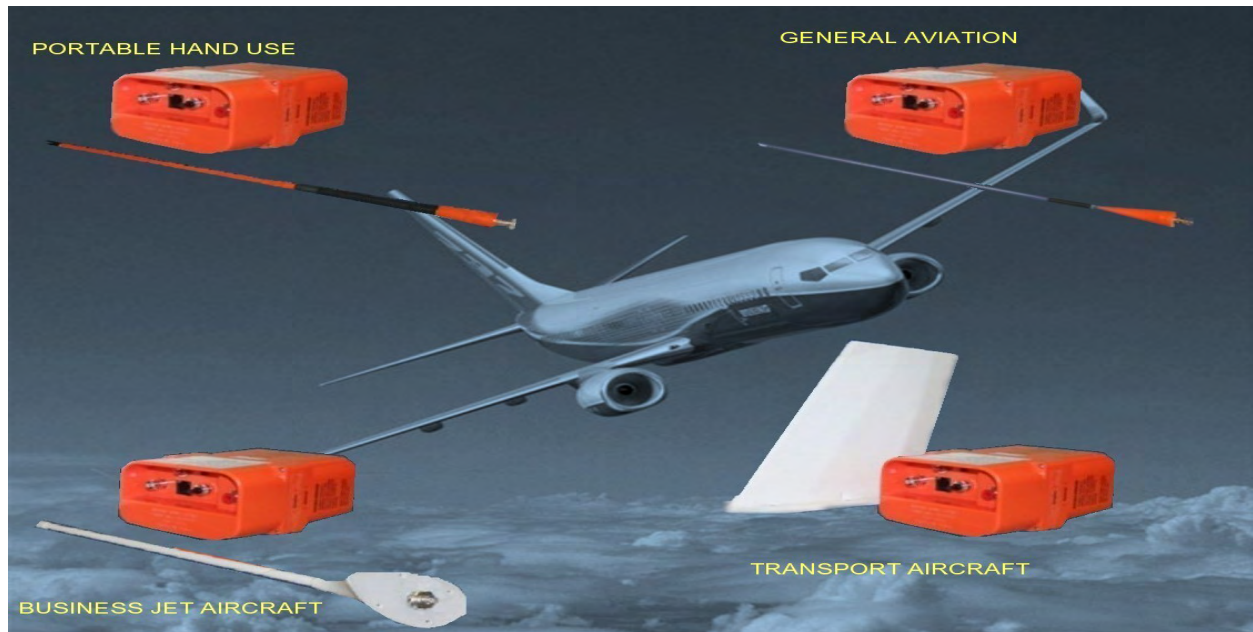




**406 MHZ ELT EMERGENCY LOCATOR TRANSMITTER
WITH EXTERNAL GPS/NAV POSITION,
(406 / 243.0 / 121.5) MHZ
MODEL AK-451- () SERIES**



WORLD'S LEADING PRODUCER OF ELT AND MULTI AXES ELT
DESCRIPTION FEATURES

The Ameri-King AK-451-() Series is a FAA TSO'd pending approved, JAA JTSO'd pending approved, 406 Mhz ELT Emergency Locator Transmitter, Types (AF) Automatic Fixed, (AP) Automatic Portable, (S) Survival. It transmits aircraft GPS/NAV position data, immediately and accurately, on triple (406 Satellite /243 Military /121.5 Civilian) Mhz frequencies.

The supreme advantage feature is the aircraft GPS/NAV Latitude / Longitude exact position shall be transmitted, within 1 minute, on the very first burst, without awaiting for a Polar Orbiting Satellite (could be up to 4 hours). Enhance the accuracy significantly, for the ground search area, from 1-2 kilometers (non GPS/ NAV Position) to 22 meters typical (with GPS/NAV Position).

- Applicable to all Aircraft types: Transport Aircraft; Business Jet Aircraft; General Aviation, Rotary Helicopters.
- Single Antenna, Blade Type (1.0 Mach); Rod Type (350 Knots); Whip Type (250 Knots); and Portable Hand Use.
- Ultra Long Lasting, **up to 90 hours @ -20 deg C**, Lithium Battery Package, Li MnO2 or Li SO2, 4 D-Size Cells, 5 yrs useful life time.
- Made with Reliable sealed G Switch, for dependable safety.
- Optional high activated level G Switch per EURO CAE Spec
- Optional Multi Axes (6 Axes) G Switch for Helicopter applications.
- Simple Installation. All accessories include Pre-fabricated Wiring Harness Assy, Remote Control Panel, Audible Warn Horn, Coaxial Cable Assy, Universal Mounting Tray.

Having a triple frequencies insures your distress message reaches both NOAA Satellite Operation and US Air Force AFSR Ground Operation, Search and Rescue Team, with 100% fully confidence, due to transmitting on both 243.0 Military and 121.5 Civilian bands, for immediate ground search dispatch, narrowing the searching time to almost nothing.

The choice is clear, when it come to Safety, Fast, Accuracy, Reliability, Price and Product Support, Ameri-King's AK-451-() Series is your best choice.



