REPORT ON

Testing of the ACR Electronics, Inc PLB-300
in accordance with
Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard
T.007 Issue 4 November 2005

Report No RM615355/01 Issue 3 **December 2006**

TÜV SÜD Product Service

BABT

Product Service

Competence. Certainty. Quality.

TUV Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk; www.babt.com

REPORT ON Testing of the ACR Electronics, Inc PLB-300 in accordance with Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard T.007 Issue 4 November 2005

Report No RM615355/01 Issue 3

December 2006

PREPARED FOR

ACR Electronics, Inc
5757 Ravenswood Road
Ft. Lauderdale
FL.33312

PREPARED BY

N Bennett
Administrator

APPROVED BY

N Forsyth
Authorised Signatory

DATED 11th December 2006

0141
Group

CONTENTS

SECTION 1

REPORT SUMMARY

Testing of the ACR Electronics, Inc PLB-300
in accordance with
Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard
T.007 Issue 4 November 2005

1.1 STATUS

Manufacturer	ACR Electronics, Inc
Type Designation	PLB-300
TUV Reference	RM615355_02 PLB-300, Serial Number: 3 RM615355_06 PLB-300, Serial Number: 9 RM615355_27 PLB-300, Serial Number: 7 RM615355_33 PLB-300, Serial Number: 8 Antenna manufacturer: ACR Electronics Inc Model Number: A3-06-2493, Internal Antenna
Number of Samples Tested	One
Test Specification	Cospas-Sarsat T.007 Issue 4 November 2005
Date of Receipt of Test Sample	30th August 2006
Start of Test	1st September 2006
Finish of Test	19th October 2006
Test Engineer(s)	R Henley J Holding R Hampton

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out is shown below.

Section	Spec Clause	Test Description	Result	Levels/Comments
	-	Table of Test Results	N/A	
-	A3.2.2	Transmitted Power Output	Pass	
2.1	A3.1.4	Digital Message Coding	Pass	
-	A3.1	Digital Message Generator	Pass	
-	A3.2.3	Data Encoding and Modulation	Pass	
-	A3.2.1	406MHz Transmitted Frequency	Pass	
2.2	A3.2.2.4	Spurious Emissions	Pass	
2.3	A3.3	406MHz VSWR Check – Decoded Message	Pass	
2.4	A3.6	Self Test Mode – Decoded Message	Pass	
2.5	A2.2	Thermal Shock	Pass	
2.6	A2.3	Operating Lifetime at Minimum Temperature	Pass	
2.7	A2.4	Frequency Stability with Temperature Gradient	Pass	
-	A3.5	Long Term Frequency Stability	Supplied	Customer supplied data
-	A3.4	Protection Against Continuous Transmission	Supplied	Customer supplied data
2.8	A2.5	Satellite Qualitative Test	Pass	
2.9	A2.6	Antenna Characteristics	Pass	
2.10	C2/16	Beacon Coding Software	Pass	Customer supplied data
2.11	A3.8	Navigation System	Pass	
2.11.1	A3.8	National Location Protocol 1	Pass	
2.11.2	A3.8	Standard Location Protocol 1	Pass	

1.3 APPLICATION FORM

1.3.1 Beacon Manufacturer and Beacon Model

Beacon Manufacturer	ACR Electronics, Inc.
Beacon Model	PLB-300

1.3.2 Beacon Type and Operational Configurations

Beacon Type	**Beacon used while:**	**Tick where appropriate**
EPIRB	Floating in water or on deck or in a safety raft	☐
PLB	On ground and above ground	☒
	On ground and above ground and floating in water	☐
ELT Survival	On ground and above ground	☐
	On ground and above ground and floating in water	☐
ELT Auto Fixed	Fixed ELT with aircraft external antenna	☐
ELT Auto Portable	In aircraft with an external antenna	☐
	On ground, above ground, or in a safety raft with an integrated antenna	☐
ELT Auto Deployable	Deployable ELT with attached antenna	☐
Other (specify)		☐

1.3.3 Beacon Characteristics

Characteristic	**Specification**
Operating temperature range	Tmin = -20°C Tmax= +55°C
Operating lifetime	24 hours
Battery chemistry	LiMnO2
Battery cell size and number of cells	2/3A size, 6 cells (2x3 cells)
Battery manufacturer	Sanyo, CR123A
Battery pack manufacturer and part number	ACR, A3-06-2511
Oscillator type (e.g. OCXO, MCXO, TCXO)	TCXO
Oscillator manufacturer	C-MAC
Oscillator part name and number	A1-11-0687-1 (E3499)
Oscillator satisfies long-term frequency stability requirements (Yes or No)	Yes

1.3 APPLICATION FORM

1.3.3 Beacon Characteristics (Continued...)

Characteristic	Specification
Antenna type (Integrated or External)	*Integrated*
Antenna manufacturer	ACR Electronics, Inc.
Antenna part name and number	A3-06-2493
Navigation device type (Internal, External or None)	*Internal*
Features in beacon that prevent degradation to 406 MHz signal or beacon lifetime resulting from a failure of navigation device or failure to acquire position data (Yes, No, or N/A)	*Yes*
Features in beacon that ensures erroneous position data is not encoded into the beacon message (Yes, No or N/A)	*Yes*
Navigation device capable of supporting global coverage (Yes, No or N/A)	*Yes*
For Internal Navigation Devices	
- Geodetic reference system (WGS 84 or GTRF)	*WGS 84*
- GNSS receiver cold start forced at every beacon activation (Yes or No)	*Yes*
- Navigation device manufacturer	Wonde Proud
- Navigation device model name and part Number	ZX4125P-4, A1-11-0688
- GNSS system supported (e.g. GPS, GLONASS, Galileo)	GPS
For External Navigation Devices	
- Data protocol for GNSS receiver to beacon interface	na
- Physical interface for beacon to navigation device	na
- Electrical interface for beacon to navigation device	na
- Navigation device model and manufacturer (if beacon designed to use specific devices)	na

1.3 APPLICATION FORM

1.3.3 Beacon Characteristics (Continued...)

Characteristic	Specification
Self-Test Mode Characteristics	
- Self-test has separate switch position (Yes or No)	*Yes*
- Self-test switch automatically returns to normal position when released (Yes or No)	*Yes*
- Self-test activation can cause an operational mode transmission (Yes or No)	*No*
- Self-test causes a single beacon self-test message burst only regardless of how long the self-test activation mechanism applied (Yes or No)	*Yes*
- Results of self-test indicated by (e.g. Pass / Fail Indicator Light, Strobe Light, etc.)	4 beeps and green light
- Self-test can be activated from beacon remote activation points (Yes or No)	*No*
- Self-test performs an internal check and indicates that RF power emitted at 406 MHz and 121.5 MHz if beacon includes a 121.5 MHz homer (Yes or No)	*No*
- Self-test transmits a signal(s) other than at 406 MHz (Yes & details or No)	no
- Self-test can be activated directly at beacon (Yes or No)	*Yes*
- List of items checked by self-test	Battery,406 PWR,Lock Det.
- Self-test transmission burst duration (440 or 520 ms)	*440 ms*
- Self-test format bit ("0" or "1")	*1*
Beacon includes a homer transmitter (if yes identify frequency of transmission)	121.5 MHz
-Homer Transmit Power	17 dBm
-Homer Duty Cycle	98 %
-Duty Cycle of Homer Swept Tone	37.5 %

1.3 APPLICATION FORM

1.3.3 Beacon Characteristics (Continued...)

Characteristic	Specification
Beacon includes a strobe light (Yes or No)	*No*
- Strobe light intensity	
- Strobe light flash rate	
Beacon transmission repetition period satisfies C/S T.001 requirement that two beacon's repetition periods are not synchronised closer than a few seconds over 5 minute period, and the time intervals between transmissions are randomly distributed on the interval 47.5 to 52.5 seconds (Yes or No)	*Yes*
Other ancillary devices (e.g. voice transceiver). List details on a separate sheet if insufficient space to describe.	na
Beacon includes automatic activation mechanism (Yes or No)	*No*

1.3.4 Information Provided by the Cospas-Sarsat Accepted Test Facility

Name and Location of Beacon Test Facility: TUV Product Service Ltd, United Kingdom

Date of Submission for Testing: 30th August 2006

Applicable C/S Standards:

Document	Issue	Revision
C/S T.001	3 (Revision 7)	Nov-05
C/S T.007	4	Nov-05

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 Specification for Cospas-Sarsat 406 MHz Distress Beacons (C/S T.001) as demonstrated in the attached report.

Signed: N Forsyth

Name: N Forsyth

Position Held: Authorised Signatory

Date: 11th December 2006

1.3 APPLICATION FORM

1.3.5 Applicant Details

Company Name	ACR Electronics, Inc.		
Address	5757 Ravenswood Road		
Category of Applicant	☒ Manufacturer	☐ Importer	
	☐ Distributor	☐ Agent	
Contact Name	Chung Tong	Telephone	954-981-3333, ext. 186
Email	ctong@acrelectronics.com	Facsimile	954-983-5087

1.3.6 Manufacturer Details

Company Name	Same as above		
Address			
Contact Name		Telephone	
Email		Facsimile	

1.3.7 Declaration of Build Status

Hardware Version	
- PCB Revision	Rev.A (same as T2)
- Battery Model	A3-06-2511
Software Version	
Firmware Version	Rev.A (same as T9.3)
Other (Specify)	

1.3.8 Applicant's Declaration

I hereby declare that I am entitled to sign on the behalf of the applicant and that the information supplied is correct and complete

Signed: Chung Tong

Name: Chung Tong

Position Held: Principal electrical Engineer

Date: 8/28/06

1.4 MODIFICATIONS

No modifications were made during testing.

1.5 REPORT MODIFICATION RECORD

Issue 1 – First Issue.

Issue 2 – To include amendments required by worksheet 1 (Cospas-Sarsat).

Issue 3 – Change to Interpretation of Last Valid Position test leads to revised Position Retention Time figures in section 2.11. Test outcomes are unaffected.

SECTION 2

TEST DETAILS

Testing of the ACR Electronics, Inc PLB-300
in accordance with
Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard
T.007 Issue 4 November 2005

TABLE OF TEST RESULTS

Parameter	Limits	Units	Test Results T_{min} (°C) -20	T_{amb} 23.5	T_{max} (°C) +55	Comments
1. Power Output Clause A3.2.2						Test sample: RM615355_02 Build state: 0 **Result: Pass**
Transmitter power output	35 to 39	dBm	38.021	38.350	38.388	
Power output rise time	< 5	ms	0.02	0.03	0.03	
Power output 1ms before burst	< -10	dBm	-31.99	-31.18	-33.32	
2. Digital Message Coding Clause A3.1.4						Test sample: RM615355_02 Build state: 0 **Result: Pass**
Bit sync Bits 1 – 15	111111111111111	P / F	P	P	P	Decoded messages: Pages 17 to 19
Frame Sync 16 – 24	000101111	P / F	P	P	P	
Format Flag 25	1 bit	data	1	1	1	
Protocol Flag 26	1 bit	data	0	0	0	
Identification / position data 27 – 85	59 bits	P / F	P	P	P	
BCH code 86 – 106	21 bits	P / F	P	P	P	
Emerg. code/nat. use/supplem. data 107 – 112	6 bits	data	110111	110111	110111	
Additional Data / BCH (if applicable) 112 – 144	32 bits	P / F	P	P	P	
Position Error (if applicable)	< 5	km	N/A	N/A	N/A	
3. Digital Message Generator Clause A3.1						Test sample: RM615355_02 Build state: 0 **Result: Pass**
Repetition rate T_R						
Average T_R	48.5 to 51.5	seconds	49.696	49.829	49.796	
Minimum T_R	$47.5 \leq T_R \leq 48.0$	seconds	47.67	47.84	47.84	
Maximum T_R	$52.0 \leq T_R \leq 52.5$	seconds	52.07	52.07	52.07	
Standard deviation	0.5 to 2.0		1.539	1.462	1.448	
Bit rate						
Minimum f_b	≥ 396	bits/sec	398.385	398.386	398.283	
Maximum f_b	≤ 404	bits/sec	398.388	398.388	398.387	
Total transmission time						
Short message	435.6 – 444.4	ms	-	-	-	
Long message	514.8 - 525.2	ms	523.333	523.321	523.321	
Unmodulated carrier						
Minimum T_1	≥ 158.4	ms	160.480	160.480	160.480	
Maximum T_1	≤ 161.6	ms	160.481	160.480	160.481	
First burst delay	>47.5	seconds	68	69	69	

TABLE OF TEST RESULTS

Parameter	Limits	Units	Test Results			Comments
			T_{min} (°C) -20	T_{amb} 23.5	T_{max} (°C) +55	
4. Modulation Clause A3.2.3						Test sample: RM615355_02 Build state: 0 **Result: Pass**
Biphase L	P / F	P / F	P	P	P	
Rise time	50 - 250	µs	178.15	166.16	163.49	
Fall Time	50 - 250	µs	170.39	169.72	161.71	
Phase deviation: positive	+ (1.0 to 1.2)	radians	1.11	1.10	1.12	
Phase deviation: negative	- (1.0 to 1.2)	radians	-1.10	-1.12	-1.11	
Symmetry measurement	≤ 0.05	radians	0.019	0.0188	0.0204	
5. 406 MHz Transmitted Frequency Clause A3.2.1						Test sample: RM615355_02 Build state: 0 **Result: Pass**
Nominal value	IAW T.001 / T.007	MHz	406.027494	406.027476	406.027474	
Short term stability	$\leq 2x10^{-9}$	/100 ms	$4.248x10^{-10}$	$3.908x10^{-10}$	$3.666x10^{-10}$	
Medium term stability						
Slope	$(-1 \text{ to } +1)x10^{-9}$	/minute	$-8.154x10^{-11}$	$-1.397x10^{-10}$	$1.075x10^{-10}$	
Residual frequency variation	$\leq 3x10^{-9}$		$5.511x10^{-10}$	$8.948x10^{-11}$	$1.608x10^{-10}$	
6. Spurious Emissions Clause A3.2.2.4						Test sample: RM615355_02 Build state: 0 **Result: Pass**
In band (406.0 – 406.1 MHz)	IAW mask	P / F	P	P	P	Spectrum plots: Page 21
7. 406MHz VSWR Check Clause A3.3						Test sample: RM615355_02 Build state: 0 **Result: Pass**
Nominal transmitted frequency	IAW T.001 / T.007	MHz	406.027499	406.027475	406.027473	
Modulation						
Rise time	50 - 250	µs	168.16	174.15	166.15	
Fall Time	50 - 250	µs	174.39	165.72	171.73	
Phase deviation: positive	+ (1.0 to 1.2)	radians	1.10	1.10	1.11	
Phase deviation: negative	- (1.0 to 1.2)	radians	-1.11	-1.11	-1.12	
Symmetry measurement	≤ 0.05	radians	0.0182	0.0196	0.0196	
Digital Message	Must be correct	P / F	P	P	P	Decoded message: Page 21
8. Self Test Mode Clause A3.6						Test sample: RM615355_02 Build state: 0 **Result: Pass**
Frame sync	011010000	P / F	P	P	P	
Format flag	0 or 1	1 / 0	1	1	1	
Single radiated burst	440 / 520 +/- 1%	ms	443.38	443.36	443.40	
Default position data (if applicable)	Must be correct	P / F	P	P	P	
Description provided	Y / N			P		
Data on protections against repetitive transmission	Y / N			P		Applicant's data: B.2 of Annex B
Single burst verification	1 burst	P / F	P	P	P	
Provides for beacon 15 Hex ID	Must be correct	P / F	P	P	P	Decoded message: Page 22

TABLE OF TEST RESULTS

Parameter	Limits	Units	Test Results	Comments
9. Thermal Shock Clause A2.2				Test sample: RM615355_02 Build state: 0 **Result: Pass**
Soak Temperature		°C	23.5	
Measurement Temperature		°C	-6.5	
Meet within 15 minutes, maintained for 2 hours:				
Transmitted frequency				Test data: Page 23 to 27
Nominal value	IAW T.007 / T.012	MHz	Max 406.027506 Min 406.027501	
Short term stability	≤ $2x10^{-9}$	/100ms	Max $1.224X10^{-10}$ Min $6.421X10^{-11}$	
Medium term stability				
Slope	(-1 to +1)$x10^{-8}$	/minute	Max $8.732X10^{-10}$ Min $-1.498X10^{-10}$	
Residual frequency variation	≤ $3x10^{-9}$		Max $4.985X10^{-10}$ Min $7.306X10^{-11}$	
Transmitter output power	35 – 39	dBm	Max 38.586 Min 38.00	
Digital Message	Must be correct	P / F	P	Decoded message: Page 28
10. Operating Lifetime at Minimum Temperature Clause A2.3				Test sample: RM615355_02 Build state: 0 **Result: Pass**
Duration	>24		>48	Quiescent battery current: Page 36 to 42
Transmitted frequency				Test data: Page 30 to 34
Nominal value	IAW T.007 / T.012	MHz	Max 406.027508 Min 406.027503	
Short term stability	≤ $2x10^{-9}$	/100ms	Max $4.387x10^{-10}$ Min $6.943X10^{-11}$	
Medium term stability				
Slope	(-1 to +1)$x10^{-8}$	/minute	Max $8.875X10^{-11}$ Min $-7.713X10^{-11}$	
Residual frequency variation	≤ $3x10^{-9}$		Max $3.289X10^{-10}$ Min $5.044X10^{-11}$	Transmitter Output Power is within the limits up to Approximately 57 hours.
Transmitter output power	35 – 39	dBm	Max 38.06 Min 34.39	
Digital Message	Must be correct	P / F	P	Decoded message: Page 35
11. Frequency Stability with Temperature Gradient Clause A2.4				Test sample: RM615355_02 Build state: 0 **Result: Pass**
Transmitted frequency				Test data: Page 39 to 43
Nominal value	IAW T.007 / T.012	MHz	Max 406.027519 Min 406.027462	
Short term stability	≤ $2x10^{-9}$	/100ms	Max $1.599x10^{-10}$ Min $5.728x10^{-11}$	
Medium term stability				
Slope (A to B, C+15 to D, E+15 to F)	(-1 to +1)$x10^{-8}$	/minute	Max $3.57x10^{-10}$ Min $-4.319x10^{-10}$	
Slope (B to C+15, D to E+15)	(-2 to +2)$x10^{-8}$	/minute	Max Min	
Residual frequency variation	≤ $3x10^{-9}$		Max $1.203x10^{-9}$ Min $5.474x10^{-11}$	
Transmitter output power	35 – 39	dBm	Max 38.633 Min 37.39	
Digital Message	Must be correct	P / F	P	Decoded message: Page 48
12. Long Term Frequency Stability Clause A3.5				
Data on long term stability	Y / N		Y	Applicant's data: B.5 to B.63 of Annex B

