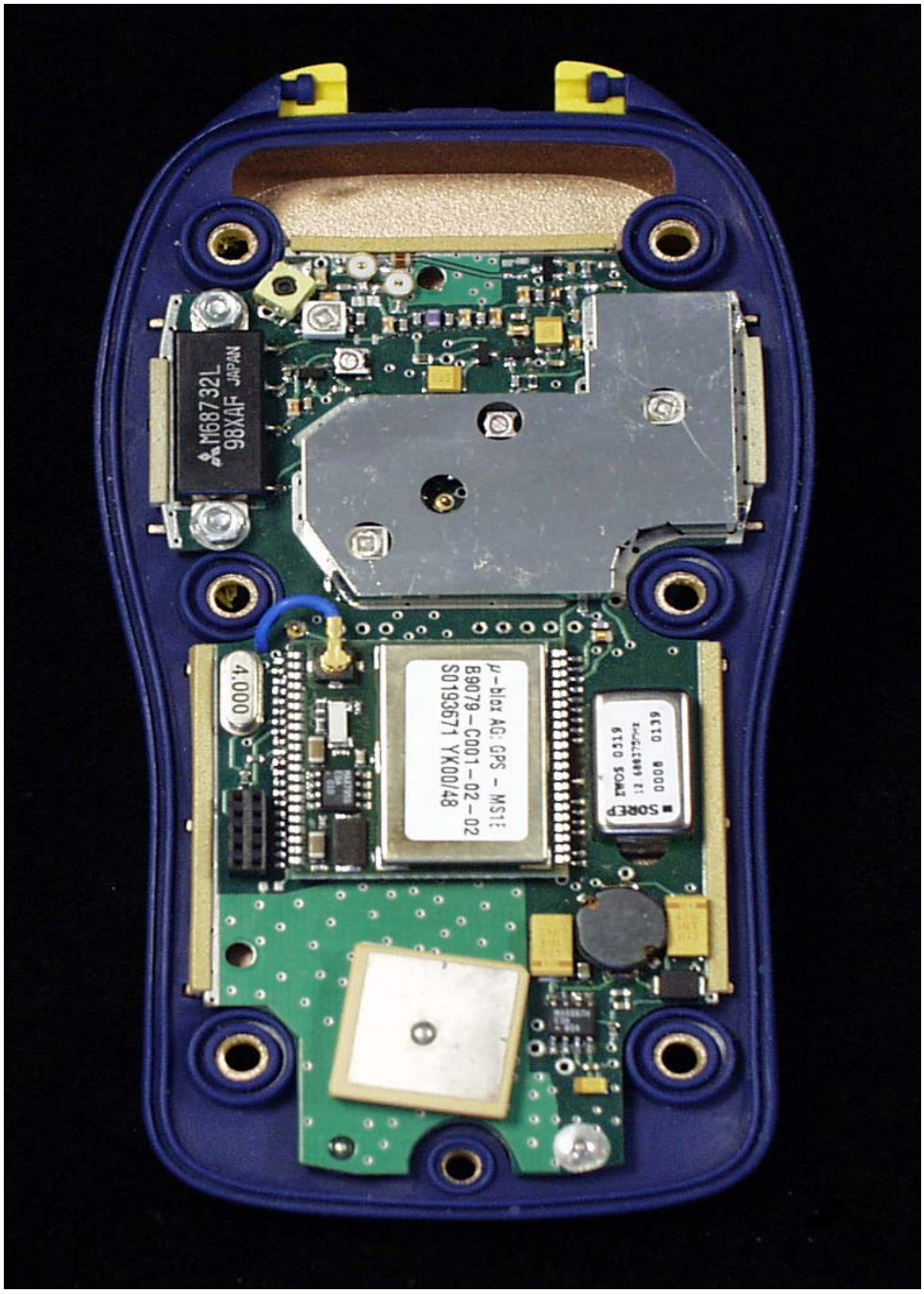
Rear View with -20°C battery label

Rear View with battery removed – Blank PLB label

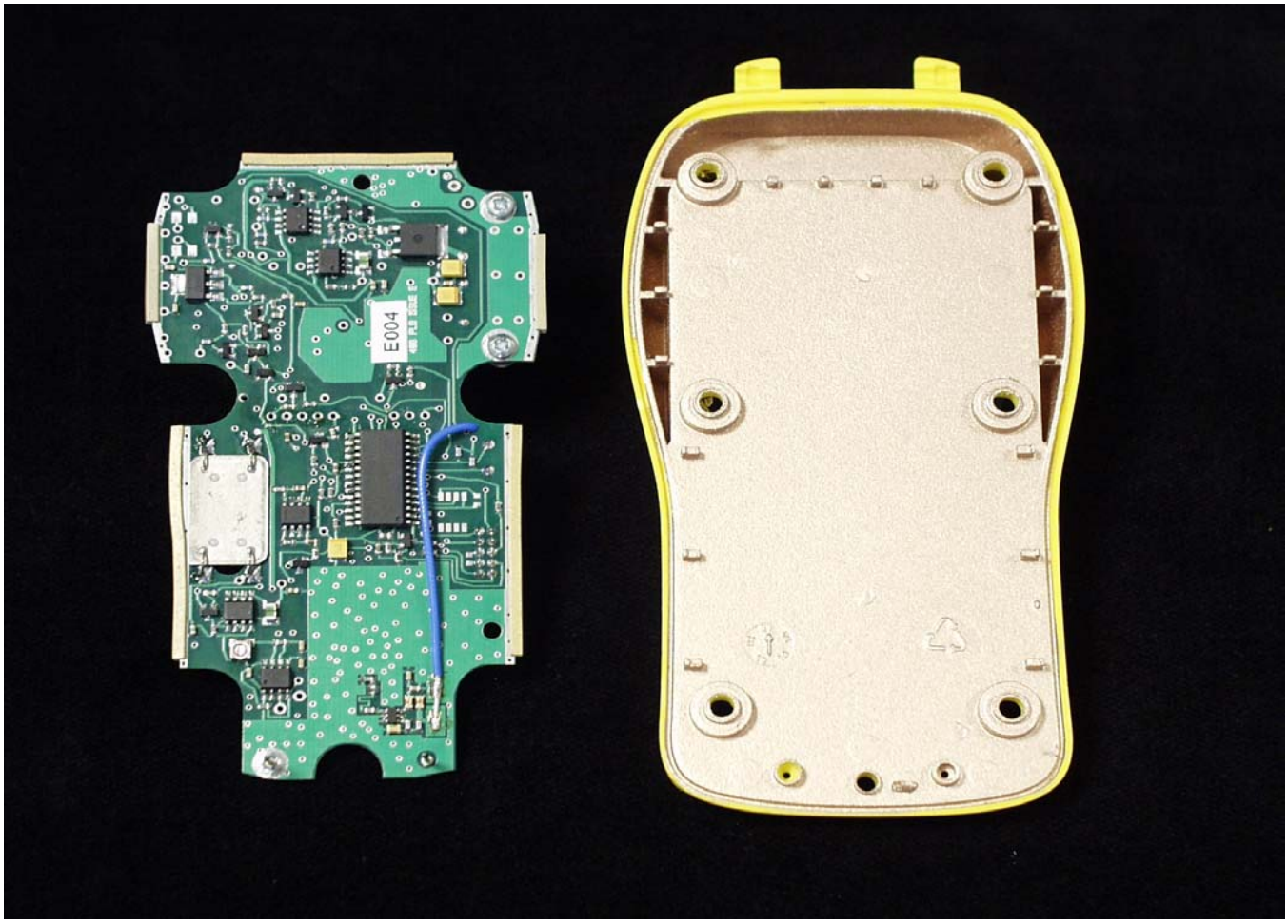
Rear View with battery removed – Completed PLB label



Switch Assembly



Top Internal View



Rear Internal View

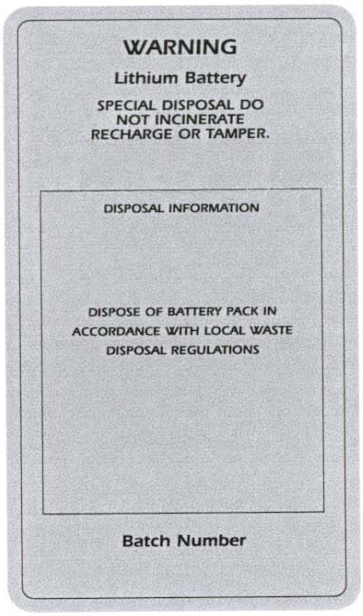
Battery Outer P1+
85-731-041

Battery Outer FastFind+
85-731-044

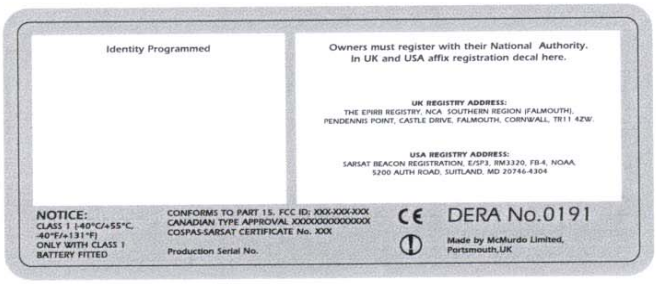
Battery Outer P1
85-731-021

Battery Outer FastFind
85-731-024

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	Hygromer	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).