SPECIFICATIONS FOR MODEL AK-451

APPROVALS: COSPAS-SARSAT
FAA TSO C126 / C91a / C142 ELT
Emergency Locator Transmitter, Type (AF) (AP) (S)

PHYSICAL CHARACTERISTICS:

*Size and Weight:

Main unit: (4.27"Wx2.95"Hx5.64"L) 1lb 14 oz
Remote unit: (2.17"Wx1.20"Hx1.18"L) 1.0 oz
Blade/ Rod/ Whip antenna: (9"/ 18.5"/ 24" L) 1.4/ 0.5/ 0.25 Lbs
Portable antenna: (17"L) 4 oz
Coax Cable Assy: (6 ft) 5 oz
Aural Monitor: (0.7"Dia x 1"D) 0.3 oz
Mounting tray: (4.51"W x 0.75"H x 5.87"L) 4.0 oz

*Case and color:

High impact, fire resistant, waterproof, high temperature
ABS plastic, safety international orange color

GENERAL SPECIFICATIONS (STANDARD CONDITIONS):

Operating frequencies: 406.028 +/- 0.001 MHz
243.0/ 121.5 MHz +/- 0.0025%

Transmitter Power Output:

5 W +/- 2 db @ 406 MHz, for 24 Hrs
23 dBm @ 243 and 121.5 MHz, for 90 Hrs

OPERATING LIFE, 90 HRS @ -20 deg C (TYP):

- Interface with External GPS/NAV, via RS-232 Aviation Protocol: Garmin Int Inc , Honeywell Bendix King Inc. , Trimble Nav Inc.; Arnav Inc., Il Morrow Inc.
- Coding Programming Worldwide, all available ELT Protocols, i.e. Long Messages and Short Messages (Location Protocol; User Location Protocol; User Ptotocol)
- OXCO technology for perfect gradient temp stability.
- PERP: 5W (406.028 Mhz) 50 mw (243.0/121.5) Mhz
- RTCA Env Categories:
F1XBA(204/183)(204/183)
(204/183)XR(204/183)XXSXXXXA(204/183)BXXXX
- Pending Approvals: COSPAS-SARSAT, FAA, JAA, FCC
- Patent Pending. **Made in U.S.A.**
(See back side for detail specifications)

GPS/NAV POSITION INTERFACES:

Interface with External a/c GPS/NAV, via RS-232
Aviation Protocol:

Garmin Int Inc 500/400/300/200/100 Series
Honeywell Bendix King KLN 900/90B/94/89B/88 etc
Trimble Nav Inc. NAV1000/2000, TNL2100/3100 etc
Arnav Inc. R50/50i, STAR 5000, FMS5000, MFD etc
Il Morrow Inc. Flybuddy, 2001 NMS etc....

ACCESORIES SUPPLIED:

Lithium Batteries Package, **Ultra Long 90 Hrs**, LiMnO2, or LiSO2; High Speed Fixed Antenna, Coax Cable Assembly, Remote Control Panel, Wiring Interconnect Assembly, Audible Monitor , Mounting Tray, Velcro holder, Hex Key Tool. All of the accessories are provided and may be ordered extra separately.

WARRANTY:

Two (2) years. Optional extended four (4) years.
Lifetime warranty includes no charge for the electronic components. After the warranty has expired, customers shall pay only for the labor repair work.

HOW TO ORDER:

AK-451-1-(AF)(AP)(S): ELT Package, 406/243/121.5 MHz with GPS/NAV Position, General Aviation a/c, 250 Knotts.

AK-451-2-(AF)(AP)(S): ELT Package, 406/243/121.5 MHz with GPS/NAV Position, Business a/c , 350 Knotts.

AK-451-3-(AF)(AP)(S): ELT Package, 406/243/121.5 MHz with GPS/NAV Position, Transport a/c , 1.0 Mach.

AK-451-4-(AF)(AP)(S): ELT Package, 406/243/121.5 MHz with GPS/NAV Position, Portable Hand Use.

451-H: Optional, Multi Axes (6 Axes) G switch, for helicopters.

AK-451-H-(AF)(AP)(S): ELT Package, 406/243/121.5 MHz with GPS/NAV Position, with optional Multi-Axes G Switch.

451017-1: Antenna, Blade type, General Aviation, 250 knots.

451017-2: Antenna, Rod type, Business Jet aircraft, 350 knots.

* RTCA DO - 204 / 183 / 227
 * RTCA DO - 160c ENV. CAT: F1XBA (204/183)
 (204/183)XR(204/183)XXSXXXXA(204/183)BXXXX
 * **TEMP. AND ALTITUDE:** Category F1
 Low / High Temperature: -20 / +55 deg C (Operating)
 -55 / +85 deg C (Storage)
 Altitude: 55,000 feet
 * **AUTOMATIC CRASH ACTIVATION:**
 Velocity change of 2.0 +/- 0.3G (3.5 +/- 0.5 fps)
 Optional 2.3 +/- 0.3 G (4.5 +/- 0.5 fps) for EURO CAE
 * **CRASHWORTHINESS:** 100G, 23 ms, 6 directions

PROGRAMMING CODING PROTOCOLS:

Worldwide, all available ELT Protocols in Long and Short Messages (Standard/National/User)

Location Protocol (Long): Standard Location ELT
 ELT with A/C 24 Bit Address; ELT with A/C Operator Designator; ELT with Serial No.; National Location.

User-Location Protocol (Long): Aviation; ELT with Serial No.; ELT with A/C Operator Designator & Serial No.; ELT with A/C 24 Bit Address.