TABLE OF TEST RESULTS

Parameter	Limits	Units	Test Results		Comments
13. Protection Against Continuous Transmission Clause A3.4					
Description provided	Y / N		Y		Applicant's data: B.3 of Annex B
14. Satellite Qualitative Tests – B.2 Configuration Clause A2.5					**Test sample:** RM615355_27 **Build state:** 0 **Result: Pass**
Results provided	Y / N		Y		Test data: Page 49
Successfully located by satellites / LUT	Must be correct	P / F	P		
Position error	≥80% of results ≤5 km	P / F	P		100%
14. Satellite Qualitative Tests – B.5 configuration Clause A2.5					Test sample: RM615355_27 Build state: 0 **Result: Pass**
Results provided	Y / N		Y		Test data: Page 49
Successfully located by satellites / LUT	Must be correct	P / F	P		
Position error	≥80% of results ≤5 km	P / F	P		100%
15 Antenna Characteristics – without Lifejacket Clause A2.6	Configuration	T.007	Figure B.2	Figure B.5	Test sample: RM615355_27 Build state: 0**Result: Pass (MU)**
Polarisation	Linear / RHCP		Linear	N/A	Test data: Page 51
VSWR	≤1.5		N/A	N/A	Detachable antennas only
$EIRP_{maxEOL}$	≤43	dBm	43.3*	41.8	* Pass within Measurement Uncertainty
$EIRP_{minEOL}$	≥32	dBm	31.2*	31.7**	** Limit for B.5 configuration is ≥30dBm
Azimuth gain variation at 40° elevation angle	≤3	dB	0.37	N/A	
15 Antenna Characteristics – with Lifejacket Clause A2.6	Configuration	T.007	Figure B.2	Figure B.5	Test sample: RM615355_27 Build state: 0**Result: Pass (MU)**
Polarisation	Linear / RHCP		Linear	N/A	Test data: Page 51
VSWR	≤1.5		N/A	N/A	Detachable antennas only
$EIRP_{maxEOL}$	≤43	dBm	43.3*	42.4	
$EIRP_{minEOL}$	≥32	dBm	31.2*	31.3**	* Pass within Measurement Uncertainty
Azimuth gain variation at 40° elevation angle	≤3	dB	0.82	N/A	** Limit for B.5 configuration is ≥30dBm

TABLE OF TEST RESULTS

Parameter	Limits	Units	Test Results		Comments
16. Beacon Coding Software Test C2.16					Test sample: RM615355_02 Build state: 0 **Result: Pass**
Sample message for each coding option	Must be correct		P		Customer supplied data: See Annex A
Sample self-test message for each coding option	Must be correct		P		
17. Navigation System Clause A3.8			National	Standard	Test sample: RM615355_33 Build state: 0 **Result: Pass** Test data: Page 54 to 60
Position data default values	Must be correct	P/ F	P	P	
Position acquisition time	<10/1	minutes	P	P	
Position accuracy	C/S T.001		P	P	
Encoded position data update interval	>20	minutes	22m 36s	22m 2s	
Position clearance after deactivation	Cleared	P / F	P	P	
Position data update interval (as applicable)	20/1	minutes	N/A	N/A	
Position data encoding	Must be correct	P/F	P	P	
Retained last valid position after navigation input lost	240(±5)	Minutes	236	237	
Default position data transmitted after 240(±) minutes without valid position data	Cleared	P/F	P	P	
Information provided on protection against beacon degradation due to navigation device, interference or signal failure or malfunction	No degradation	P/F	P		Applicant's data: B.4 of Annex B

2.1 DIGITAL MESSAGE CODING

FFFE2F96EE3243D07FDFF93FEAB783E0F66C

```
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 2DDC6487A0FFBFF              2DDC6487A0FFBFF Default_Id
30 Hex (Bits 25-144) = 96EE3243D07FDFF93FEAB783E0F66C

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0010 1101 1101 1100 0110 0100 1000 0111 1010 0000 1111 1111 1011 1111 1111
   0010 0111 1111 1101 0101 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
NID	27- 36	366	USA	0101 1011 10
Protocol Code	37- 40	14	Test Serial (Standard)	1110
Spare	41- 64			0011 0010 0100 0011 1101 0000
Coarse Position	65- 85		DEFAULT	0111 1111 1101 1111 1111 1
BCH Encoded	86-106		Errors=0	0010 0111 1111 1101 0101 0
BCH Generated	86-106			0010 0111 1111 1101 0101 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

Digital Message at Ambient Temperature

2.1 DIGITAL MESSAGE CODING

FFFE2F96EE3243D07FDFF93FEAB783E0F66C

```
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 2DDC6487A0FFBFF              2DDC6487A0FFBFF Default_Id
30 Hex (Bits 25-144) = 96EE3243D07FDFF93FEAB783E0F66C

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0010 1101 1101 1100 0110 0100 1000 0111 1010 0000 1111 1111 1011 1111 1111
   0010 0111 1111 1101 0101 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	366	USA	0101 1011 10
Protocol Code	37- 40	14	Test Serial (Standard)	1110
Spare	41- 64			0011 0010 0100 0011 1101 0000
Coarse Position	65- 85		DEFAULT	0111 1111 1101 1111 1111 1
BCH Encoded	86-106		Errors=0	0010 0111 1111 1101 0101 0
BCH Generated	86-106			0010 0111 1111 1101 0101 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

Digital Message at Minimum Temperature

2.1 DIGITAL MESSAGE CODING

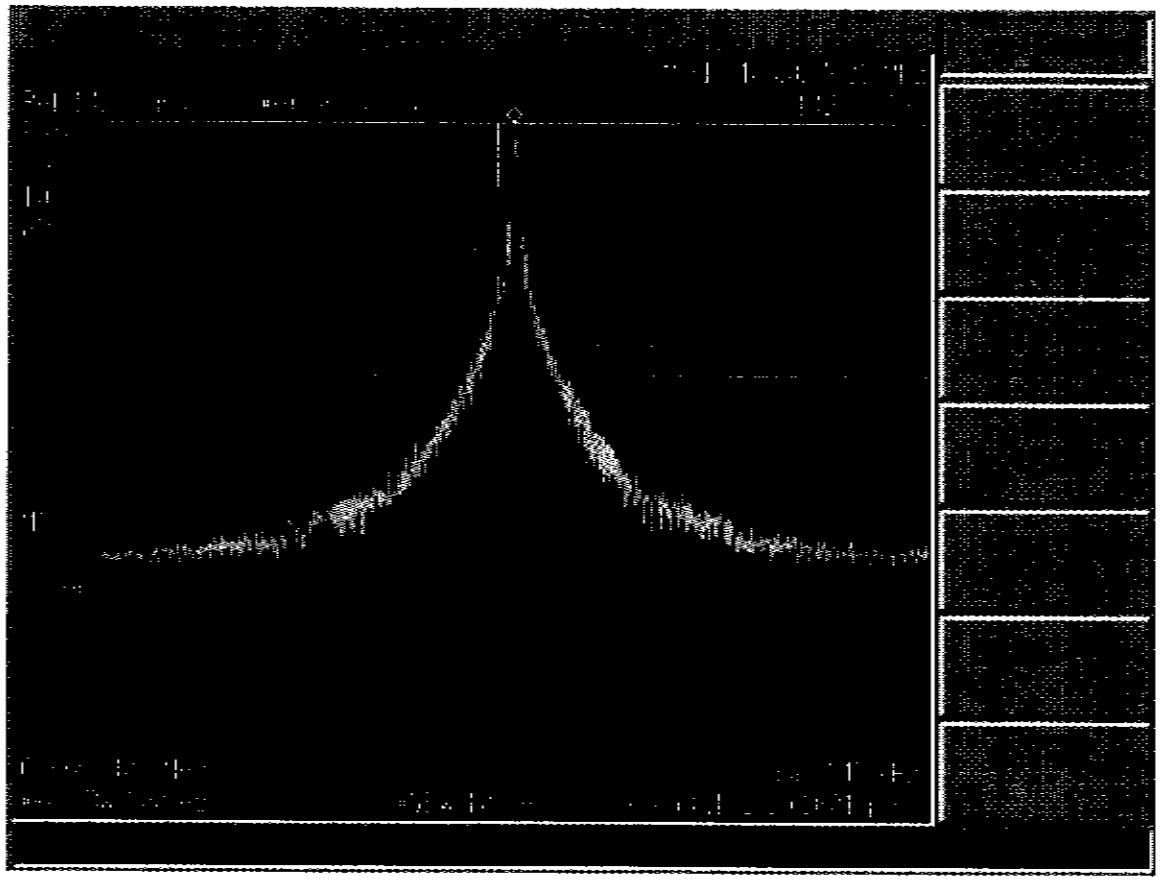
FFFE2F96EE3243D07FDFF93FEAB783E0F66C

```
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 2DDC6487A0FFBFF              2DDC6487A0FFBFF Default_Id
30 Hex (Bits 25-144) = 96EE3243D07FDFF93FEAB783E0F66C

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0010 1101 1101 1100 0110 0100 1000 0111 1010 0000 1111 1111 1011 1111 1111
   0010 0111 1111 1101 0101 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	366	USA	0101 1011 10
Protocol Code	37- 40	14	Test Serial (Standard)	1110
Spare	41- 64			0011 0010 0100 0011 1101 0000
Coarse Position	65- 85		DEFAULT	0111 1111 1101 1111 1111 1
BCH Encoded	86-106		Errors=0	0010 0111 1111 1101 0101 0
BCH Generated	86-106			0010 0111 1111 1101 0101 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

Digital Message at Maximum Temperature

2.2 SPURIOUS EMISSIONS



Combined Spurious Emissions Plot at Ambient Temperature, +55°C and -20°C

2.3 406 MHz VSWR CHECK – DECODED MESSAGE

FFFE2F96EE3243D07FDFF93FEAB783E0F66C

```
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 2DDC6487A0FFBFF              2DDC6487A0FFBFF Default_Id
30 Hex (Bits 25-144) = 96EE3243D07FDFF93FEAB783E0F66C

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0010 1101 1101 1100 0110 0100 1000 0111 1010 0000 1111 1111 1011 1111 1111
   0010 0111 1111 1101 0101 0110 1111 0000 0111 1100 0001 1110 1100 1101 1100
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
   86   90   94   98  102  106  110  114  118  122  126  130  134  138  142
```

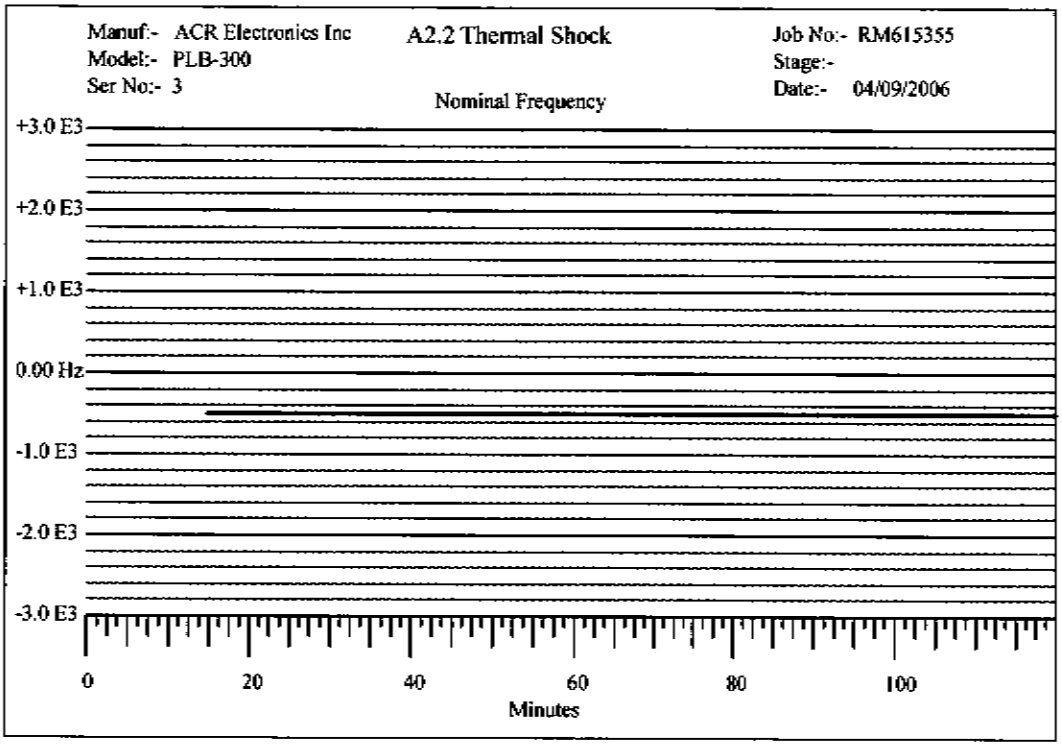
Field Name	Bit Pos	Value	Decode	Bits
Format Flag	25	1	Long Message	1
Protocol Flag	26	0	Location NEW	0
MID	27- 36	366	USA	0101 1011 10
Protocol Code	37- 40	14	Test Serial (Standard)	1110
Spare	41- 64			0011 0010 0100 0011 1101 0000
Coarse Position	65- 85		DEFAULT	0111 1111 1101 1111 1111 1
BCH Encoded	86-106		Errors=0	0010 0111 1111 1101 0101 0
BCH Generated	86-106			0010 0111 1111 1101 0101 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

2.4 SELF TEST MODE – DECODED MESSAGE

```
FFFED096EE3243D77FDFFE7A6A7700000000

Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
15 Hex (Bits 26- 85) = 2DDC6487AEFFBFF              2DDC6487AEFFBFF Default_Id
30 Hex (Bits 25-144) = 96EE3243D77FDFFE7A6A7700000000

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0010 1101 1101 1100 0110 0100 1000 0111 1010 1110 1111 1111 1011 1111 1111
   1100 1111 0100 1101 0100 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            1 Long Message: bcn entered Short Non-Spec    1
Protocol Flag       26            0 Location NEW                                0
MID                 27- 36      366 USA                              0101 1011 10
Protocol Code       37- 40       14 Test Serial (Standard)                   1110
Spare               41- 64                          0011 0010 0100 0011 1101 0111
Coarse Position     65- 85          DEFAULT           0111 1111 1101 1111 1111 1
BCH Encoded         86-106          Errors=0          1100 1111 0100 1101 0100 1
BCH Generated       86-106                            1100 1111 0100 1101 0100 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                --> Not Defined
```

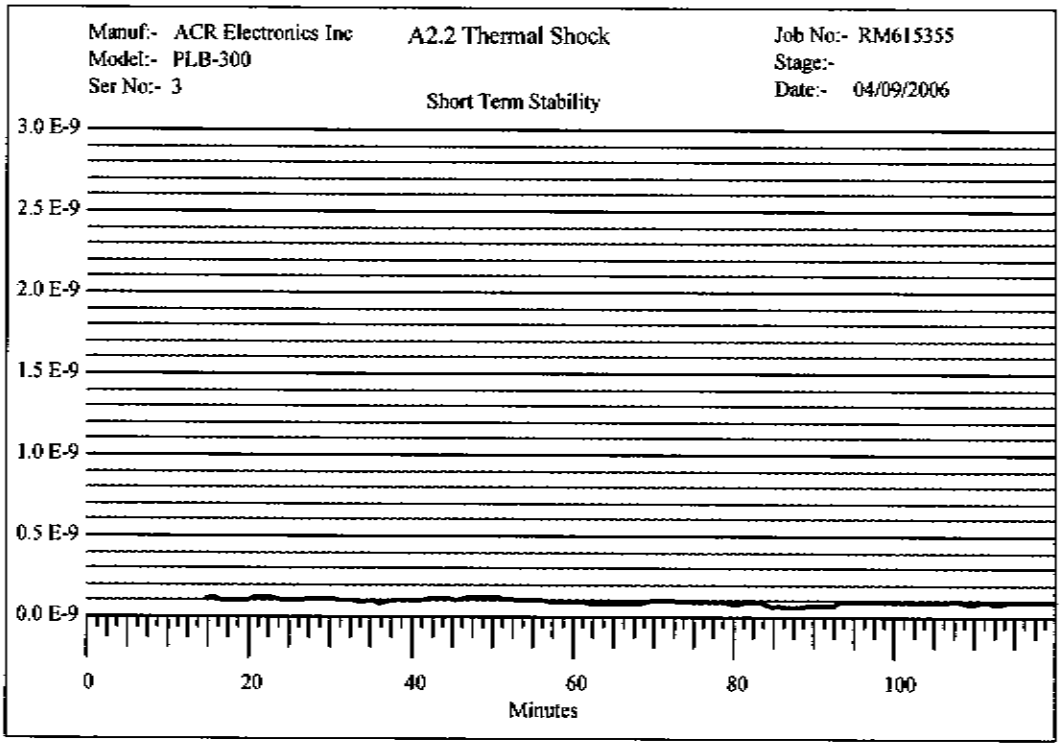
Results as reported on page 14.

2.5 THERMAL SHOCK



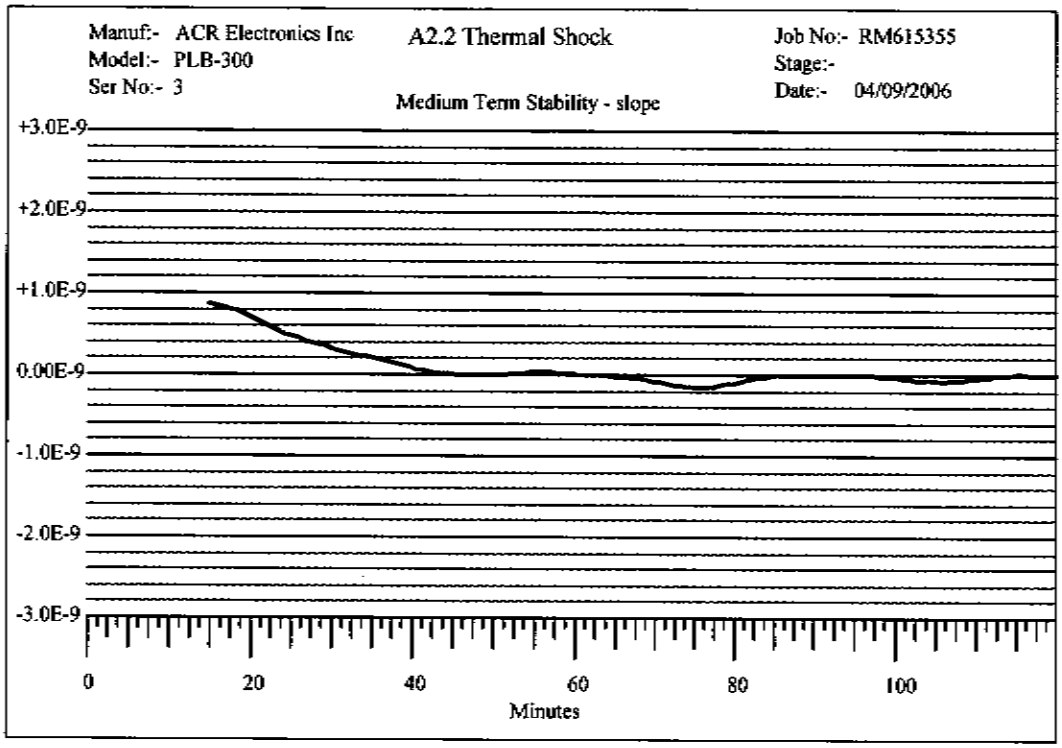
Thermal Shock - Nominal Frequency

2.5 THERMAL SHOCK



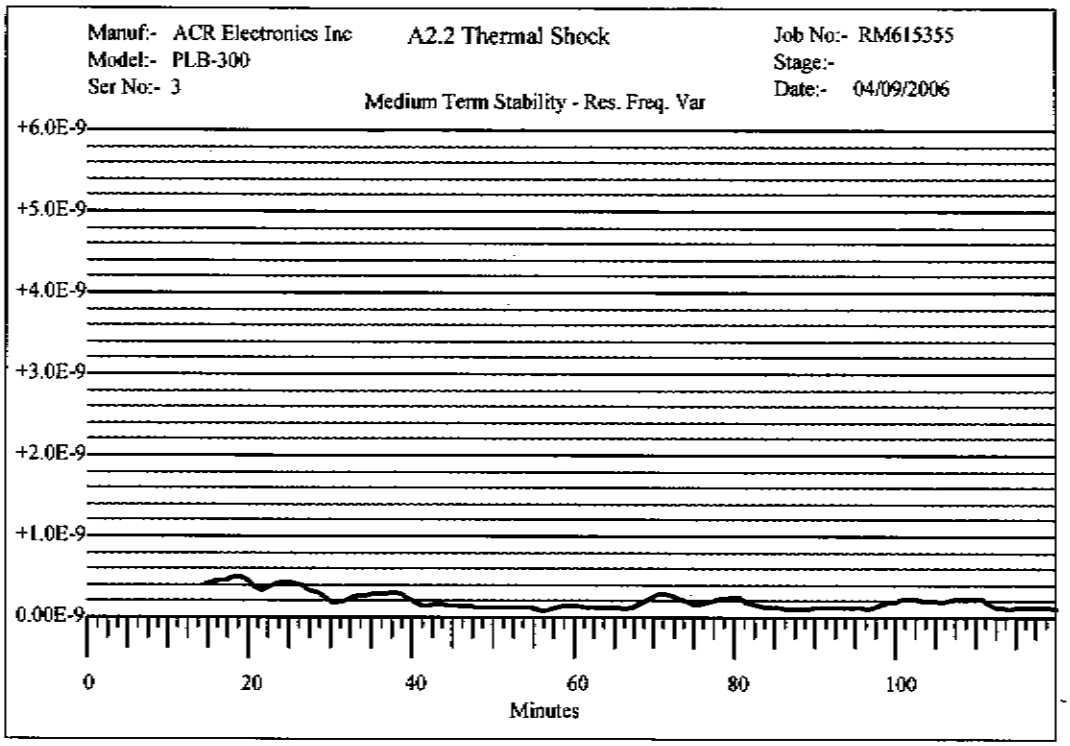
Thermal Shock - Short Term Stability

2.5 THERMAL SHOCK



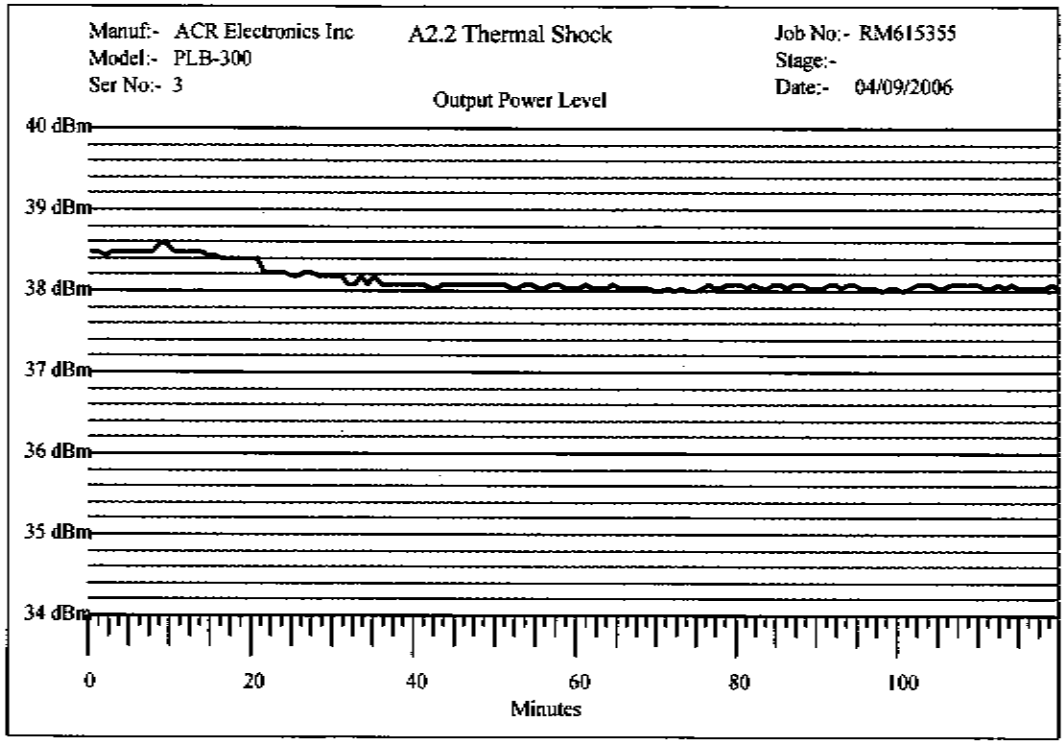
Thermal Shock - Medium Term Stability, Mean Slope

2.5 THERMAL SHOCK



Thermal Shock - Medium Term Stability, Residual Frequency Variation

2.5 THERMAL SHOCK



Thermal Shock - Output Power

2.5 THERMAL SHOCK

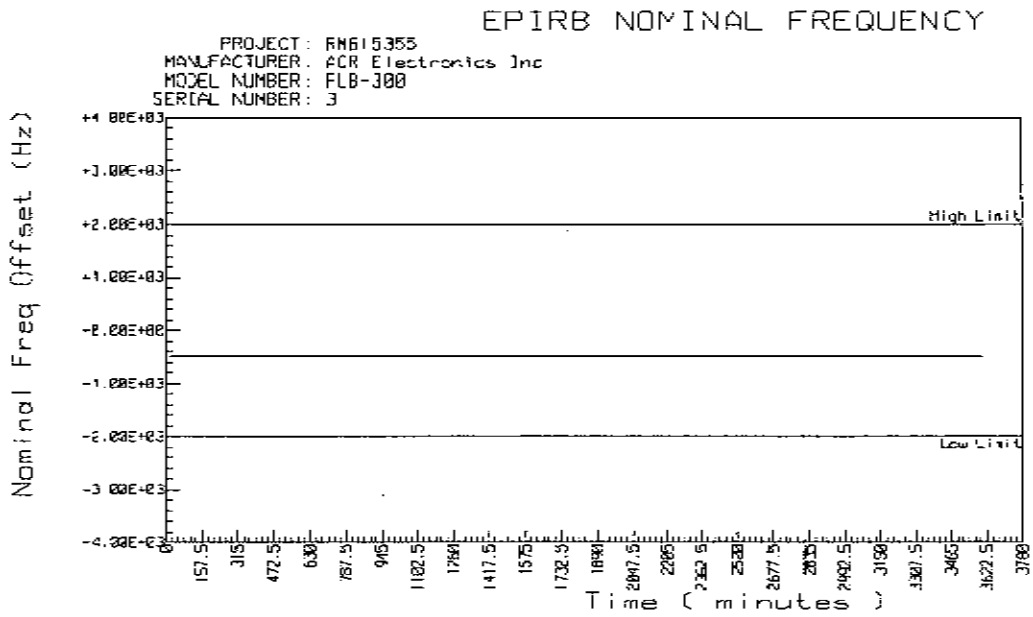
FFFE2F96EE3243D07FDFF93FEAB783E0F66C