ANNEX A

Technical Data

ANNEX B

Results of Satellite Qualitative Tests and Antenna Characteristics

Results of Antenna Characteristics

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

Antenna Factor (dB) =	20.72
Cable Loss (dB) =	4.50
$Pt_{ambient}$ (dBm) =	37.89
Pt_{cool} (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) = 4DC7A000F600002F59130000000000

   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 0000 0101
   1110 1011 0010 0010 0110 0000 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) = 4DC7A000F600002F59130000000000

   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 0000 0101
   1110 1011 0010 0010 0110 0000 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

================================================================================
```

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 0000 0101
   1001 0100 0011 0110 0000 0101 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: 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

================================================================================
 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) = 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

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          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 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 0000 0101
   1001 0100 0011 0110 0000 0100 1100 1101 0110 0000 0010 1101 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 1111 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                                                  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 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                             0100 0110 1011 0011 1101 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          DEFAULT              1000 0011 1110 0000 1111
Resultant Position              --> Not Defined
BCH Encoded       133-144          Errors=0                       0110 0110 1100
BCH Generated     133-144                                         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                                                 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       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) = 0DC700407B7FDFF9CD3DB700000000

   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) = 0DC700407B7FDFF9CD3DB700000000

   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) = 0DC700407B33202621E2B700000000

   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

================================================================================
```

Standard Short Location Protocol – Normal Message : GPS Position N 51°19’22” W 1°22’33”

```
TOTAL HEX MESSAGE = FFFE2F0DC700407B336034AD81F7

================================================================================
 Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
 15 Hex (Bits 26- 85) = 1B8E0080F666C06              1B8E0080F6FFBFF Default_Id
 30 Hex (Bits 25-144) = 0DC700407B336034AD81F700000000

   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 1100 0000 0110
   1001 0101 1011 0000 0011 1110 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        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) = 0DCB001EDFC0FF063A64B700000000

   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 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          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                                                   110
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                                                  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          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

================================================================================
```

National Location Protocol – Normal Message : GPS Position N 51°0’0” W 1°0’0”

```
TOTAL HEX MESSAGE = FFFED08DCB001ECCC1010728D5F781000D6D

================================================================================
 Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
 15 Hex (Bits 26- 85) = 1B96003D9982020              1B96003DBF81FE0 Default_Id
 30 Hex (Bits 25-144) = 8DCB001ECCC1010728D5F781000D6D

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0001 1011 1001 0110 0000 0000 0011 1101 1001 1001 1000 0010 0000 0010 0000
   1110 0101 0001 1010 1011 1110 1111 0000 0010 0000 0000 0001 1010 1101 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

================================================================================
```

National Location Protocol – Normal Message : GPS Position N 51°19’22” W 1°22’33”

```
TOTAL HEX MESSAGE = FFFE2F8DCB001ECCD5015D0623B7132008F7

================================================================================
 Beacon Id Format......... 30 Hex Id, Long Message, Bits 25-144
 15 Hex (Bits 26- 85) = 1B96003D99AA02B              1B96003DBF81FE0 Default_Id
 30 Hex (Bits 25-144) = 8DCB001ECCD5015D0623B7132008F7

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0001 1011 1001 0110 0000 0000 0011 1101 1001 1001 1010 1010 0000 0010 1011
   1010 0000 1100 0100 0111 0110 1110 0010 0110 0100 0000 0001 0001 1110 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            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) = 0DCB001EDFC0FF063A64B700000000

   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 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          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                                                   110
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) = 0DCB001EDFC0FF063A64B700000000

   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 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          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                                                   110
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 : GPS Position N 51°0’0” W 1°0’0”

```
TOTAL HEX MESSAGE = FFFE2F0DCB001ECCC10104D076F7

================================================================================
 Beacon Id Format......... 22 Hex Id, Short Message, Bits 25-112
 15 Hex (Bits 26- 85) = 1B96003D9982020              1B96003DBF81FE0 Default_Id
 30 Hex (Bits 25-144) = 0DCB001ECCC10104D076F700000000

   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 1000 0010 0000 0010 0000
   1001 1010 0000 1110 1101 1110 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        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

================================================================================
```

National Short Location Protocol – Normal Message : GPS Position N 51°19’22” W 1°22’33”

```
TOTAL HEX MESSAGE = FFFE2F0DCB001ECCD5015EFE80B7

================================================================================
 Beacon Id Format......... 22 Hex Id, Short Message, Bits 25-112
 15 Hex (Bits 26- 85) = 1B96003D99AA02B              1B96003DBF81FE0 Default_Id
 30 Hex (Bits 25-144) = 0DCB001ECCD5015EFE80B700000000

   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

================================================================================
```