User Protocol (Short): Aviation; ELT with Serial No.; ELT with A/C Operator Designator & Serial No.; ELT with A/C 24 Bit Address.

451017-3: Antenna, Whip type, Transport aircraft, 1.0 Mach.
451017-4: Antenna, Portable Hand Use.

4500010-1: Battery Package, Lithium, LiMnO₂, 90 Hrs lasting.
4500010-2: Battery Package, Lithium, LiSO₂, 87 Hrs lasting
4500010-3: Battery Package, Lithium, LiMnO₂, 92 Hrs lasting.
T-451: Test Set and ELT Coding Equipment for AK-451

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AMERI-KING CORPORATION

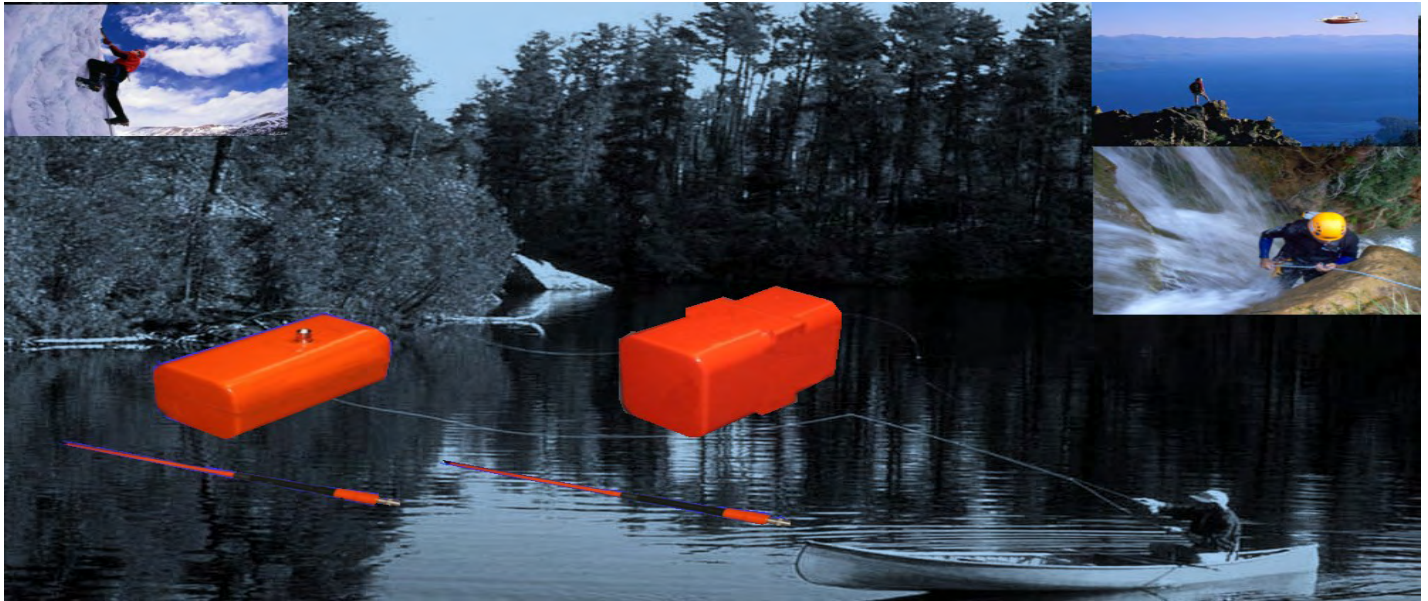
17881 Sampson Lane., Huntington Beach, CA 92647

Tel: (714) 842-8555 - **Fax:** (714) 842-4235

Email: sales@ameri-king.com **Website:** www.ameri-king.com



406 MHZ SATELLITE PLB PERSONAL LOCATOR BEACON (406 / 243.0 / 121.5) MHZ, PART NO.: AK-451-PLB



WORLD'S LEADING PRODUCER OF SATELLITE PLB

DESCRIPTION

FEATURES

The Ameri-King AK-451-PLB is a COSPAS-SARSAT pending approved, FCC pending approved, 406 Mhz Satellite PLB Personal Locator Beacon, tripple (406 Satellite /243 Military /121.5 Civilian) Mhz frequencies.

The advantage for 406 Mhz Satellite PLB Personal Locator Beacon against 121.5 Mhz satellite is enhance the accuracy significantly, for the ground search area, from 15-20 kilometers (121.5 Mhz satellite) to 490 meters typical (406 Mhz satellite).

Having a triple frequencies insures your distress message reaches both NOAA Satellite Operation and US Air Force AFSR Ground Operation, Search and Rescue Team, with 100% fully confidence, due to transmitting on both 243.0 Military and 121.5 Civilian bands, for immediate ground search dispatch, narrowing the searching time.

The choice is clear, when it come to Safety, Fast, Accuracy, Reliability, Price and Product Support, Ameri-King's AK-451-() Series is your best choice.