```
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 2DDC6487A0FFBFF              2DDC6487A0FFBFF Default_Id
30 Hex (Bits 25-144) = 96EE3243D07FDFF93FEAB783E0F66C

26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
|    |    |    |    |    |    |    |    |    |    |    |    |    |    |
1 0010 1101 1101 1100 0110 0100 1000 0111 1010 0000 1111 1111 1011 1111 1111
0010 0111 1111 1101 0101 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	366	USA	0101 1011 10
Protocol Code	37- 40	14	Test Serial (Standard)	1110
Spare	41- 64			0011 0010 0100 0011 1101 0000
Coarse Position	65- 85		DEFAULT	0111 1111 1101 1111 1111 1
BCH Encoded	86-106		Errors=0	0010 0111 1111 1101 0101 0
BCH Generated	86-106			0010 0111 1111 1101 0101 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

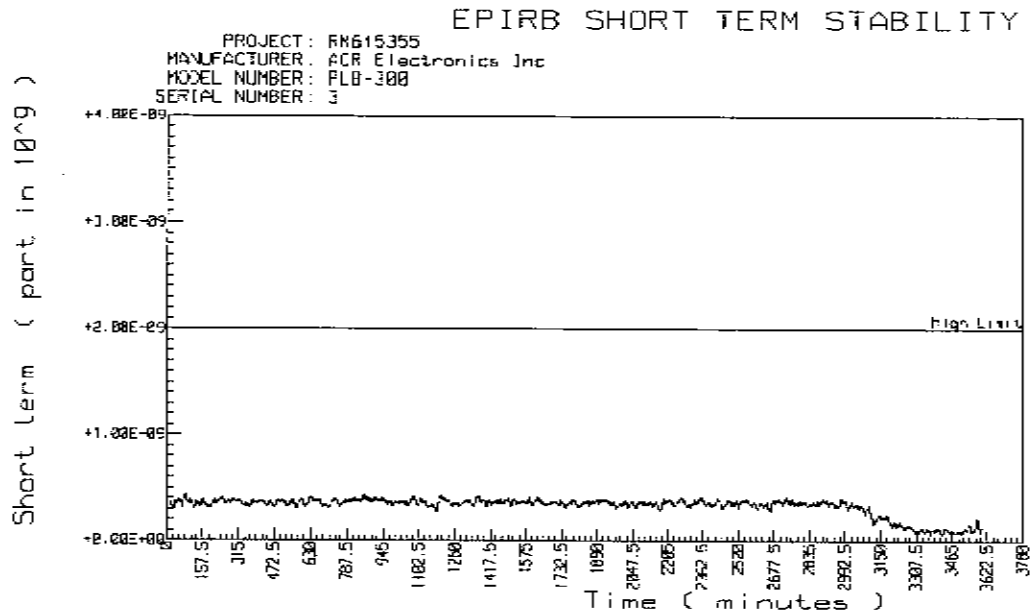
Thermal Shock - Digital Message

2.6 OPERATING LIFETIME AT MINIMUM TEMPERATURE



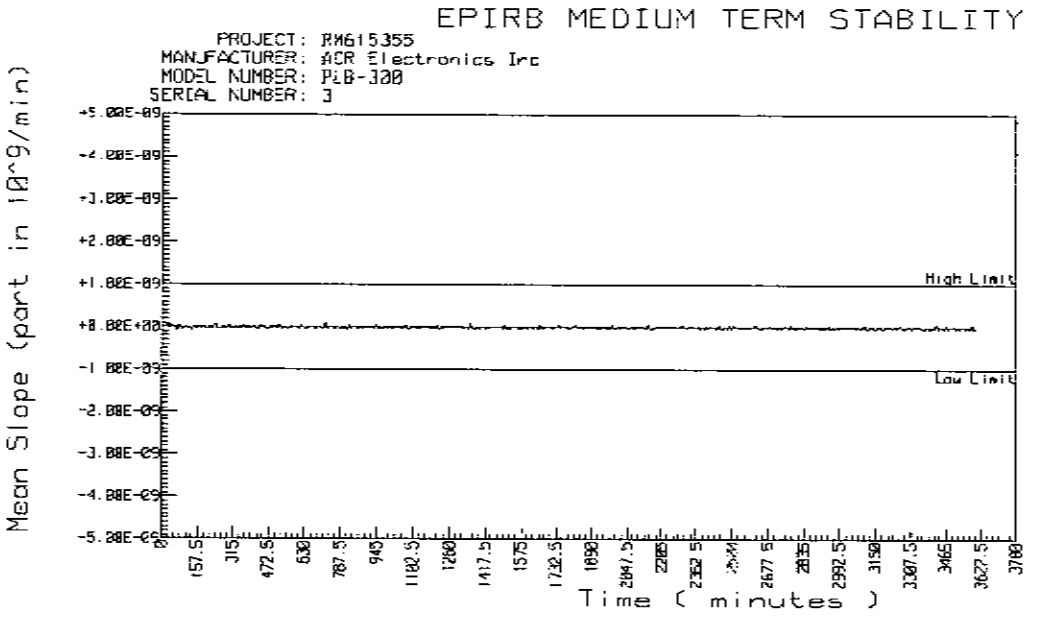
Operating Lifetime at Minimum Temperature - Nominal Frequency

2.6 OPERATING LIFETIME AT MINIMUM TEMPERATURE



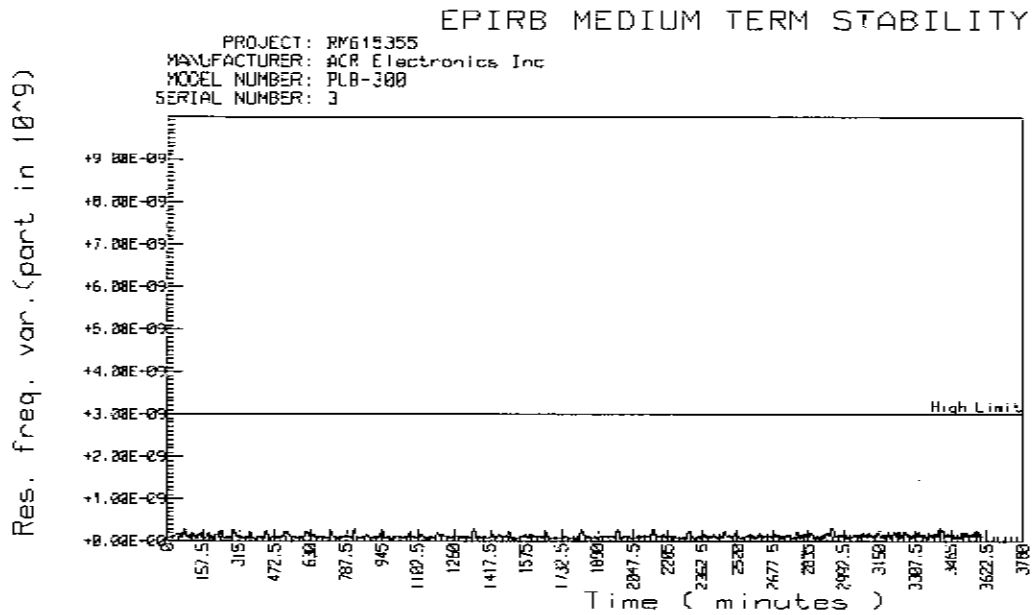
Operating Lifetime at Minimum Temperature - Short Term Stability

2.6 OPERATING LIFETIME AT MINIMUM TEMPERATURE



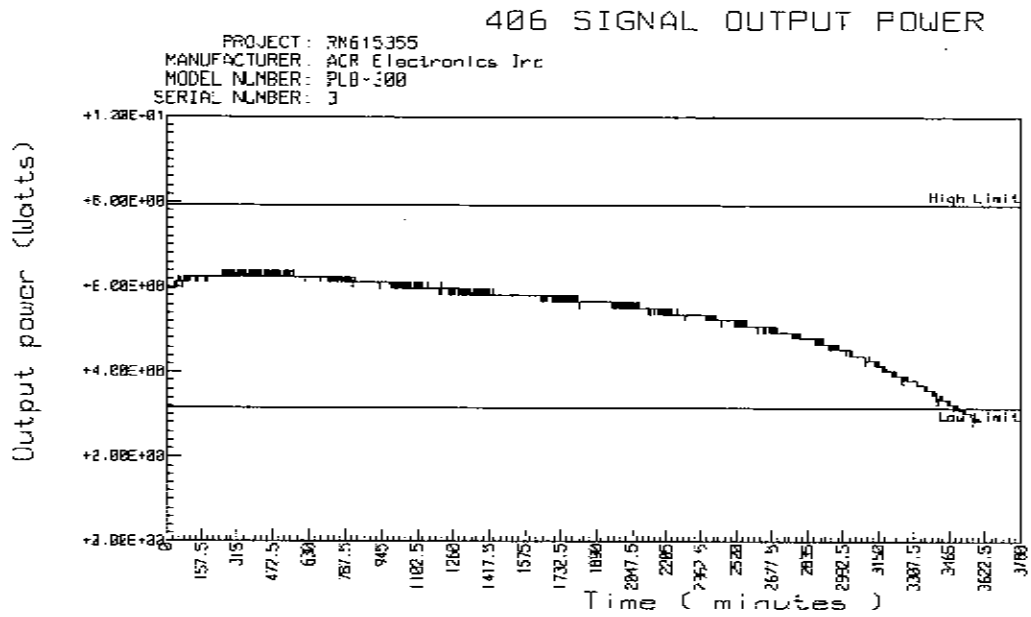
Operating Lifetime at Minimum Temperature - Medium Term Stability, Mean Slope

2.6 OPERATING LIFETIME AT MINIMUM TEMPERATURE



Operating Lifetime at Minimum Temperature - Medium Term Stability, Residual Frequency Variation