- Applicable to all Land Uses, hiking, canoeing, camping, skiing etc. with Portable Antenna .
- Ultra Long lasting Battery Package, **up to 90 hours @ - 20 deg C**, 5 years useful life time Lithium type, LiMnO2 or LiSO2, 4 D-Size.
- Able to Interface with External GPS, via RS-232
- **Protocol:** Coding Programming International Worldwide, all available PLB Protocols, i.e. Short Messages (PLB User/Serial No/User/ National User).
- OXCO conventional technology for perfect gradient temp stability.
- PERP: 5W+/-2 dB @ 406.028 Mhz for 24Hrs
23 dBm @ 243 & 121.5 Mhz for 90 Hrs
- Waterproof and Flame tested.
- Pending Approvals: COSPAS-SARSAT, FCC.
- Patent Pending. **Made in U.S.A.**

(See back side for detail

specifications)



Toulouse, 4 july 2007

INTESPACE reference : E6557-CS_ws

REPORT OF ADDITIONAL C/S T.A. TEST OF 406 MHz DISTRESS BEACON

MANUFACTURER : Ameri-King Corp

BEACON MODEL : AK-451 ()Series ELT (AF)(AP)(S) & PLB

Written : 4 july 2007

By : Gérard PEYROU

Visa :

Approved : 11 july 2007

By : Paul Eric DUPUIS

Visa :

Quality Control : 12 july 2007

By : André LOUH

Visa :

Distribution :

- Mr Keith VAN	Ameri-King Corp	(1 copy)
- COSPAS/SARSAT Secretariat		(1 copy)
- INTESPACE	ITS/ES (RLS)	(1 copy)

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1 - ADMINISTRATION

1.1. WORK ORDER

Manufacturer : Ameri-King Corp
Address : 17881 Sampson Ln. Huntington Beach,
CA 92647, USA

Represented by : Mr Keith VAN

1.2. INTESPACE TEST CENTER

The test operations have been conducted by : G. PEYROU

1.3. SCHEDULE

Start of test: 8 june 2007
End of test : 4 july 2007

1.4. WORK REFERENCE : **E6557-CS_ws**

1.5. EQUIPMENT UNDER TEST

The results from this test report concern only the equipment
here after referenced :

- Commercial designation :
- Model : AK-451 ()Series ELT (AF)(AP)(S) & PLB
- S  rial number: C/S 09 (But n   1) and C/S 08 (But n   2)

2 - TEST FACILITIES

- ARGOS - COSPAS/SARSAT Certification Test Bench.
- Anechoic chamber for antenna test .
- Toulouse CNES MCC .

3 - OBJECTIVE OF TEST

To complete and to correct the first C/S TA Test Report ref: E6667-CS following COSPAS-SARSAT 406 MHz BEACON TYPE APPROVAL WORKSHEET FOR Ameri-King's ELT models AK-451 AF/AP/S(PLB) Application 21 February 2007

- item 16 : Short message
- item 21 : Self Test for short message
- item 23 : Operating Life Time Test at min temperature with Ultralfe U10014 and Saft LO26SXC battery p
- item 27 : PLB Satellite test on Dry Ground configuration
- item 28 : Additional Antenna Test on AK 451.017 1B whip antenna checked with the RHCP reference ante
- item 29 : Beacon Coding Software

4 - STANDARDS AND TEST PROCEDURES APPLICABLE

COSPAS-SARSAT standards :

- "C/S T. 001- Issue 3 - Revision 7 - November 2005 "
- "C/S T. 007- Issue 4 - Revision 1 - October 2006"

INTESPACE Radio Beacon Test Procédures :

- | | |
|---|------------------------|
| - " COSPAS-SARSAT Certification Test" | Réf. ITS : 572 AP/QA |
| - " 406 MHz Characteristic Antenna Test " | Réf. ITS : 566 AP/QA |
| - " Radio Beacon Test Report " | Réf. ITS : 579 AP/QA-f |

4 - RESULTS

See the following pages :

- Summary of results of 406 MHz beacon test do or re-do following Worksheet for Type Approval Review Ameri-King's ELT models AK-451 AF/AP/S(PLB)
- Test results : data and graphs
- F-B.1/5 table and diagram of RHCP antenna measurements on the AK 451.017-1B whip antenna.
(Additional antenna test results of "E6557-CS Annex-A (Ant) Rev1" report)
- F-A.8, F-A.9 and F-A.10 satellite test result tables with PLB on Dry Ground operation
(Additional satellite test results of "E6557-CS Annex-B" report)
- F.C and F.D revised tables in "Annex-E (Coding Soft) Rev1" of E6557-CS TA Test report

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min.} -20°C (±3)	T _{amb.} 22°C (±3)	T _{max.} 55°C (±3)	
1 - POWER OUTPUT						
o transmitter power output	35 - 39	dBm	35,3	35,3	35,9	not checked
o Power output rise time	< 5	ms	0,05	0,06	0,05	
o power output 1 ms before burst	< -10 dBm	√ *	—	—	—	
2 - DIGITAL MESSAGE						
	Bits number					
o bit sync	1-15	15 bits "1"	√	√	√	Not applicable
o frame sync	16-24	9 bits (000101111)	√	√	√	
o format flag	25	1 bit	√	0	0	
o protocol flag	26	1 bit	√	1	1	
o identification/position code	27-85	59 bits	√	√	√	
o BCH code	86-106	21 bits	√	√	√	
o emerg. code/nat. use/supplem. data	107-112	6 bits	data bits	011111	011111	
o additional data/BCH (if applicable)	113-144	32 bits	√	N/A	N/A	
o position error (if applicable)	< 5	km	N/A	N/A	N/A	