2.6 OPERATING LIFETIME AT MINIMUM TEMPERATURE



Operating Lifetime at Minimum Temperature - Output Power

2.6 OPERATING LIFETIME AT MINIMUM TEMPERATURE

FFFE2F96EE3243D07FDFF93FEAB783E0F66C

```
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 2DDC6487A0FFBFF              2DDC6487A0FFBFF Default_Id
30 Hex (Bits 25-144) = 96EE3243D07FDFF93FEAB783E0F66C

26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
|    |    |    |    |    |    |    |    |    |    |    |    |    |    |
1 0010 1101 1101 1100 0110 0100 1000 0111 1010 0000 1111 1111 1011 1111 1111
0010 0111 1111 1101 0101 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	366	USA	0101 1011 10
Protocol Code	37- 40	14	Test Serial (Standard)	1110
Spare	41- 64			0011 0010 0100 0011 1101 0000
Coarse Position	65- 85		DEFAULT	0111 1111 1101 1111 1111 1
BCH Encoded	86-106		Errors=0	0010 0111 1111 1101 0101 0
BCH Generated	86-106			0010 0111 1111 1101 0101 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

Operating Lifetime at Minimum Temperature - Digital Message

2.6 OPERATING LIFETIME AT MINIMUM TEMPERATURE

Battery Discharge Current

The discharge current for the batteries was measured for each of the following beacon states.

Beacon in the Off or Standby State, "Standby Current"
Beacon performing a Self-test, "Self-test Current"
Beacon activated and transmitting, "Operating Current"

The individual tests were conducted for the following durations:

Standby Current	:	20.7 minutes	(1239800 ms)
Self-test Current	:	9.99 seconds	(9990 ms)
Long GPS Test	:	10 minutes	(599950 ms)
Stuck Mode	:	20.4 minutes	(1223650 ms)
Operating Current	:	26.2 minutes	(1573450 ms)

Assumptions / Supplied Data

Battery Replacement Interval	: 5 years
Battery Capacity	: 2.8 Ah
Battery Self Drain	: 1.00 % per year
Self-test Interval	: 12 tests per year
Long GPS Test Interval	: 1 test(s) per battery
Stuck Mode Tests	: 60 test(s) per battery

Test Results

Mode Current	= Accumulated Charge	/ Time		
Standby Current	= 5332538 pC	/ 1239800 ms	=	4.30 nA
Self-test Current	= 1370996.8 uC	/ 9990 ms	=	137.24 mA
Long GPS Test	= 15424532 uC	/ 599950 ms	=	25.71 mA
Stuck Mode	= 24521273 uC	1223650 ms	=	20.04 mA
Operating Current	= 110263781 uC	/ 1573450 ms	=	70.08 mA

2.6 OPERATING LIFETIME AT MINIMUM TEMPERATURE

Battery Preconditioning / Discharge Time Calculations

Battery Self Drain = Capacity - [(100% - Self Drain/Year%)$^{\text{Replacement Interval}}$ x Capacity]
= 2.8- ((1- 0.0100)^{5} x 2.8) = 0.1372 Ah

Standby Drain = Hours per year x Battery Replacement Interval x Standby Current
= 365 x 24 x 5 x 4.30 x 10^{-9} = 0.0002 Ah
Worst Case = 1.65 x 0.0002 Ah = 0.0003 Ah