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min.} -20°C (±3)	T _{amb.} 22°C (±3)	T _{max.} 55°C (±3)	
3 - DIGITAL MESSAGE GENERATOR						
o repetition rate T _R :						
average T _R =	48,5 - 51,5	seconds	50,22	50,22	50,22	
minimum T _R =	47,5≤T _R ≤48,0	seconds	47,99	47,99	47,99	
maximum T _R =	52,0≤T _R ≤52,5	seconds	52,01	52,01	52,01	
standard deviation =	0,5 - 2,0		1,32	1,31	1,31	
o bit rate						
minimum f _b =	396	bits/sec.	399,63	399,67	399,65	
maximum f _b =	404	bits/sec.	399,68	399,72	399,71	
o total transmission time :						
short message =	435.6 - 444.4	ms	440,30	440,27	440,24	
long message =	514.8 - 525.2	ms				
o unmodulated carrier						
minimum T ₁ =	158,4	ms	159,87	159,84	159,79	
maximum T ₁ =	161,6	ms	159,88	159,85	159,81	
o first burst delay	> 47,5	seconds				

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min.} -20°C (±3)	T _{amb.} 22°C (±3)	T _{max.} 55°C (±3)	
4 - MODULATION						
o biphasé-L		√	√	√	√	
o rise time	50 - 250	microsec.	80	90	90	
o fall time	50 - 250	microsec.	80	90	90	
o phase deviation : positive	+ (1.0 to 1.2)	radians	+ 1,06	+ 1,14	+ 1,14	
o phase deviation : negative	- (1.0 to 1.2)	radians	- 1,17	- 1,15	- 1,11	
o symmetry measurement	≤ 0.05		+ 0,0201	+ 0,0201	+ 0,0160	
5 - 406 MHz TRANSMITTED FREQUENCY						
o nominal value	as specified in C/S T.001 and C/S T.012	MHz	406,0277322	406,0276890	406,0276953	
o short term stability	≤ 2 x 10 ⁻⁹	/100 ms	2,92E-10	4,15E-10	2,58E-10	
o medium term stability . slope	(-1 to +1) x 10 ⁻⁹	/minute	-5,04E-12	1,67E-11	4,55E-10	
. residual frequency variation	≤ 3 x 10 ⁻⁹		4,93E-10	7,46E-10	1,38E-09	
6 - SPURIOUS EMISSION¹ (into 50 ohms)						
o in-band (406.0 - 406.1 MHz)	C/S T.001 mask	√	—	—	—	not checked

¹ Include spectral plots of the 406,0-406,1 MHz band, showing the transmit signal and emission mask as defined in C/S T.001.

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min.} -20°C (±3)	T _{amb.} 22°C (±3)	T _{max.} 55°C (±3)	
8 - SELF-TEST MODE (if applicable)						
o frame sync	9 bits (011010000)	√		√		
o format flag	1/0	bit		0		
o single radiated burst	≤ 440 /520 (+1%)	ms		440,27		
o default position data (if applicable)	must be correct	√		√		
o description provided		√		√		
o design data provided on protection against repetitive self-test mode transmissions	protection provided	√		√		
o single burst verification	one burst	√		√		
o provides for beacon 15 Hex ID	correct	√		√		
o 121,5 MHz RF power (if applicable)	self-test checks that RF power emitted	√		√		
o 406 MHz RF power	self-test checks that RF power emitted	√		√		

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS	COMMENTS
10.1- OPERATING LIFETIME AT MINIMUM TEMPERATURE¹	ULTRALIFE - U10014			Data and graphs pages 22 to 35
o Duration	> 24	hours	24 hours for 406 MHz and around 78 hours for 121,5/243 MHz	
o Transmitted frequency :	as specified in C/S T.001 and C/S T.012 $\leq 2 \times 10^{-9}$	MHz	406,027737 / 406,027743	
- nominal value		/100 ms	4E-10	
- short term stability		/minute	-7E-10 / 1E-10	
- medium term stability			1,14E-09	
. slope	$(-1 \text{ to } +1) \times 10^{-9}$			
. residual frequency variation	$\leq 3 \times 10^{-9}$			
o Transmitted power output	35 - 39	dBm	35,6 / 36,5	
o Digital message	must be correct	√	√	
10.2- OPERATING LIFETIME AT MINIMUM TEMPERATURE¹	SAFT - LO26SXC			Data and graphs pages 36 to 48
o Duration	> 24	hours	24 hours for 406 MHz and around 63 hours for 121,5/243 MHz	
o Transmitted frequency :	as specified in C/S T.001 and C/S T.012 $\leq 2 \times 10^{-9}$	MHz	406,027727 / 406,027733	
- nominal value		/100 ms	5E-10	
- short term stability		/minute	-7E-10 / 1E-10	
- medium term stability			8,7E-10	
. slope	$(-1 \text{ to } +1) \times 10^{-9}$			
. residual frequency variation	$\leq 3 \times 10^{-9}$			
o Transmitted power output	35 - 39	dBm	36 / 36,4	
o Digital message	must be correct	√	√	

¹ Attach graphs depicting test results.