Self-test Drain = Self-tests per battery x Self-test Current x Self-test duration (in hours)
= 12 x 5 x 137.24 x 10^{-3} x (9.99 / 3600) = 0.0228 Ah
Worst Case = 1.65 x 0.0228 Ah = 0.0377 Ah

Long GPS Test = Tests per battery x Long GPS Test Current x Test duration (in hours)
= 1 x 25.71 x 10^{-3} x (10 / 60) = 0.0043 Ah
Worst Case = 1.65 x 0.0043 Ah = 0.0071 Ah

Stuck Mode = Tests per battery x Stuck Mode Current x duration (in hours)
= 60 x 20.04 x 10^{-3} x (20.4 / 60) = 0.4087 Ah
Worst Case = 1.65 x 0.4087 Ah = 0.6743 Ah

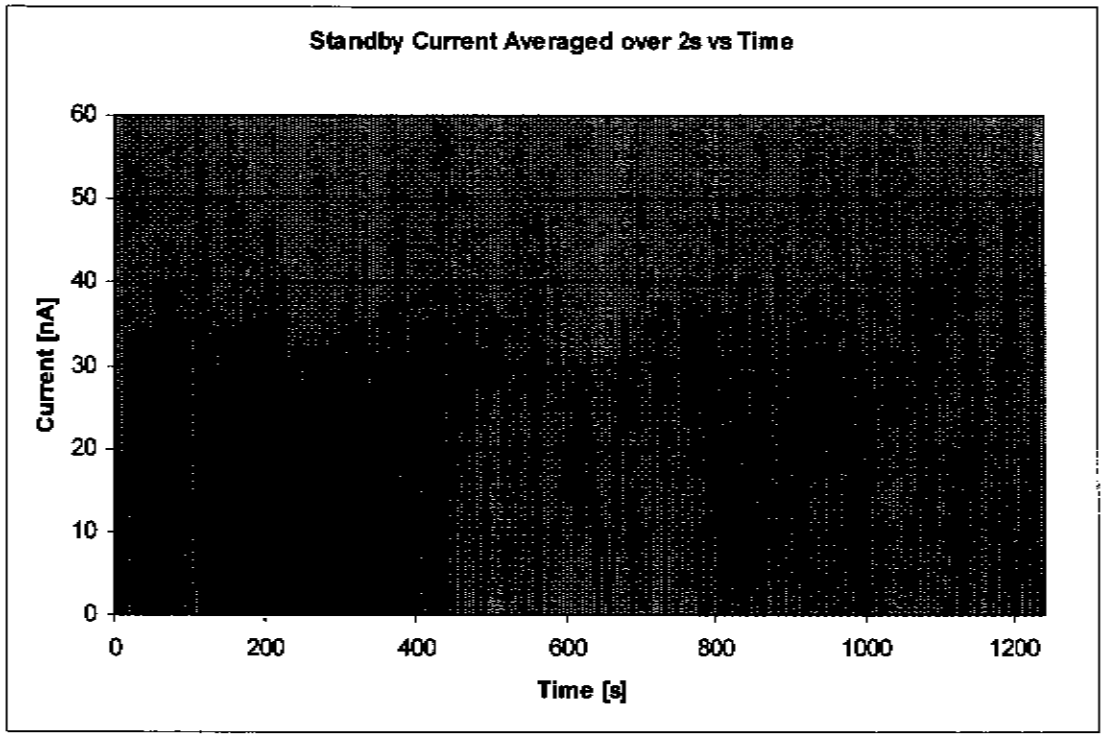
Total Drain = Self + Standby* + Self-test* + Long GPS Test* + Stuck Mode* Drains
= 0.1372 + 0.0003 + 0.0377 + 0.0071 + 0.6743
= 0.5882 Ah

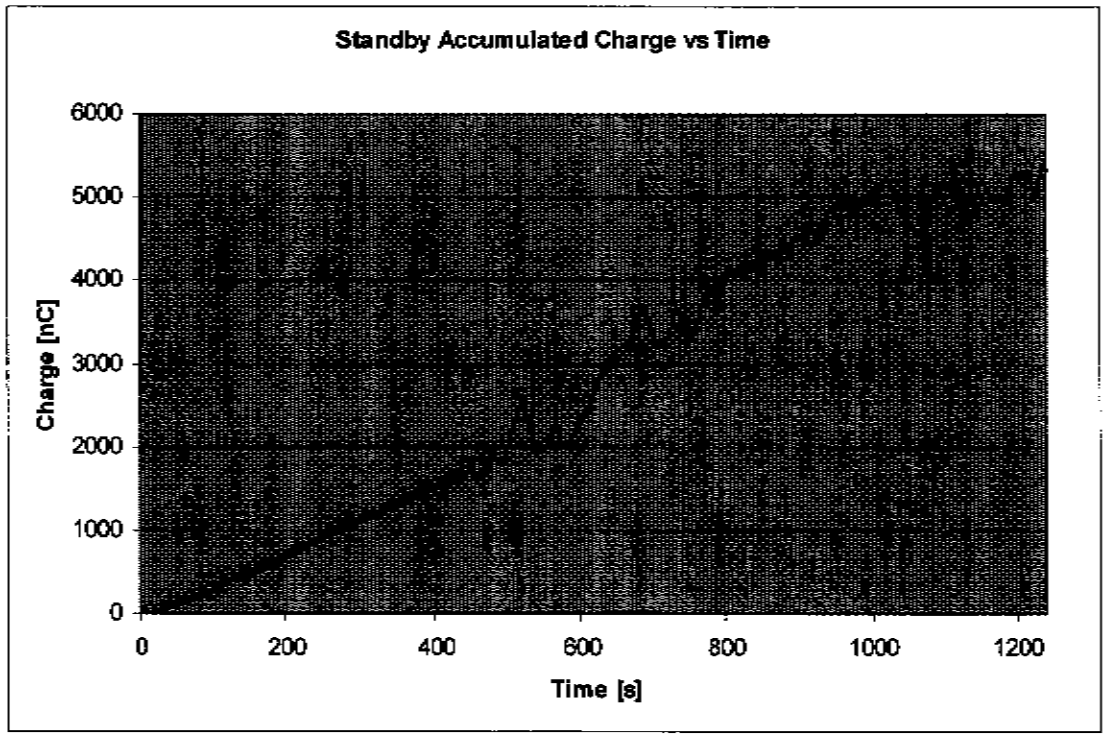
* Worst Case

Battery Preconditioning / Discharge Time = Worst Case drain / Operational Current
= 0.5882 / (70.08 x 10^{-3})
= 8.39 hours

2.10 OPERATING LIFETIME AT MINIMUM TEMPERATURE

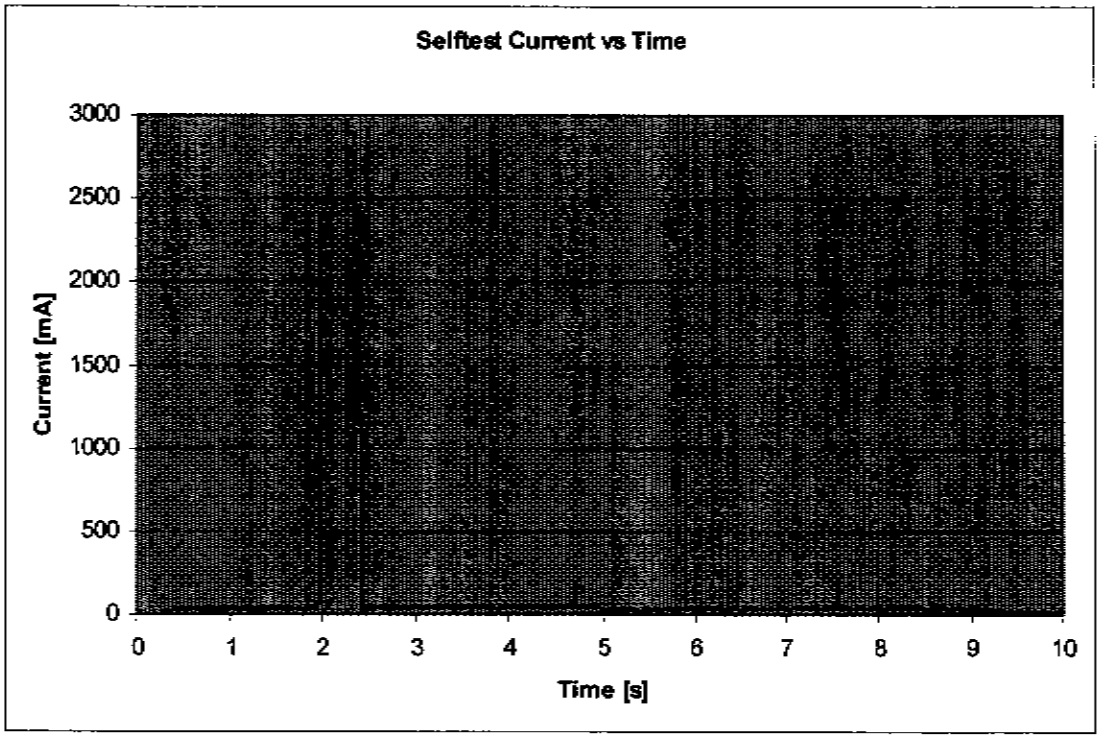
Battery Current Measurement Results (continued) - Standby Mode

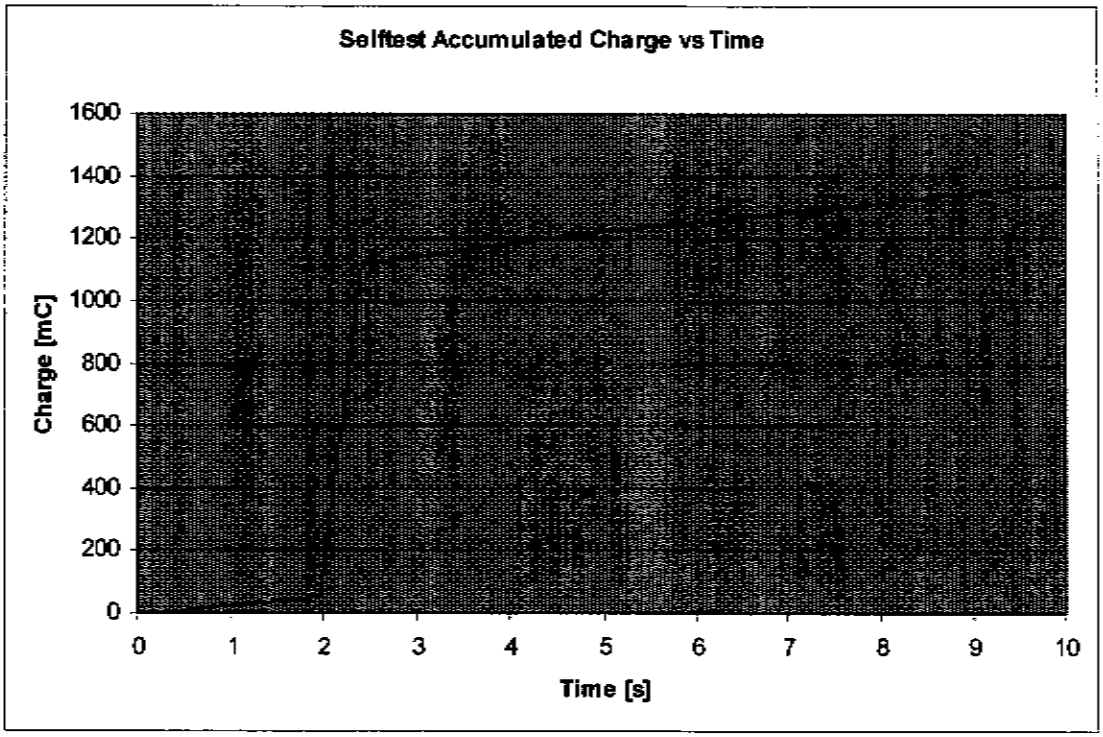




2.10 OPERATING LIFETIME AT MINIMUM TEMPERATURE

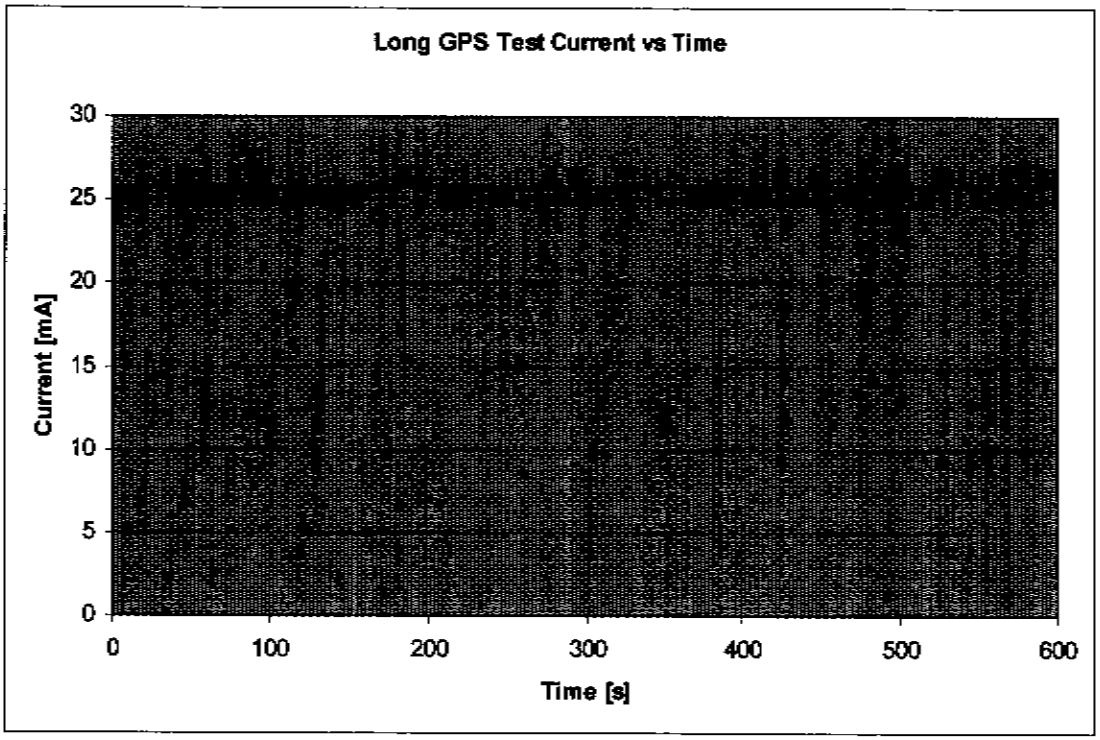
Battery Current Measurement Results (continued) - Selftest Mode

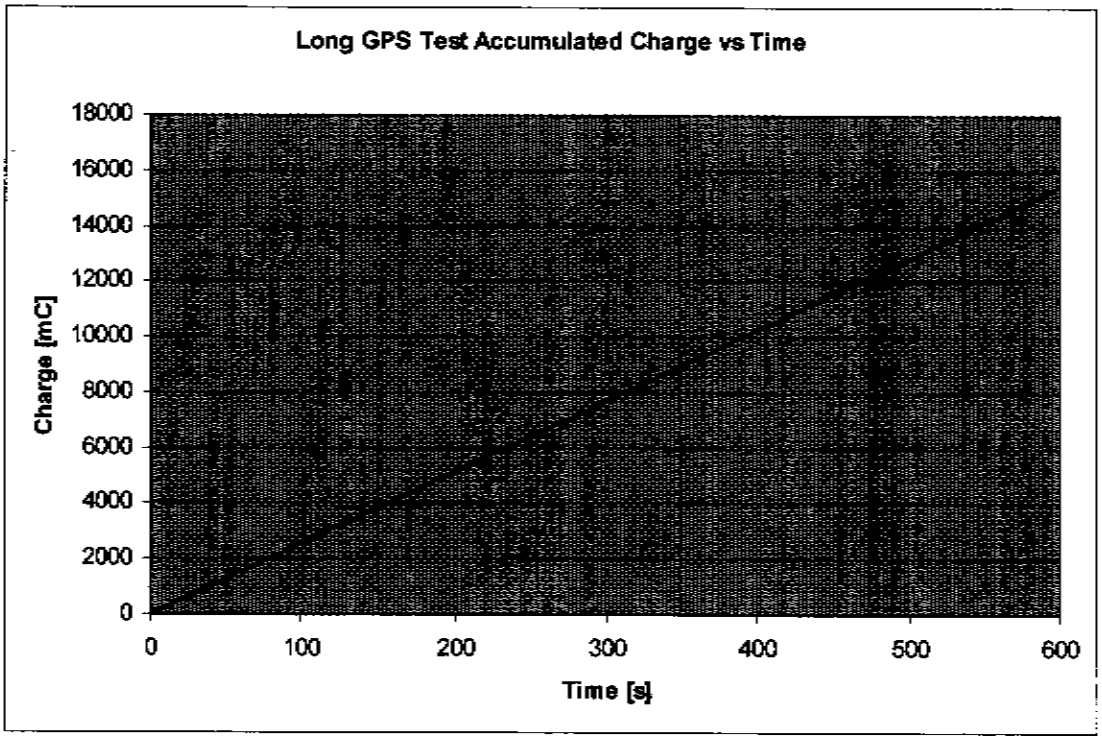




2.10 OPERATING LIFETIME AT MINIMUM TEMPERATURE

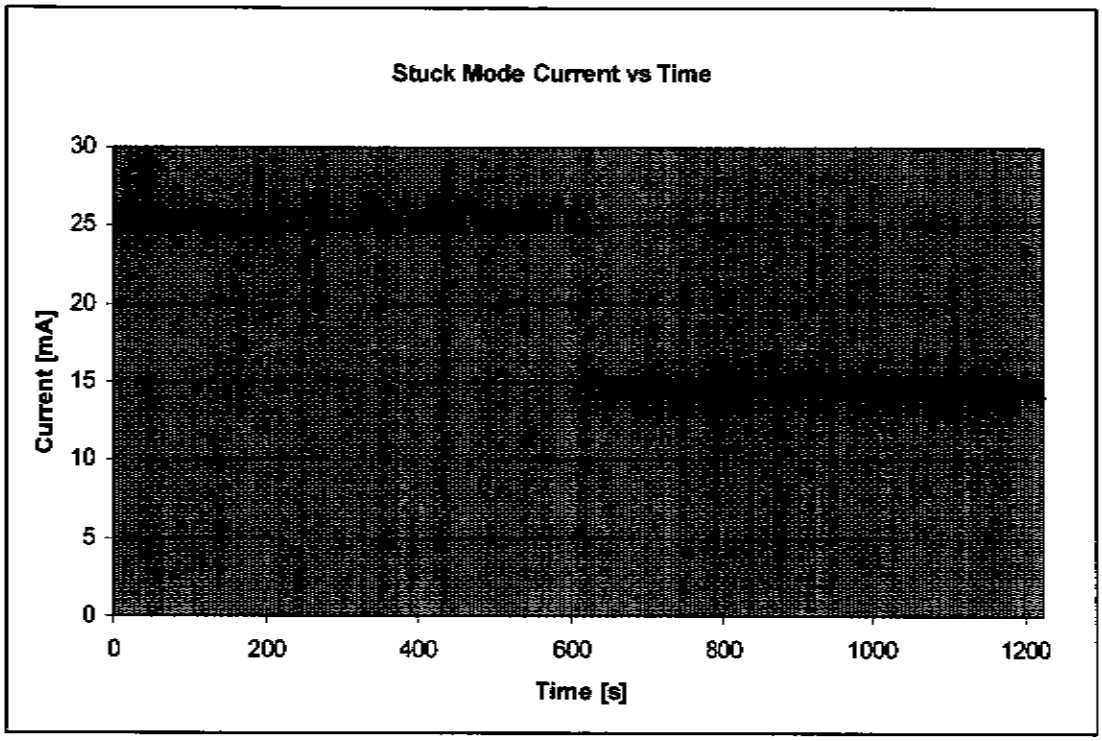
Battery Current Measurement Results (continued) – Long GPS test Mode

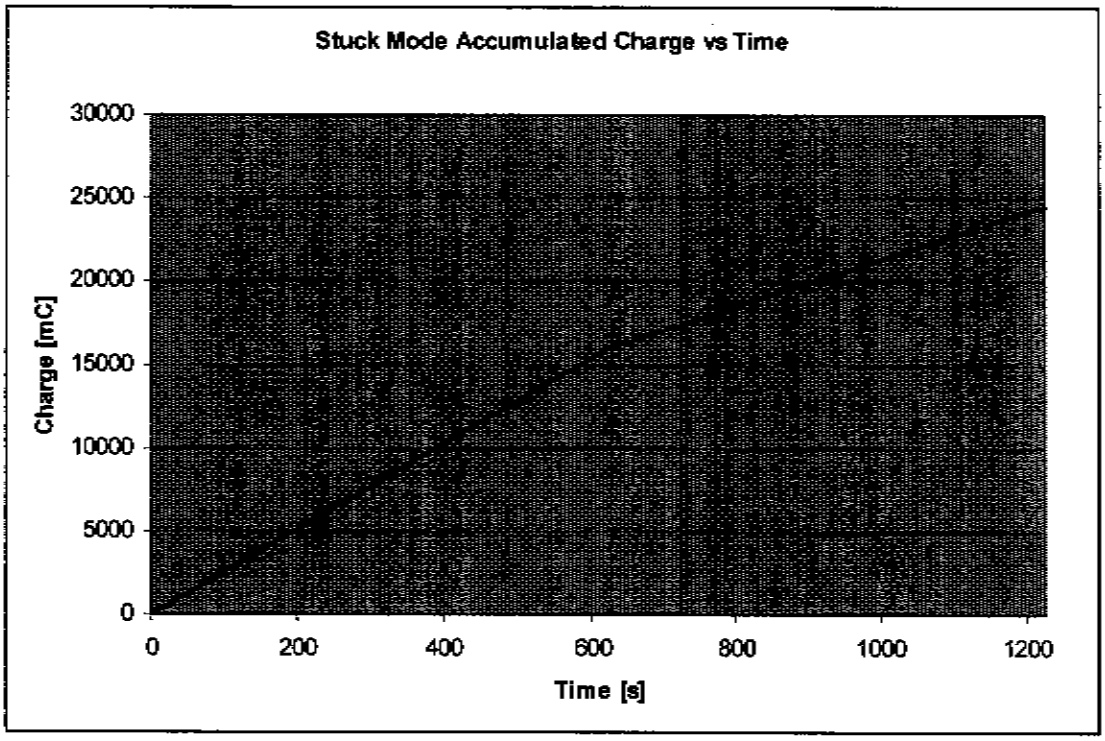




2.10 OPERATING LIFETIME AT MINIMUM TEMPERATURE

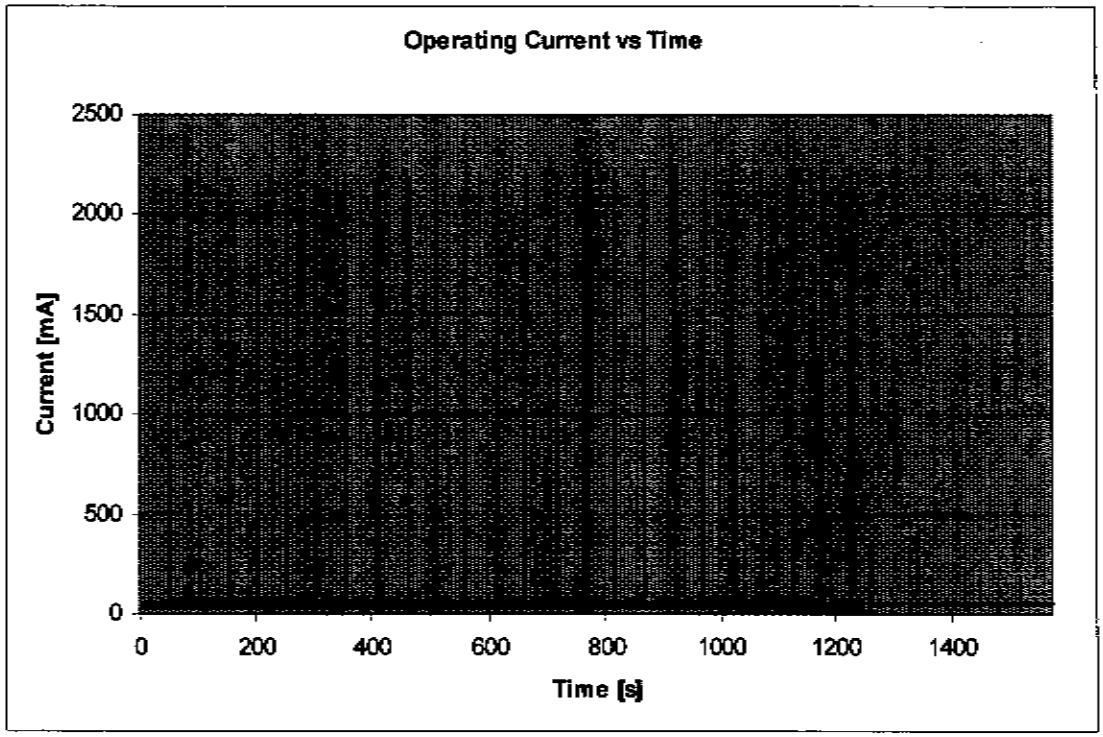
Battery Current Measurement Results (continued) – Stuck Mode

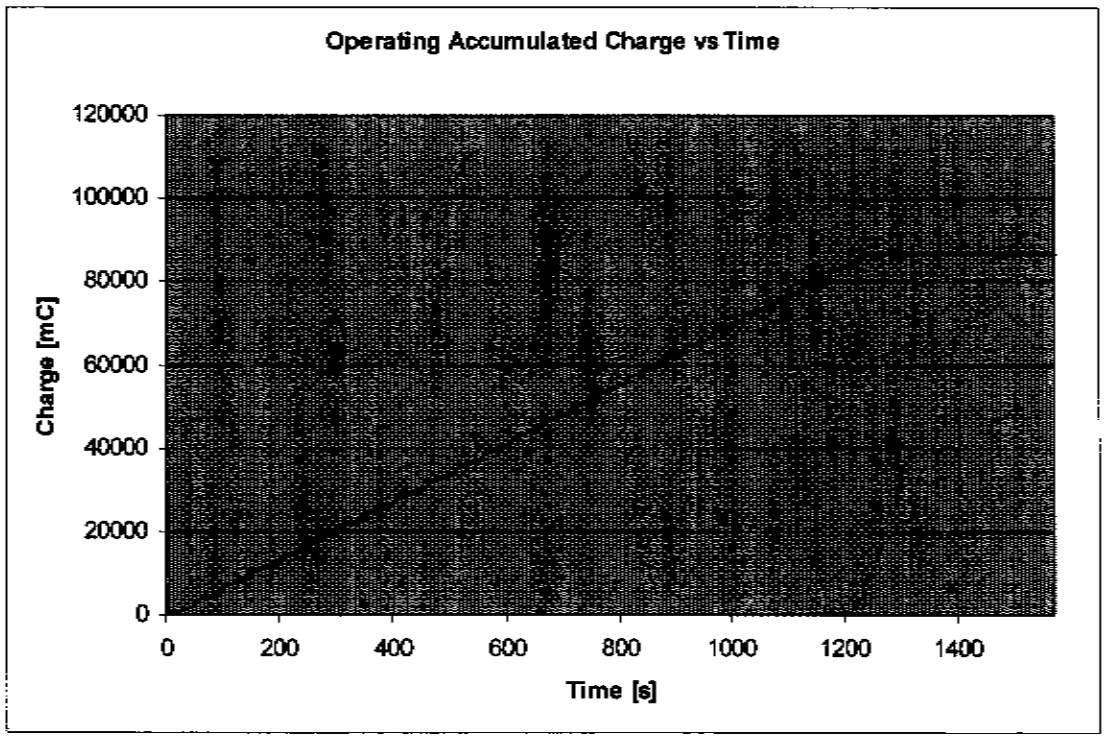




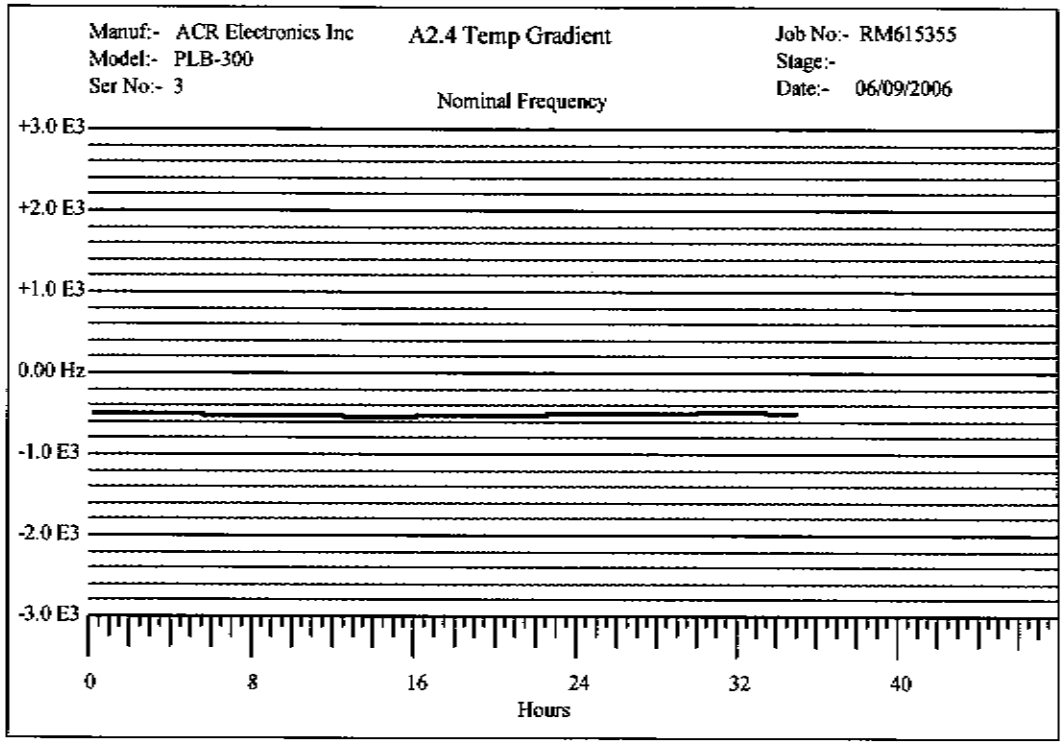
2.10 OPERATING LIFETIME AT MINIMUM TEMPERATURE

Battery Current Measurement Results (continued) - Operational Mode



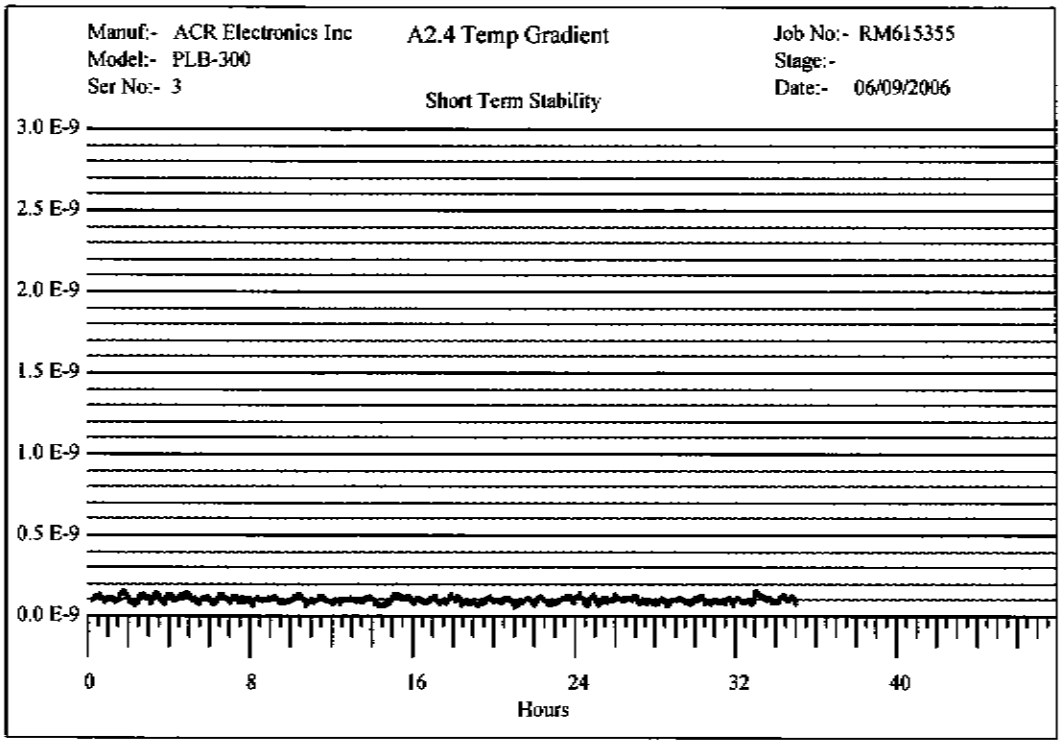


2.7 FREQUENCY STABILITY WITH TEMPERATURE GRADIENT



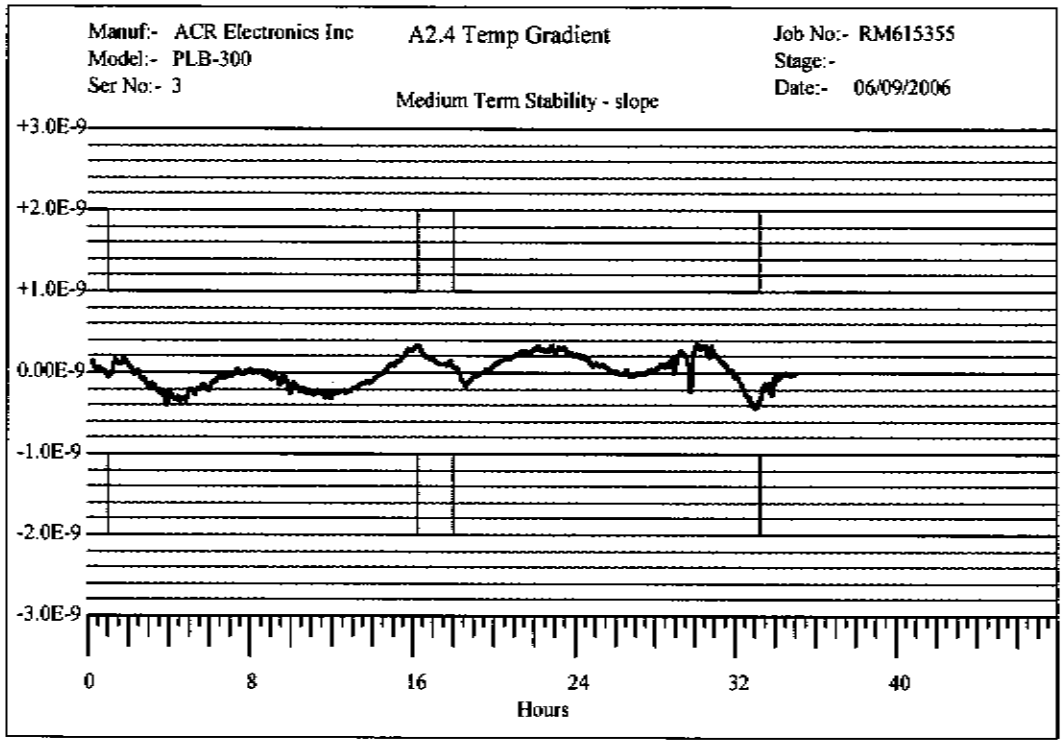
Temperature Gradient - Nominal Frequency

2.7 FREQUENCY STABILITY WITH TEMPERATURE GRADIENT



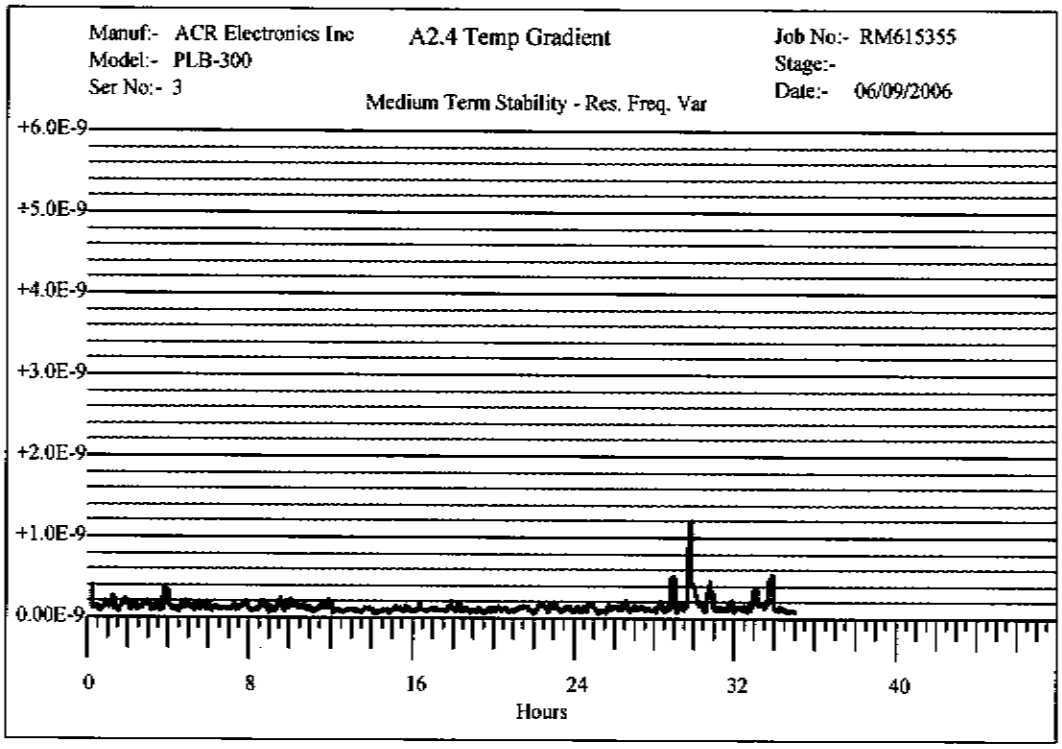
Temperature Gradient - Short Term Stability

2.7 FREQUENCY STABILITY WITH TEMPERATURE GRADIENT



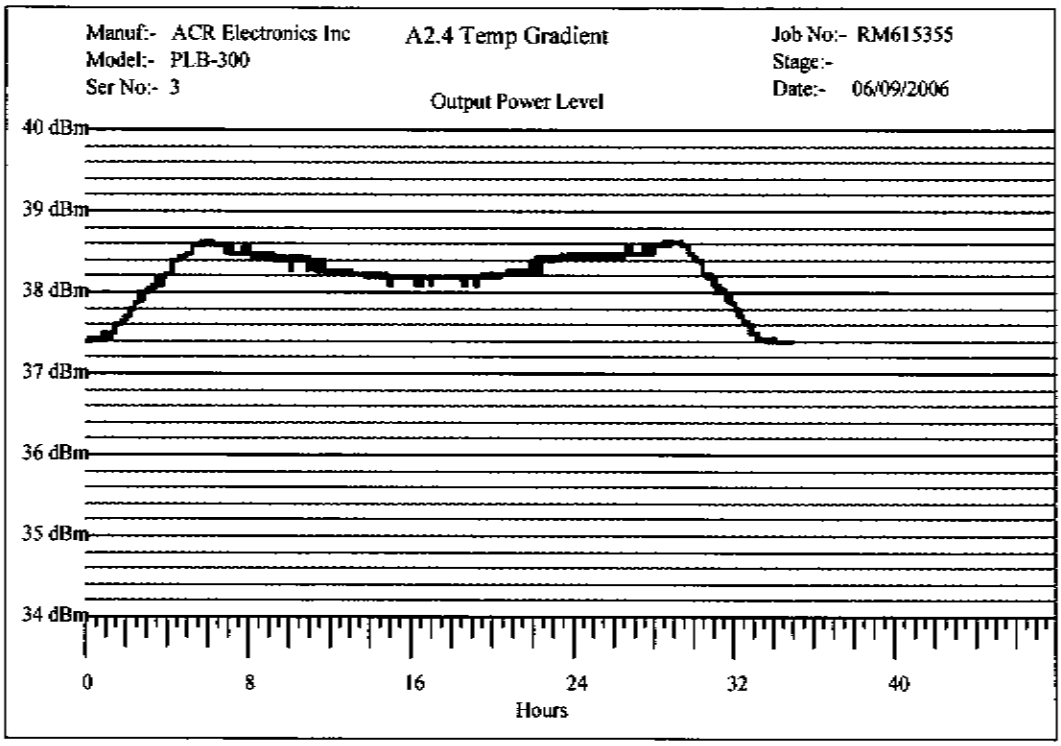
Temperature Gradient - Medium Terms Stability, Mean Slope

2.7 FREQUENCY STABILITY WITH TEMPERATURE GRADIENT



Temperature Gradient – Medium Term Stability, Residual Frequency Variation

2.7 FREQUENCY STABILITY WITH TEMPERATURE GRADIENT



Temperature Gradient – Output Power

2.7 FREQUENCY STABILITY WITH TEMPERATURE GRADIENT

FFFE2F96EE3243D07FDFF93FEAB783E0F66C

```
Beacon Id Format..... 30 Hex Id, Long Message, Bits 25-144
15 Hex (Bits 26- 85) = 2DDC6487A0FFBFF              2DDC6487A0FFBFF Default_Id
30 Hex (Bits 25-144) = 96EE3243D07FDFF93FEAB783E0F66C

26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
|    |    |    |    |    |    |    |    |    |    |    |    |    |    |
1 0010 1101 1101 1100 0110 0100 1000 0111 1010 0000 1111 1111 1011 1111 1111
0010 0111 1111 1101 0101 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	366	USA	0101 1011 10
Protocol Code	37- 40	14	Test Serial (Standard)	1110
Spare	41- 64			0011 0010 0100 0011 1101 0000
Coarse Position	65- 85		DEFAULT	0111 1111 1101 1111 1111 1
BCH Encoded	86-106		Errors=0	0010 0111 1111 1101 0101 0
BCH Generated	86-106			0010 0111 1111 1101 0101 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

Temperature Gradient – Digital Message Check

2.8 SATELLITE QUALITATIVE TESTS – WITHOUT LIFEJACKET

Date of the Test:	25th and 26th September 2006
Time of the Test:	11:35 to 11:40
Beacon Model:	PLB-300
Antenna Part/Model Number	A3-06-2493
Beacon 15 Hex ID:	2DDC6 487AC FFBFF
Actual location of the test beacon:	Latitude: 050° 49.091' N Longitude: 001° 11.870' W
Beacon test configuration (e.g. on dry ground floating in water etc):	C/S T.007 Figure B.2

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg)	Location Error (km)
S10	6966	2DDC6 487AC FFBFF	52.25045	-1.73583	-124.24	11:33:17	12.602	1.093
S6	60537	2DDC6 487AC FFBFF	52.24495	-1.73117	-130.98	11:08:05	5.746	0.477
S9	22117	2DDC6 487AC FFBFF	52.23258	-1.72262	-125.82	09:23:49	-16.193	1.146
S7	43512	2DDC6 487AC FFBFF	52.23539	-1.71221	-126.14	07:50:31	11.992	1.526
S7	43511	2DDC6 487AC FFBFF	52.23983	-1.71994	-114.62	06:11:04	-2.215	0.884
S7	43510	2DDC6 487AC FFBFF	52.24161	-1.71973	-117.35	04:30:12	-17.640	0.696
S10	6962	2DDC6 487AC FFBFF	52.24043	-1.72286	-132.36	05:00:49	19.321	0.680
S8	30983	2DDC6 487AC FFBFF	52.24092	-1.72538	-123.13	04:36:31	1.983	0.507
S10	6961	2DDC6 487AC FFBFF	52.24448	-1.72098	-124.42	03:21:19	6.769	0.905
S8	30982	2DDC6 487AC FFBFF	52.23407	-1.72399	-125.41	02:55:16	-13.365	0.958
S10	6960	2DDC6 487AC FFBFF	52.24154	-1.72019	-124.04	01:40:25	-8.223	0.864
S9	22111	2DDC6 487AC FFBFF	52.24355	-1.71778	-119.06	22:54:52	-11.355	1.069
S8	30976	2DDC6 487AC FFBFF	52.24289	-1.71700	-123.15	16:21:06	-14.131	1.103
S10	6954	2DDC6 487A6 FFBFF	52.24134	-1.71858	-128.96	15:05:47	-18.713	0.972
S9	22110	2DDC6 487AC FFBFF	52.25056	-1.72766	-124.64	21:14:33	3.789	1.142
S9	22109	2DDC6 487AC FFBFF	52.24562	-1.73122	-119.83	19:35:36	16.956	0.549
S7	43504	2DDC6 487AC FFBFF	52.24989	-1.71798	-122.85	18:01:42	-9.814	1.439
S7	43503	2DDC6 487AC FFBFF	52.24954	-1.72337	-123.36	16:21:34	5.217	1.167
S7	43502	2DDC6 487A6 FFBFF	52.24648	-1.72698	-120.31	14:42:47	18.100	0.748
S10	6953	2DDC6 487A6 FFBFF	52.24476	-1.71973	-118.04	13:23:53	-3.131	0.995
S8	30975	2DDC6 487A6 FFBFF	52.24602	-1.72557	-121.72	14:39:47	1.264	0.763
S9	22105	2DDC6 487A6 FFBFF	52.24356	-1.71874	-127.17	13:06:37	15.999	1.007
S8	30974	2DDC6 487A6 FFBFF	52.24959	-1.73279	-127.28	12:59:53	14.899	0.979
S10	6952	2DDC6 487A6 FFBFF	52.24573	-1.72862	-124.55	11:43:27	11.275	0.620
S9	22104	2DDC6 487A6 FFBFF	52.23994	-1.72392	-122.99	11:27:34	2.609	0.614

Ratio of Successful Solutions = $\frac{\text{number of Doppler solutions within 5km with 1°<CTA<21°}}{\text{number of satellite passes over test duration with 1°<CTA<21°}}$

$= \frac{25}{25} = 100\ \%$

2.8 SATELLITE QUALITATIVE TESTS – WITHOUT LIFEJACKET

Date of the Test:	28th and 29th September 2006
Time of the Test:	16:57 to 07:26
Beacon Model:	PLB-300
Antenna Part/Model Number	A3-06-2493
Beacon 15 Hex ID:	2DDC6 487AC FFBFF
Actual location of the test beacon:	Latitude: 052° 14.447' N Longitude: 001° 43.970' W
Beacon test configuration (e.g. on dry ground floating in water etc):	C/S T.007 Figure B.5

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg)	Location Error (km)
S7	43554	2DDC6 487AC FFBFF	52.24031	-1.71670	-125.21	06:39:40	2.080	1.099
S7	43553	2DDC6 487AC FFBFF	52.23835	-1.72234	-120.64	04:59:14	-13.178	0.764
S8	31026	2DDC6 487AC FFBFF	52.24260	-1.72399	-128.51	05:41:48	11.076	0.635
S10	7004	2DDC6 487AC FFBFF	52.23554	-1.73249	-129.23	04:30:30	15.866	0.583
S8	31025	2DDC6 487AC FFBFF	52.23644	-1.73485	-126.55	04:01:29	-3.292	0.502
S10	7003	2DDC6 487AC FFBFF	52.24176	-1.72023	-124.29	02:50:34	2.362	0.864
S8	31024	2DDC6 487AC FFBFF	52.23432	-1.72414	-127.81	02:19:42	-18.851	0.930
S10	7002	2DDC6 487AC FFBFF	52.23996	-1.72314	-125.89	01:09:14	-13.004	0.666
S9	22154	2DDC6 487AC FFBFF	52.24526	-1.72090	-131.66	23:26:15	-16.177	0.952
S9	22152	2DDC6 487AC FFBFF	52.24909	-1.73264	-126.42	20:06:07	13.193	0.923
S7	43547	2DDC6 487AC FFBFF	52.24616	-1.71734	-128.75	18:30:37	-14.286	1.212

Ratio of Successful Solutions = $\frac{\text{number of Doppler solutions within 5km with 1°<CTA<21°}}{\text{number of satellite passes over test duration with 1°<CTA<21°}}$

$= \frac{11}{11} = 100\ \%$

2.8 SATELLITE QUALITATIVE TESTS – WITH FLOATATION SUIT

Date of the Test:	13th and 14th September 2006
Time of the Test:	10:39 to 11:11
Beacon Model:	PLB-300
Antenna Part/Model Number	A3-06-2493
Beacon 15 Hex ID:	2DDC6487A6FFBFF
Actual location of the test beacon:	Latitude: 050° 49.091' N Longitude: 001° 11.870'W
Beacon test configuration (e.g. on dry ground floating in water etc):	C/S T.007 Figure B.2

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg)	Location Error (km)
S9	21932	2DDC6 487A6 FFBFF	50.81784	-1.19364	-114.37	09:23:18	-16.155	0.297
S6	60353	2DDC6 487A6 FFBFF	50.85111	-1.28218	-127.65	10:36:01	1.948	6.959
S6	60352	2DDC6 487A6 FFBFF	50.83278	-1.17429	-130.75	06:54:52	-13.812	2.316
S7	43327	2DDC6 487A6 FFBFF	50.81426	-1.20698	-121.30	08:00:01	14.171	0.776
S7	43325	2DDC6 487A6 FFBFF	50.81154	-1.19487	-114.62	04:40:06	-16.090	0.767
S8	30800	2DDC6 487A6 FFBFF	50.81497	-1.19341	-119.30	05:27:31	10.373	0.473
S8	30798	2DDC6 487A6 FFBFF	50.82144	-1.19555	-115.56	02:05:12	-20.738	0.396
S8	30799	2DDC6 487A6 FFBFF	50.81882	-1.20209	-121.75	03:47:06	-4.668	0.307
S10	6777	2DDC6 487A6 FFBFF	50.81691	-1.19645	-120.24	02:13:53	-2.584	0.172
S10	6776	2DDC6 487A6 FFBFF	50.81644	-1.19620	-115.08	00:32:03	-18.652	0.225
S9	21926	2DDC6 487A6 FFBFF	50.82522	-1.19042	-120.72	22:53:28	-11.430	0.939
S6	60346	2DDC6 487A6 FFBFF	50.84209	-1.19830	-127.74	22:20:28	-13.685	2.657
S9	21925	2DDC6 487A6 FFBFF	50.82346	-1.20703	-118.88	21:13:11	4.196	0.872
S6	60345	2DDC6 487A6 FFBFF	50.83726	-1.19896	-127.83	20:39:20	2.136	2.121
S9	21924	2DDC6 487A6 FFBFF	50.82796	-1.21326	-122.59	19:34:18	17.812	1.534
S6	60344	2DDC6 487A6 FFBFF	50.83715	-1.22683	-130.37	18:59:37	16.143	2.930
S7	43319	2DDC6 487A6 FFBFF	50.82565	-1.18992	-119.93	18:10:41	-11.414	0.999
S7	43318	2DDC6 487A6 FFBFF	50.82414	-1.20256	-115.18	16:30:27	4.209	0.740
S8	30791	2DDC6 487A6 FFBFF	50.82280	-1.20107	-110.84	13:49:52	8.526	0.561
S8	30792	2DDC6 487A6 FFBFF	50.83183	-1.19382	-120.43	15:30:28	-6.751	1.542
S7	43317	2DDC6 487A6 FFBFF	50.82817	-1.21665	-122.56	14:51:36	17.843	1.725
S10	6770	2DDC6 487A6 FFBFF	50.82921	-1.18846	-121.05	13:56:36	-8.300	1.391
S10	6769	2DDC6 487A6 FFBFF	50.82150	-1.20304	-113.46	12:15:43	7.188	0.519
S9	21920	2DDC6 487A6 FFBFF	50.81420	-1.19640	-122.77	13:05:57	17.022	0.454
S6	60340	2DDC6 487A6 FFBFF	50.82480	-1.21290	-128.68	12:28:31	17.607	1.288
S10	6768	2DDC6 487A6 FFBFF	50.82183	-1.20486	-116.53	10:36:16	20.209	0.638
S9	21919	2DDC6 487A6 FFBFF	50.81654	-1.18717	-119.93	11:26:58	3.216	0.771
S6	60339	2DDC6 487A6 FFBFF	50.83124	-1.21736	-128.79	10:48:58	3.953	1.997

Ratio of Successful Solutions = $\frac{\text{number of Doppler solutions within 5km with 1°<CTA<21°}}{\text{number of satellite passes over test duration with 1°<CTA<21°}}$

$= \frac{27}{28} = 96.43\ \%$

2.8 SATELLITE QUALITATIVE TESTS – WITH FLOATATION SUIT

Date of the Test:	27th and 28th September 2006
Time of the Test:	11:30 to 07:11
Beacon Model:	PLB-300
Antenna Part/Model Number	A3-06-2493
Beacon 15 Hex ID:	2DDC6 487A6 FFBFF
Actual location of the test beacon:	Latitude: 052° 14.447' N Longitude: 001° 43.970'W
Beacon test configuration (e.g. on dry ground floating in water etc):	C/S T.007 Figure B.5

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg)	Location Error (km)
S7	43540	2DDC6 487A6 FFBFF	52.24106	-1.72266	-122.19	07:03:22	5.508	0.693
S7	43539	2DDC6 487A6 FFBFF	52.23643	-1.72219	-123.76	05:23:16	-9.495	0.871
S10	6990	2DDC6 487A6 FFBFF	52.24398	-1.71747	-130.29	04:40:37	17.061	1.104
S8	31011	2DDC6 487A6 FFBFF	52.23961	-1.72169	-123.10	04:13:11	-1.506	0.769
S10	6989	2DDC6 487A6 FFBFF	52.24051	-1.71602	-124.57	03:00:50	3.855	1.144
S8	31010	2DDC6 487A6 FFBFF	52.23477	-1.72403	-126.22	02:31:35	-17.028	0.897
S10	6988	2DDC6 487A6 FFBFF	52.23746	-1.72463	-126.95	01:19:39	-11.410	0.669
S9	22140	2DDC6 487A6 FFBFF	52.24491	-1.71918	-134.15	23:49:39	-19.725	1.036
S6	60558	2DDC6 487A6 FFBFF	52.26212	-1.72792	-132.45	22:27:31	-14.158	2.395
S9	22139	2DDC6 487A6 FFBFF	52.24422	-1.72158	-123.98	22:08:32	-4.264	0.856
S9	22138	2DDC6 487A6 FFBFF	52.24456	-1.72713	-118.25	20:28:51	10.200	0.572
S6	60557	2DDC6 487A6 FFBFF	52.25565	-1.73473	-132.56	20:46:17	1.221	1.657
S6	60556	2DDC6 487A6 FFBFF	52.22199	-1.73068	-134.39	19:06:28	14.909	2.094
S7	43533	2DDC6 487A6 FFBFF	52.24616	-1.71709	-131.44	18:54:46	-17.958	1.349
S7	43532	2DDC6 487A6 FFBFF	52.24609	-1.71543	-122.56	17:13:52	-2.530	1.436
S8	31004	2DDC6 487A6 FFBFF	52.25025	-1.71393	-124.56	15:57:29	-10.473	1.662
S7	43531	2DDC6 487A6 FFBFF	52.27364	-1.71260	-133.52	15:34:23	11.696	3.902
S10	6982	2DDC6 487A6 FFBFF	52.24893	-1.71994	-130.58	14:44:51	-15.533	1.261
S8	31003	2DDC6 487A6 FFBFF	52.25676	-1.73364	-124.22	14:16:31	4.678	1.776
S9	22133	2DDC6 487A6 FFBFF	52.24283	-1.72183	-121.95	12:21:12	10.187	0.782
S8	31002	2DDC6 487A6 FFBFF	52.24840	-1.74042	-126.01	12:36:56	17.630	0.991
S10	6980	2DDC6 487A6 FFBFF	52.25197	-1.73449	-128.09	11:23:07	13.894	1.248

Ratio of Successful Solutions = $\frac{\text{number of Doppler solutions within 5km with 1°<CTA<21°}}{\text{number of satellite passes over test duration with 1°<CTA<21°}}$

$= \frac{22}{22} = 100\ \%$

2.9 ANTENNA CHARACTERISTICS – B.2 CONFIGURATION WITHOUT LIFEJACKET

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi
0	39.8	1.49	43.1	4.79	43.2	4.82	37.9	-0.46	31.3	-7.07
30	40.2	1.90	42.8	4.48	42.7	4.30	37.7	-0.63	31.5	-6.84
60	40.1	1.79	43.2	4.88	43.1	4.79	37.7	-0.62	30.5	-7.85
90	40.0	1.70	42.9	4.59	42.9	4.60	38.0	-0.40	30.4	-7.91
120	40.3	1.99	43.1	4.77	43.1	4.79	38.0	-0.31	31.2	-7.19
150	40.4	2.00	43.1	4.77	43.1	4.70	37.9	-0.40	31.8	-6.59
180	39.9	1.60	43.1	4.77	43.3	5.00	37.9	-0.45	32.6	-5.79
210	39.7	1.40	43.1	4.77	43.4	5.10	37.8	-0.52	32.5	-5.81
240	40.0	1.68	43.0	4.67	43.2	4.90	37.9	-0.41	33.0	-5.35
270	40.0	1.69	43.1	4.77	43.3	4.99	38.0	-0.33	32.8	-5.58
300	40.1	1.78	43.1	4.78	43.5	5.11	38.1	-0.26	32.2	-6.10
330	40.2	1.89	42.8	4.47	43.3	4.91	37.9	-0.44	32.2	-6.12
Gain Variation	0.61		0.41		0.80		0.37		2.56	

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh
0	111.20	90.70	114.10	91.80	113.40	93.70	107.10	80.40	98.70	86.80
30	111.60	91.70	113.80	90.70	112.90	91.70	106.90	85.50	98.90	87.50
60	111.50	90.90	114.20	90.90	113.40	90.80	106.90	86.70	97.90	86.30
90	111.40	91.70	113.90	91.60	113.20	90.90	107.10	88.90	98.00	82.80
120	111.70	91.30	114.10	86.80	113.40	90.70	107.10	92.70	98.50	87.70
150	111.70	92.40	114.10	88.90	113.30	91.70	107.00	92.80	99.10	88.40
180	111.30	91.40	114.10	87.50	113.60	91.80	106.90	93.90	99.90	89.20
210	111.10	91.00	114.10	88.00	113.70	92.00	106.90	92.20	100.00	87.30
240	111.40	89.60	114.00	87.10	113.50	91.60	107.10	88.40	100.60	83.70
270	111.40	90.80	114.10	84.80	113.60	91.00	107.20	86.60	100.40	82.00
300	111.50	89.10	114.10	90.20	113.70	92.80	107.30	64.00	99.90	79.40
330	111.60	91.00	113.80	88.60	113.50	92.60	107.10	84.20	99.70	86.80
Min (Vv-Vh)	19.30		22.30		19.70		13.00		10.70	

$EIRP_{LOSS} = Pt_{ambient} - Pt_{EOL}$ = (38.35 – 38.01) = 0.34dB

$EIRP_{maxEOL}$ = MAX [EIRPmax, ($EIRP_{max}$ - $EIRP_{LOSS}$)] = MAX (43.3, 43.0) = 43.3dBm*

$EIRP_{minEOL}$ = MIN [EIRPmin, ($EIRP_{min}$ - $EIRP_{LOSS}$)] = MIN (31.5, 31.2) = 31.2dBm*

* These results are a Pass within Measurement Uncertainty.