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS	COMMENTS
14 - SATELLITE QUALITATIVE TESTS² (results provided)	15 Hex ID provided by LUT and position within 5 km 80% ³	✓	✓	Satellite C/S F-A.(8,9&10) tables of E6557-CS_ws (Add_Sat) report
15 - ANTENNA CHARACTERISTICS				
o Polarization	linear or RHCP		Vertical	F-B.1/5 table and diagram p 49&50 Additional antenna test results of "E6557-CS Annex-A (Ant) Rev1" report The test measurements have been done with RHCP Search Antenna
o VSWR	≤ 1.5			
o ERPLOSS		dB	-0,2	
o ERPmax EOL	≤ 43	dBm	43,0	
o ERPmin EOL	≥ 32	dBm	30,6	out-of-spec but results are acceptable with the C/S T.008 measurement uncertainty applied
o azimuth gain variation at 40° elevation angle	≤ 3	dB	0,7	
16 - BEACON CODING SOFTWARE³				
o sample message provided for each coding option of the applicable coding types	correct	✓	✓	See manufacturer doc. and Annex E of E6557-CS test report reviewed (F.C and F.D revised tables)
o sample self-test message provided for each coding option of the applicable coding types	correct	✓	✓	

² Attach a satellite qualitative test summary report (Appendix A to Annex F) for each test configuration.

³ Attach examples of each requested coding option as per Appendix D to Annex F.

**User Protocol Short Message Verification of
Ameri-King Corp
AK-451 ()Series ELT (AF)(AP)(S) & PLB
N° C/S 09 (But n° 1)
at -20° C, 22° C and 55° C**

Certification Test at -20°C

Date of test : 21-Jun-07

Manufacturer : Ameri-King

Beacon Type : AK-451 ()Series ELT (AF)(AP)(S) & PLB

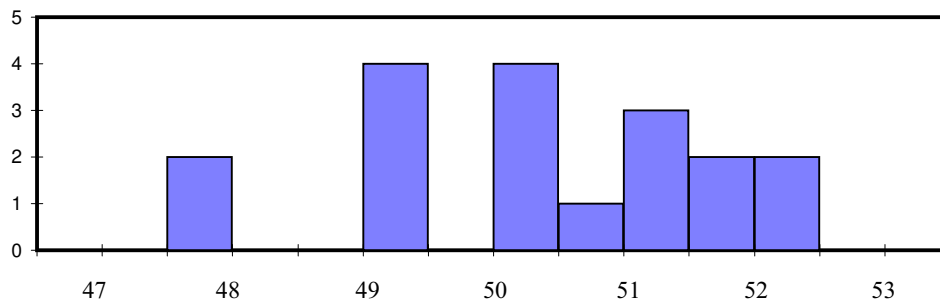
Number : C/S 09 (But n° 1)

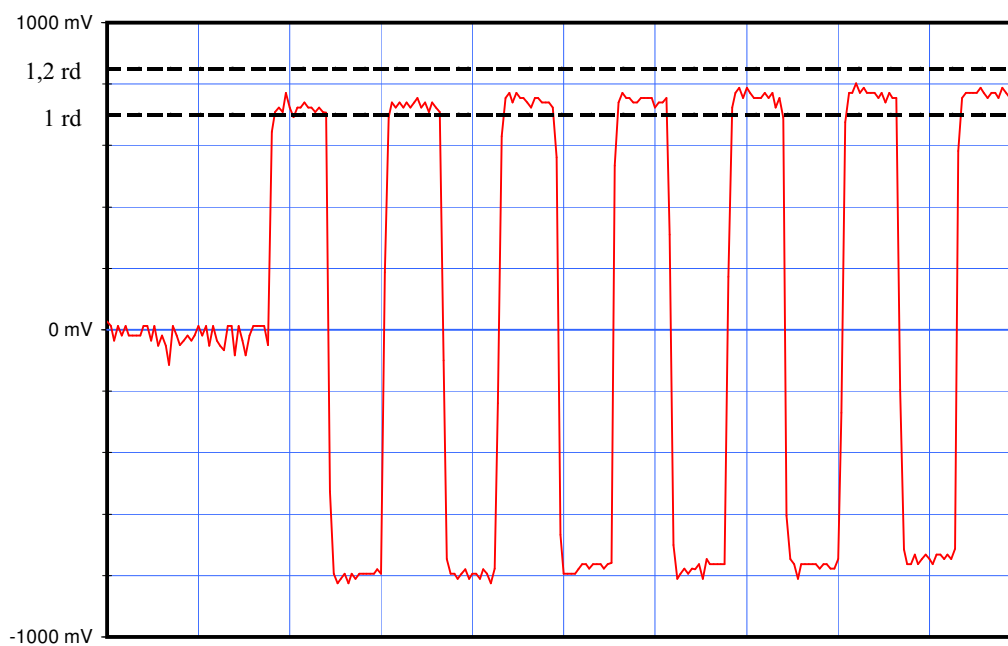
Message

Message received		FFFE2F4C9269B7380BA60B571C1F
Format Flag	25	0
Protocol flag	26	1
Ident./Position code	27-85	9924D36E70174C1
Country Code/Country	27-36	0201 / ALBANIA
Protocol Code : U/Std-Nat	37-39/37-40	001
Protocol Code Used	37-39/37-40	User -
Identification Data	40-85/41-64/41-58	9924D36E70174C1
Identification Used		00C7518
Calculated BCH1	25-85	0D5C70
Encoded BCH1	86-106	0D5C70
Homing	84-85	01
Em.cod/nat.use/supp.data	107-112	011111
Emer cod / Encod pos data	107	0
Activation type	108	1 Manual and Automatic
Calculated BCH2	N/A	
Encoded BCH2	N/A	
Latitude position	N/A	
Longitude position	N/A	
Delta position	N/A	

Electrical and other parameters

CW preamble	ms	158,4 <	< 161,6	159,88
Total transmission time	ms	435,6 <	<444,4	440,30
Modulation frequency	Hz	396<	< 404	399,65
Phase deviation : total	rd		<=2,40	2,23
Phase deviation : positive	rd	1,00 <	< 1,20	1,06
Phase deviation : negative	rd	-1,20 <	< -1,00	-1,17
Symmetry measurement	%		<=5 %	2,01
Nominal frequency : F2	Hz			406027732,21
Short term2				2,33E-10
Short term3				2,92E-10
Slope				-5,04E-12
Residual				4,93E-10
406 MHz power output	dBm			35,3
Homing frequency	MHz			121,50
121,5 MHz power output	dBm			20,9
Soak temperature	°C			-19,9
Extra feature				No

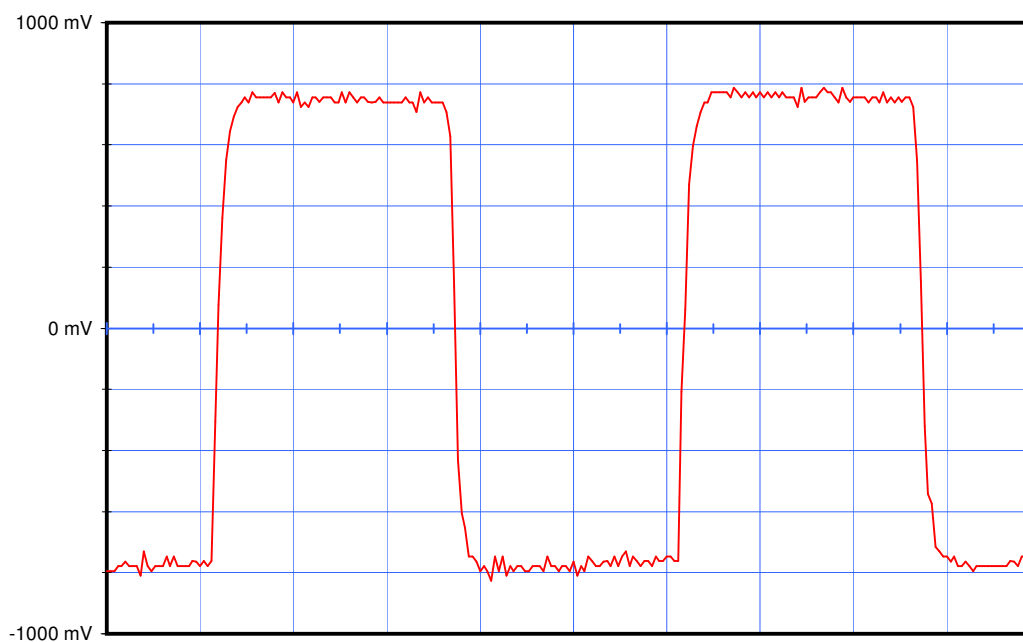




0 ms
Vmarker1 850 mv ==> 1,2 rd
Vmarker2 700 mv ==> 1 rd

10 ms
2 ms/div.