Pt_{amb} is the power at ambient from the summary table
Pt_{EOL} is the power at the end of the Operating Life at Minimum Temperature
$EIRP_{max}$ is the maximum EIRP from the antenna characteristics spreadsheet
$EIRP_{min}$ is the minimum EIRP from the antenna characteristics spreadsheet

2.9 ANTENNA CHARACTERISTICS – B.2 CONFIGURATION WITH LIFEJACKET

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	ERP dBm	Ant dBi	ERP dBm	Ant dBi	ERP dBm	Ant dBi	ERP dBm	Ant dBi	ERP dBm	Ant dBi
0	40.5	2.18	**43.2**	4.87	**43.3**	4.93	36.4	-1.96	**~~31.3~~**	-7.03
30	40.8	2.49	**43.2**	4.87	42.9	4.52	36.2	-2.13	**31.5**	-6.82
60	40.7	2.38	**43.3**	4.97	**43.3**	4.91	36.3	-2.00	**~~30.9~~**	-7.41
90	40.6	2.28	**43.1**	4.75	**43.2**	4.80	36.5	-1.89	**~~30.6~~**	-7.73
120	40.5	2.18	**43.2**	4.87	**43.3**	4.90	36.7	-1.70	**~~31.2~~**	-7.16
150	40.5	2.19	**43.2**	4.88	**43.2**	4.81	36.8	-1.54	**~~31.3~~**	-7.07
180	40.1	1.78	**43.2**	4.86	**43.1**	4.72	36.8	-1.57	**31.8**	-6.60
210	40.1	1.78	**43.2**	4.87	**43.2**	4.82	36.8	-1.52	**31.6**	-6.76
240	40.3	1.97	43.0	4.67	43.0	4.62	36.8	-1.53	**31.8**	-6.54
270	40.4	2.09	**43.2**	4.86	**43.3**	4.92	36.9	-1.45	**31.7**	-6.65
300	40.4	2.08	43.0	4.67	**43.3**	4.93	37.0	-1.31	**31.5**	-6.84
330	40.4	2.08	42.9	4.56	**43.1**	4.72	36.5	-1.82	**31.6**	-6.74
Gain Variation	0.71		0.41		0.41		0.82		1.20	

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh
0	111.90	90.50	114.20	87.40	113.50	94.80	105.60	78.30	98.90	83.00
30	112.20	91.10	114.20	87.40	113.10	93.80	105.40	84.40	99.00	86.10
60	112.10	89.90	114.30	89.10	113.50	92.90	105.50	87.10	98.30	87.30
90	112.00	90.20	114.00	97.10	113.40	91.80	105.60	88.00	98.10	85.00
120	111.90	89.60	114.20	85.40	113.50	91.90	105.70	91.60	98.50	88.10
150	111.90	90.60	114.20	90.10	113.40	93.00	105.90	90.50	98.80	84.80
180	111.50	89.90	114.20	84.60	113.30	93.50	105.80	92.40	99.30	84.50
210	111.50	89.40	114.20	85.40	113.40	94.40	105.90	91.20	99.10	85.40
240	111.70	88.60	114.00	85.10	113.20	94.20	105.90	90.80	99.40	83.30
270	111.80	90.60	114.20	81.00	113.50	94.30	106.00	90.40	99.30	82.60
300	111.80	89.40	114.00	85.90	113.50	94.80	106.20	87.10	99.20	65.00
330	111.80	90.10	113.90	80.90	113.30	94.10	105.70	85.60	99.20	83.00
Min (Vv-Vh)	21.10		16.90		18.70		13.40		10.40	

$EIRP_{maxEOL}$ = MAX [EIRPmax, ($EIRP_{max}$ - $EIRP_{LOSS}$)] = MAX (43.3, 43.0) = 43.3dBm*

$EIRP_{minEOL}$ = MIN (EIRPmin, ($EIRP_{min}$ - $EIRP_{LOSS}$)] = MIN (31.5, 31.2) = 31.2dBm*

* These Results are a Pass within Measurement Uncertainty.

2.9 ANTENNA CHARACTERISTICS – B.5 CONFIGURATION WITHOUT LIFEJACKET

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi
0	40.8	2.40	41.8	3.41	39.6	1.29	37.0	-1.32	35.3	-3.04
90	40.7	2.36	41.8	3.44	39.0	0.62	35.9	-2.50	32.0	-6.37
180	40.2	1.87	41.0	2.69	38.1	-0.28	34.9	-3.41	~~29.7~~	-8.66
270	40.5	2.12	41.2	2.84	38.9	0.53	36.2	-2.15	33.7	-4.62

$EIRP_{maxEOL}$ = MAX [EIRPmax, ($EIRP_{max}$ - $EIRP_{LOSS}$)] = MAX (41.8, 41.5) = 41.8dBm

$EIRP_{minEOL}$ = MIN [EIRPmin, ($EIRP_{min}$ - $EIRP_{LOSS}$)] = MIN (32.0, 31.7) = 31.7dBm

2.9 ANTENNA CHARACTERISTICS – B.5 CONFIGURATION WITH LIFEJACKET

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi
0	41.4	3.07	42.4	4.09	40.3	1.98	37.1	-1.26	35.2	-3.18
90	41.5	3.15	42.4	4.10	40.1	1.72	37.0	-1.39	33.3	-5.04
180	41.1	2.77	42.1	3.71	39.4	1.04	36.2	-2.13	31.6	-6.74
270	41.3	2.91	42.0	3.68	39.5	1.18	36.8	-1.59	33.2	-5.15

$EIRP_{maxEOL}$ = MAX [EIRPmax, ($EIRP_{max}$ - $EIRP_{LOSS}$)] = MAX (42.4, 42.1) = 42.4dBm

$EIRP_{minEOL}$ = MIN [EIRPmin, ($EIRP_{min}$ - $EIRP_{LOSS}$)] = MIN (31.6, 31.3) = 31.3dBm

2.10 BEACON CODING SOFTWARE

Examples of User Protocol Beacon Messages

Protocol	Operational Message (in hexadecimal including bit and frame synchronization bits)	Self-Test Message (in hexadecimal including bit and frame synchronization bits)
Maritime User Protocol with MMSI	N/A	N/A
Maritime User Protocol with Radio Call Sign	N/A	N/A
Radio Call Sign User Protocol	N/A	N/A
Serial User: Float-Free EPIRB with Serial Number	N/A	N/A
Serial User: Non Float-Free EPIRB with Serial Number	N/A	N/A
Aviation User Protocol	N/A	N/A
Serial User: ELT with Serial Number	N/A	N/A
Serial User: ELT with Aircraft Operator Designator & Serial Number	N/A	N/A
Serial User: ELT with Aircraft 24-bit address	N/A	N/A
Serial User: PLB with Serial Number	N/A	N/A
National User (Short)	N/A	N/A
National User (Long)	N/A	N/A

2.10 BEACON CODING SOFTWARE

Examples of Location Protocol Beacon Messages

For examples of location protocol beacon messages please see Annex A, customer supplied information.

2.11 NAVIGATION SYSTEM

2.11.1 NATIONAL LOCATION PROTOCOL 1

Position Data Default Values

The beacon was activated without providing navigation data and operated for 30 minutes. Message content was checked for all bursts during this period.

Hex 30 Message	Message Count
96EB00EDDFC0FF01DE81F79F3C0010	36

Position Acquisition Time and Position Accuracy

A3.8.2.1: Location: 50° 52.163' N 1° 14.605' W①

A3.8.2.2: Location: 51° 22.583' N 1° 49.833' W②

① GPS Survey Position
② Input from navigation simulator

Operation Configuration	C/S T.007 Section A3.8.2.1		C/S T.007 Section A.3.8.2.2	
	Time to Acquire Position (sec)	Location Error in metres	Time to Acquire Position (sec)	Location Error in metres
Above Dry Ground	69	40.1	119	49.8
Resting on Dry Ground	69	68.6	120	49.8

Positional accuracy was estimated using the Haversine Formula, earth's radius taken as 6367Km.

Encoded Position Data Update Interval

Location: 51° 22.583' N 1° 49.833' W②		
Time from activation to 1st message	69s	
First Message Acquired at	08:36:34	96EB00EDDFC0FF01DE81F79F3C0010
Data Acquired at	08:37:24	96EB00EDCCD701CD797FF79208025B
Location: 50° 48.683' N 1° 37.417' W②		
Data Updated at	09:00:00	96EB00EDCCB10198BC203794240FCD
Data Update Interval	22m 36s	

② Input from navigation simulator

2.11 NAVIGATION SYSTEM

2.11.1 NATIONAL LOCATION PROTOCOL 1

Position Clearance After Deactivation

The beacon was activated and a position acquired, moved and a new position acquired, deactivated and reactivated without providing navigation data.

Location: 51° 22.583' N 1° 49.833' W②		
Time from activation to 1st message	69s	
First Message Acquired at	08:36:34	96EB00EDDFC0FF01DE81F79F3C0010
Data Acquired at	08:37:24	96EB00EDCCD701CD797FF79208025B
Location: 50° 48.683' N 1° 37.417' W②		
Data Updated at	09:00:00	96EB00EDCCB10198BC203794240FCD
Deactivated at	09:04:27	
Time from re-activation to 1st message	70s	
Default data present	09:05:52	96EB00EDDFC0FF01DE81F79F3C0010

② Input from navigation simulator

Last Valid Position

Location: 51° 22.583' N 1° 49.833' W②		
Time from activation to 1st message	69s	
First Message Acquired at	08:37:06	96EB00EDCCD701CD797FF79208025B
Data Present at	08:37:06	96EB00EDCCD701CD797FF79208025B
Navigation Data Removed	08:38:45	
Last Message with Positional Data	12:34:44	96EB00EDCCD701CD797FF79208025B
First Message with Default Data	12:35:35	96EB00EDDFC0FF01DE81F79F3C0010
Last Valid Position Held	238m	

② Input from navigation simulator

2.11 NAVIGATION SYSTEM

2.11.1 NATIONAL LOCATION PROTOCOL 1

Coarse Position and Delta Offset

Script Reference (See Table D.3 of C/S T.007 – Issue 4 November 2005)	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	Confirmation that BCH Correct (✓)
1	Bits 59-85= 3F81FE0 Bits 113-126= 27CF	✓ ✓
2	Bits 59-85= A8A0C2 Bits 113-126= 2489 Number of seconds after providing navigation data that beacon transmitted the above encoded location information: 224	✓ ✓
3	Bits 59-85= A8A0C2 Bits 113-126= 3F09	✓ ✓
4	Bits 59-85= D8A0C2 Bits 113-126= 2189	✓ ✓
5	Bits 59-85=D8A0C2 Bits 113-126= B09	✓ ✓
6	Bits 59-85= C8B67D Bits 113-126= 749	✓ ✓
7	Bits 59-85= C8B67D Bits 113-126= 77E	✓ ✓
8	Bits 59-85= C8967C Bits 113-126= 702	✓ ✓
9	Bits 59-85= C8967C Bits 113-126= 77E	✓ ✓
10	Bits 59-85= C8B67D Bits 113-126= 749	✓ ✓

Input from navigation simulator

2.11 NAVIGATION SYSTEM

2.11.2 STANDARD LOCATION PROTOCOL 1

Position Data Default Values

The beacon was activated without providing navigation data and operated for 30 minutes. Message content was checked for all bursts during this period.

Hex 30 Message	Message Count
96EE3243D07FDFF93FEAB783E0F66C	36

Position Acquisition Time and Position Accuracy

A3.8.2.1: Location: 50° 52.163' N 1° 14.605' W①

A3.8.2.2: Location: 51° 22.583' N 1° 49.833' W②

① GPS Survey Position
② Input from navigation simulator

Operation Configuration	C/S T.007 Section A3.8.2.1		C/S T.007 Section A.3.8.2.2	
	Time to Acquire Position (sec)	Location Error in metres	Time to Acquire Position (sec)	Location Error in metres
Above Dry Ground	69	40.1	69	49.8
Resting on Dry Ground	69	68.6	69	49.8

Positional accuracy was estimated using the Haversine Formula, earth's radius taken as 6367Km.

Encoded Position Data Update Interval

Location: 1° 3.517' N 1° 2.483' W②		
Time from activation to 1st message	70s	
First Message Acquired at	11:00:45	96EE3243D07FDFF93FEAB783E0F66C
Data Acquired at	11:05:44	96EE3243D00120200776F78E227C98
Location: 1° 30.000' N 1° 2.483' W②		
Data Updated at	11:27:47	96EE3243D00120200776F7F82277DE
Data Update Interval	22m 2s	

② Input from navigation simulator

2.11 NAVIGATION SYSTEM

2.11.2 STANDARD LOCATION PROTOCOL 1

Position Clearance After Deactivation

The beacon was activated and a position acquired, moved and a new position acquired, deactivated and reactivated without providing navigation data.

Location: 51° 22.583' N 1° 49.833' W②		
Time from activation to 1st message	70s	
First Message Acquired at	11:00:45	96EE3243D07FDFF93FEAB783E0F66C
Data Acquired at	11:05:44	96EE3243D033A03FC899771DA4D4D0
Location: 50° 48.683' N 1° 37.417' W②		
Data Updated at	11:27:47	96EE3243D033A03FC89977A54797CD
Deactivated at	11:44:02	
Time from re-activation to 1st message	69s	
Default data present	11:48:56	96EE3243D07FDFF93FEAB783E0F66C

② Input from navigation simulator

Last Valid Position

Location: 51° 22.583' N 1° 49.833' W②		
Time from activation to 1st message	69s	
First Message Acquired at	12:03:07	96EE3243D07FDFF93FEAB783E0F66C
Data Present at	12:06:25	96EE3243D033A03FC899771DA4D4D0
Navigation Data Removed	12:09:42	
Last Message with Positional Data	16:05:38	96EE3243D033A03FC899771DA4D4D0
First Message with Default Data	16:06:26	96EE3243D07FDFF93FEAB783E0F66C
Last Valid Position Held	240m	

② Input from navigation simulator

2.11 NAVIGATION SYSTEM

2.11.2 STANDARD LOCATION PROTOCOL 1

Coarse Position and Delta Offset

Script Reference (See Table D.2 of C/S T.007 – Issue 4 November 2005)	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	Confirmation that BCH Correct (✓)
1	Bits 65-85= FFBFF Bits 113-132= 83E0F	✓ ✓
2	Bits 65-85= 2404 Bits 113-132= 8E227 Number of seconds after providing navigation data that beacon transmitted the above encoded location information: 217	✓ ✓
3	Bits 65-85= 2404 Bits 113-132= F8227	✓ ✓
4	Bits 65-85= 3404 Bits 113-132= 88227	✓ ✓
5	Bits 65-85= 3404 Bits 113-132= 74627	✓ ✓
6	Bits 65-85= 2404 Bits 113-132= 8227	✓ ✓
7	Bits 65-85= 2404 Bits 113-132= 83D7	✓ ✓
8	Bits 65-85= 2406 Bits 113-132= 8227	✓ ✓
9	Bits 65-85= 2406 Bits 113-132= 81B8	✓ ✓
10	Bits 65-85= 2402 Bits 113-132= 8206	✓ ✓

Input from navigation simulator

SECTION 3

TEST EQUIPMENT

3.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.9 Beacons - Antenna Characteristics				
Antenna, (Tuned Dipole Set)	Roberts Antenna	A-100	569	TU
Signal Generator	Rohde & Schwarz	SMS-2/28	1431	19/04/2007
Spectrum Analyser	Hewlett Packard	8568B	1666	08/06/2007
RF Preselector	Hewlett Packard	85685A	1668	08/06/2007
Test Receiver	Rohde & Schwarz	ESVP	1669	04/10/2007
Antenna Mast	EMCO	1050	1707	TU
Turntable Controller	Various	RH253	1708	TU
Spectrum Analyser	Rohde & Schwarz	EZM	1823	TU
Open Area Site 2	TUV	OATS2	1850	03/10/2008
Bilog Antenna	Schaffner	CBL6143	1858	08/09/2008
Roberts Antenna 406MHz	Compliance Design		1860	21/02/2007
Tests 1 to 8- Beacons - Constant Temperature Tests				
Signal Generator	Rohde & Schwarz	SMY01	49	19/06/2007
Power Meter	Hewlett Packard	436A	83	10/08/2007
Beacon RF Unit	TUV	N/A	97	TU
Logic Analyser	Hewlett Packard	1631D	155	06/09/2007
Signal Generator	Hewlett Packard	8644A	199	17/12/2006
1GHz Digital Oscilloscope	Lecroy	9370M	612	21/09/2007
Spectrum Analyser	Hewlett Packard	E4407B	1154	31/05/2007
Power Sensor	Hewlett Packard	8481A	1342	31/08/2007
Frequency and Time Interval Analyser	Hewlett Packard	5372A	2756	16/06/2007
Hygrometer	Rotronic	I-1000	3068	06/04/2007
50ohm/ 1W Termination	Suhner		3080	18/02/2007
50ohm/2W Termination	Omni-Spectra	3001-6100	3081	18/02/2007
20dB/10W Attenuator	Aeroflex / Weinschel	23-20-34	3160	01/06/2007
3dB/20W Attenuator	Aeroflex / Weinschel	23-3-34	3162	01/06/2007
Bandpass Filter	Trilithic	5BE406/35-1-AA	3205	TU
Short Circuit	TUV	Short Cicuit	3272	TU

3.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.11 Beacons - Navigation System				
GPS/SBAS Simulator	Spirent	STR4500	3056	19/01/2007
Hygrometer	Rotronic	I-1000	3068	06/04/2007
EPIRB Tester	Arg Electro Design	5412	3270	TU
Section 2.6 Beacons - Operating Lifetime				
Climatic Chamber	Heraeus Votsch	VMT 04/30	40	TU
Power Meter	Hewlett Packard	436A	47	21/06/2007
Signal Generator	Rohde & Schwarz	SMY01	49	19/06/2007
Frequency -Time Analyser	Hewlett Packard	5372A	93	27/07/2007
Digital Temperature Indicator + T/C	Fluke	51	412	21/09/2006
Signal Generator	Hewlett Packard	8663A	1172	01/08/2007
Power Sensor	Hewlett Packard	8482A	1341	19/09/2006
Data Logger	Pico Technology Ltd	ADC-42	2395	21/09/2006
50ohm/15W Termination	Radio Spares	612-192	2416	02/08/2007
TERMINATION: 50ohm/15W	Radio Spares	612-192	2425	02/08/2007
Distress Beacon RF Unit	TUV		2445	TU
Logic Analyser	Hewlett Packard	1631D	2757	28/07/2007
MULTIMETER	Hewlett Packard	3478A	2758	21/07/2007
Hygrometer	Rotronic	I-1000	3068	06/04/2007
20dB/10W Attenuator	Aeroflex / Weinschel	23-20-34	3160	01/06/2007
3dB/20W Attenuator	Aeroflex / Weinschel	23-3-34	3161	01/06/2007
Bandpass Filter	Trilithic	5BE406/35-1-AA	3205	TU

N.B Operating Lifetime test was performed on 4th September 2006. All test equipment shown above was in calibration at the time of test.

3.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.7 Beacons - Temperature Gradient				
Power Meter	Hewlett Packard	436A	47	21/06/2007
Signal Generator	Rohde & Schwarz	SMY01	49	19/06/2007
Climatic Chamber	Heraeus Votsch	VM 04/100	85	TU
Signal Generator	Hewlett Packard	8644A	96	17/12/2006
Time Interval Analyser	Yokogawa	TA720	181	17/11/2006
Oscilloscope	Gould	840	182	31/01/2007
Power Sensor	Hewlett Packard	8482A	1341	19/09/2006
Beacon RF Unit	TUV	N/A	3066	TU
Hygrometer	Rotronic	I-1000	3068	06/04/2007
Thermocouple Thermometer	Fluke	51	3173	22/06/2007

N.B Temperature Gradient test was performed on 6th September 2006. All test equipment shown above was in calibration at the time of test.

3.1 TEST EQUIPMENT

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

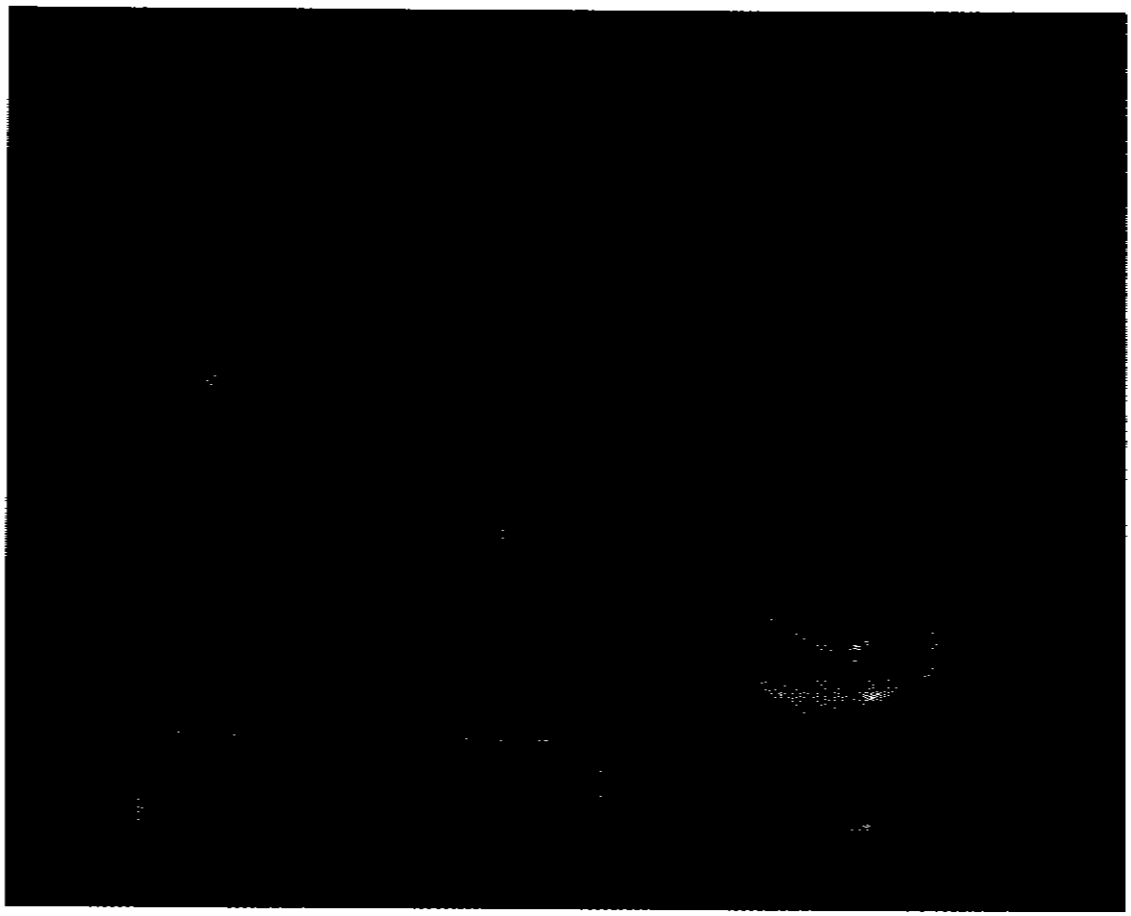
Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.5 Beacons - Thermal Shock				
Climatic Chamber	Heraeus Votsch	VMT 04/30	40	TU
Power Meter	Hewlett Packard	436A	47	21/06/2007
Signal Generator	Rohde & Schwarz	SMY01	49	19/06/2007
Climatic Chamber	Heraeus Votsch	VM 04/100	85	TU
Rubidium Frequency Standard	Quartzlock	A10-B	92	12/12/2006
Signal Generator	Hewlett Packard	8644A	96	17/12/2006
Beacon RF Unit	TUV	N/A	97	TU
Logic Analyser	Hewlett Packard	1631D	155	06/09/2007
Time Interval Analyser	Yokogawa	TA720	181	17/11/2006
Oscilloscope	Gould	840	182	31/01/2007
Signal Generator	Hewlett Packard	8644A	199	17/12/2006
Power Sensor	Hewlett Packard	8482A	1341	19/09/2006
Frequency and Time Interval Analyser	Hewlett Packard	5372A	2756	16/06/2007
Beacon RF Unit	TUV	N/A	3066	TU
Hygrometer	Rotronic	I-1000	3068	06/04/2007
50ohm/ 1W Termination	Suhner		3080	18/02/2007
50ohm/2W Termination	Omni-Spectra	3001-6100	3081	18/02/2007
20dB/10W Attenuator	Aeroflex / Weinschel	23-20-34	3160	01/06/2007
3dB/20W Attenuator	Aeroflex / Weinschel	23-3-34	3162	01/06/2007
Thermocouple Thermometer	Fluke	51	3173	22/06/2007
Bandpass Filter	Trilithic	5BE406/35-1-AA	3205	TU

N.B Thermal Shock test was performed on 4th September 2006. All test equipment shown above was in calibration at the time of test.

SECTION 4

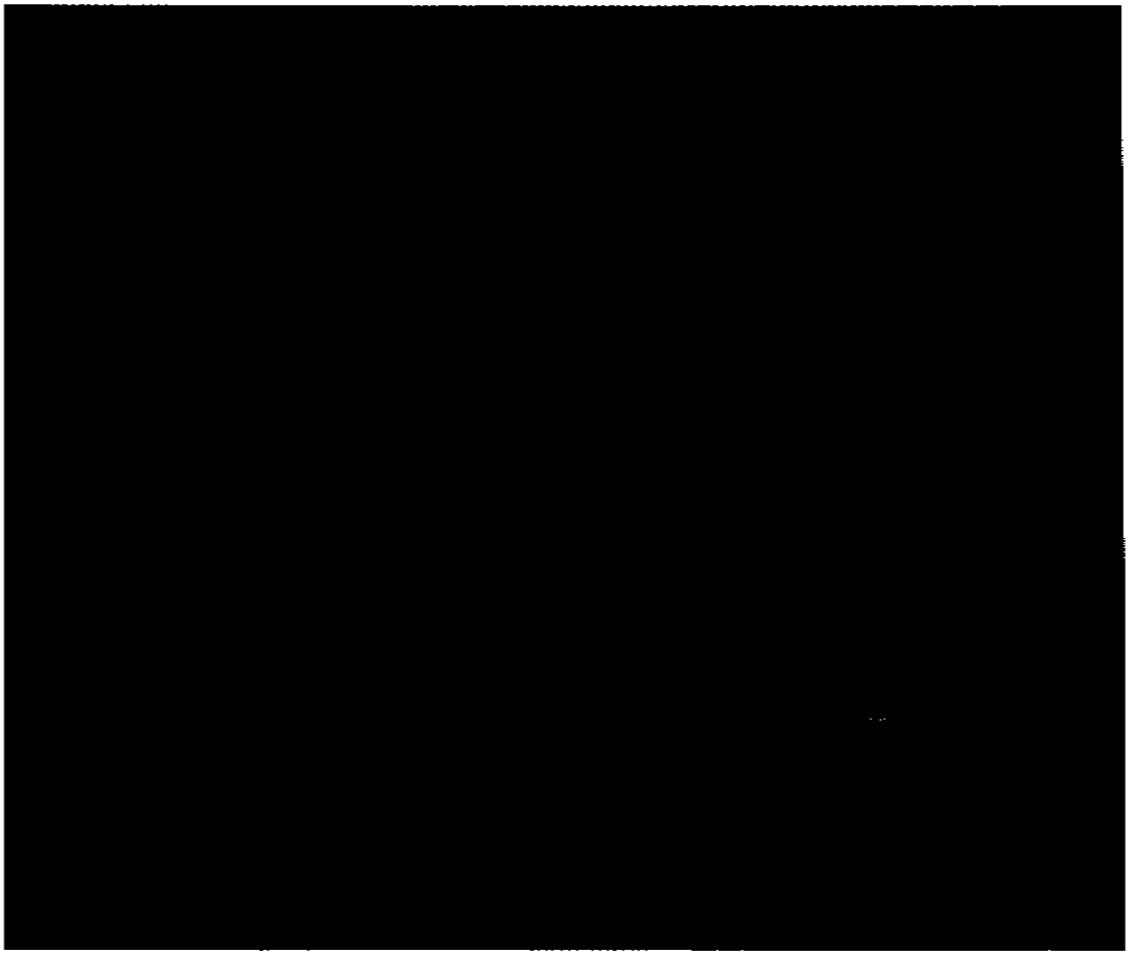
PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



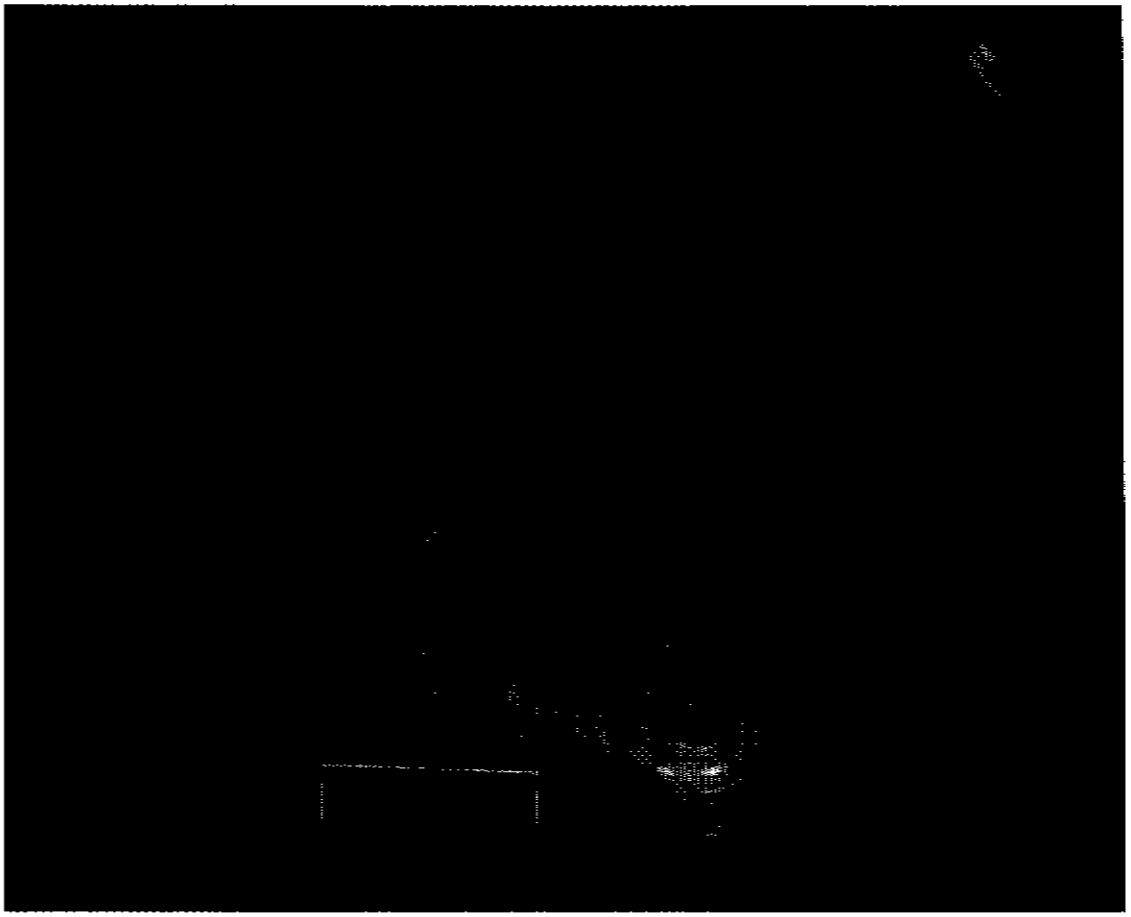
Front View

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



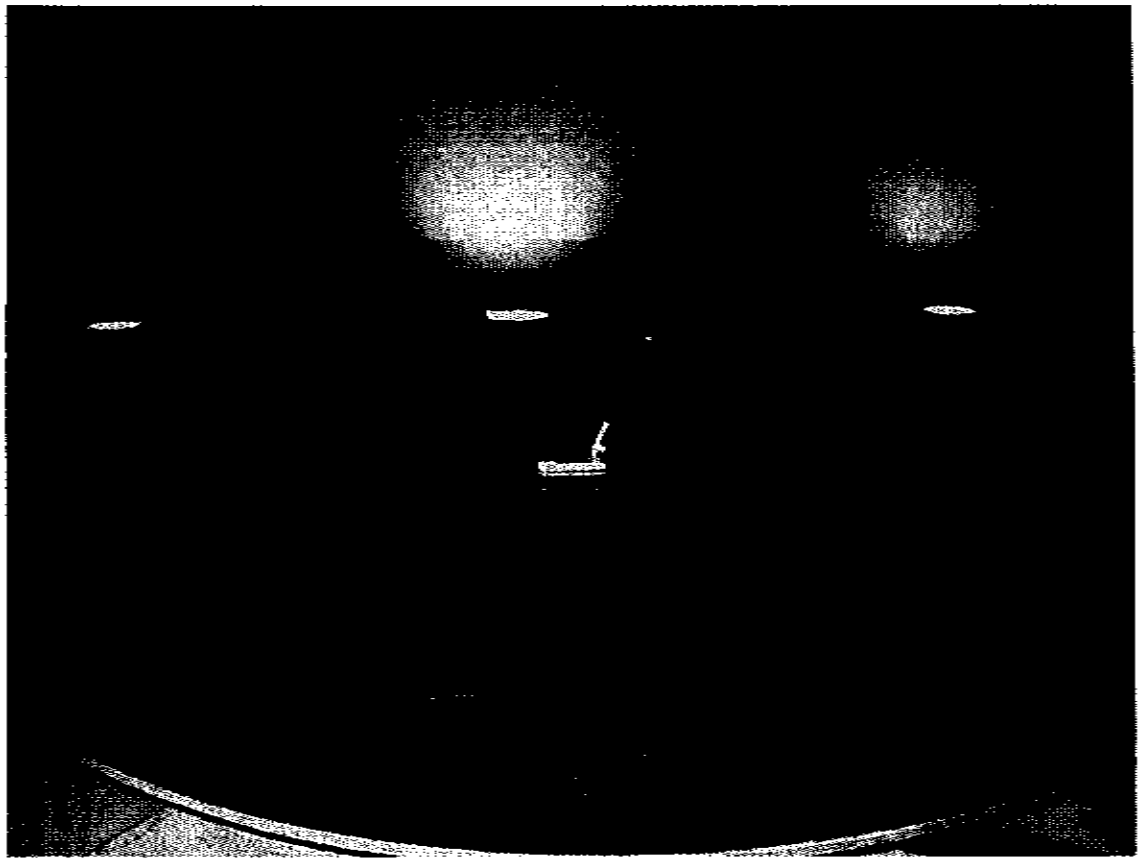
Rear View

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



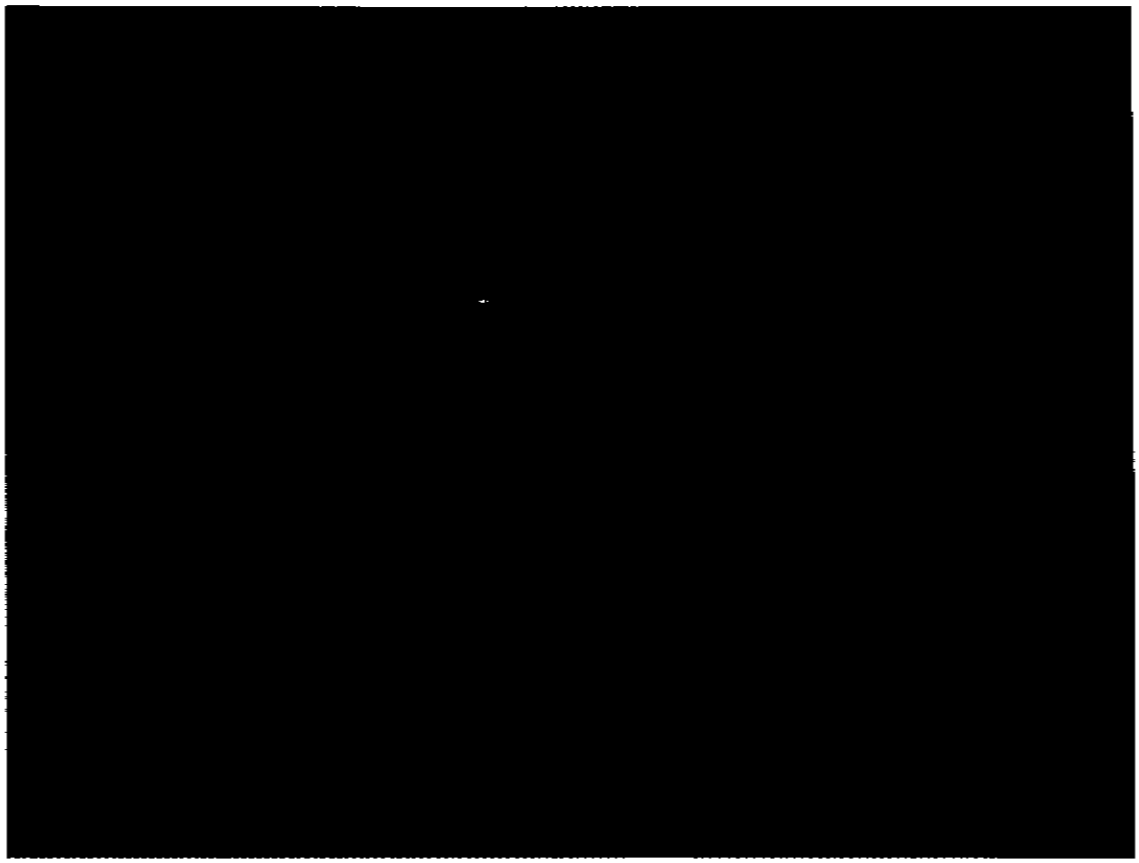
Side View

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Photograph showing EUT in B2 configuration

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Photograph showing EUT in B5 configuration

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMER AND COPYRIGHT

0141
Group

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

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).