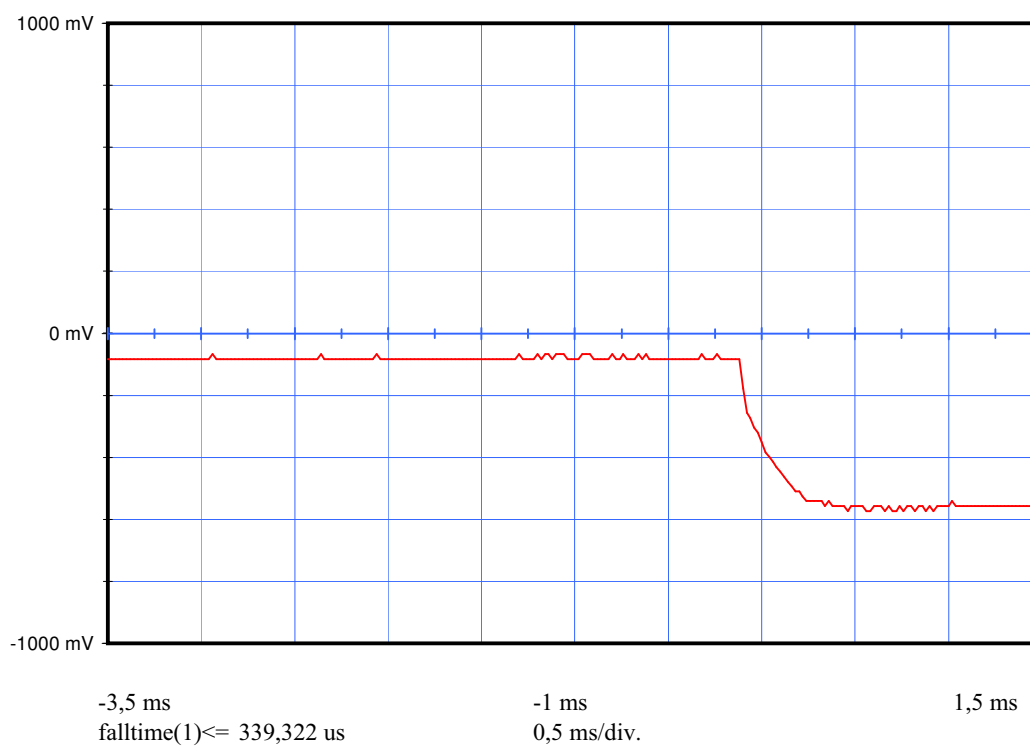
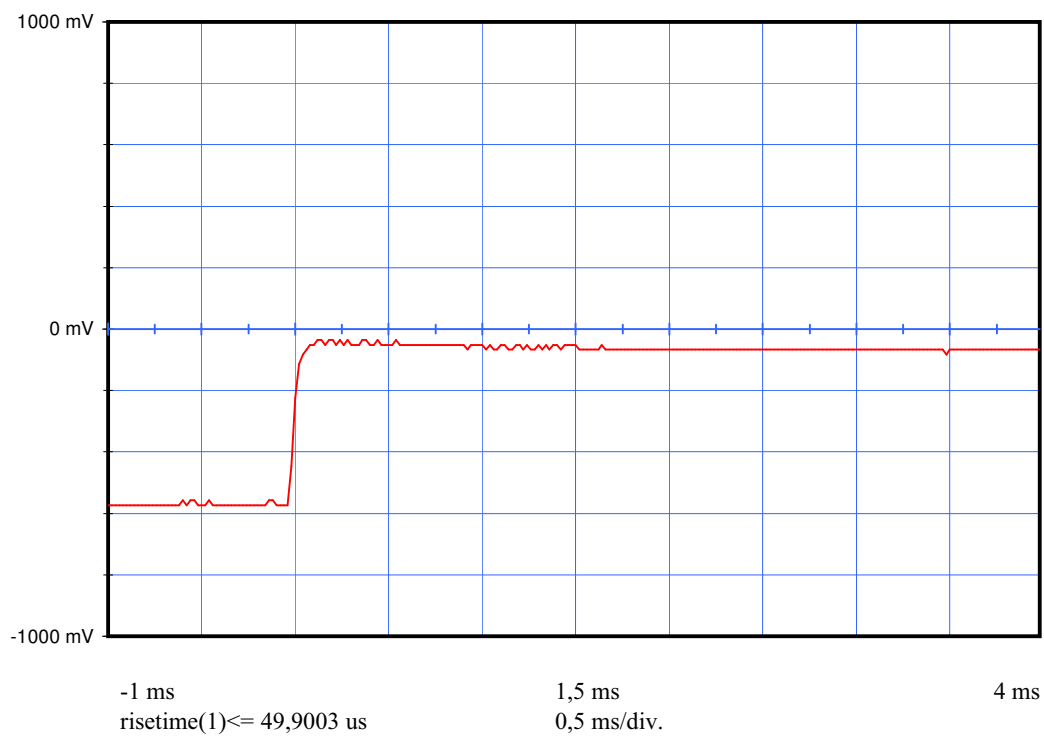
20 ms



8 ms
Duty Cycle : 0,020084265
falltime(1) <= 79,8404 us
+width(1) 1,26747 ms

10,5 ms
0,5 ms/div.
risetime(1) <= 79,8404 us
-width(1) 1,21756 ms

13 ms



Certification Test at 22°C

Date of test : 20-Jun-07

Manufacturer : Ameri-King

Beacon Type : AK-451 ()Series ELT (AF)(AP)(S) & PLB

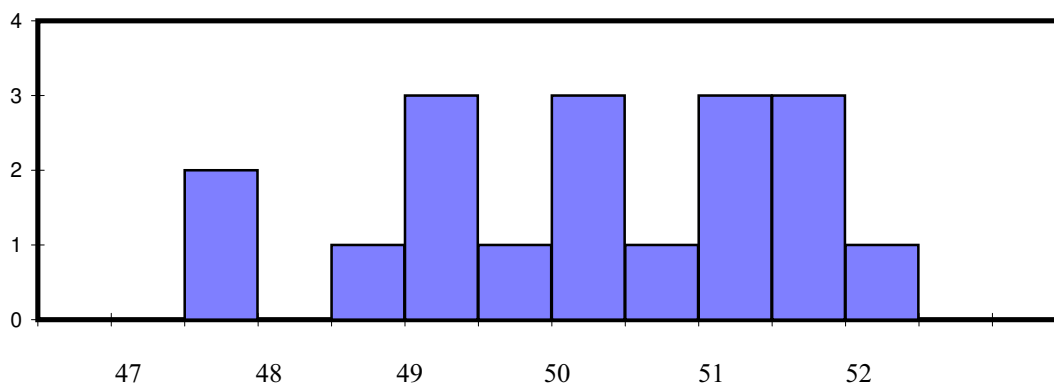
Number : C/S 09 (But n° 1)

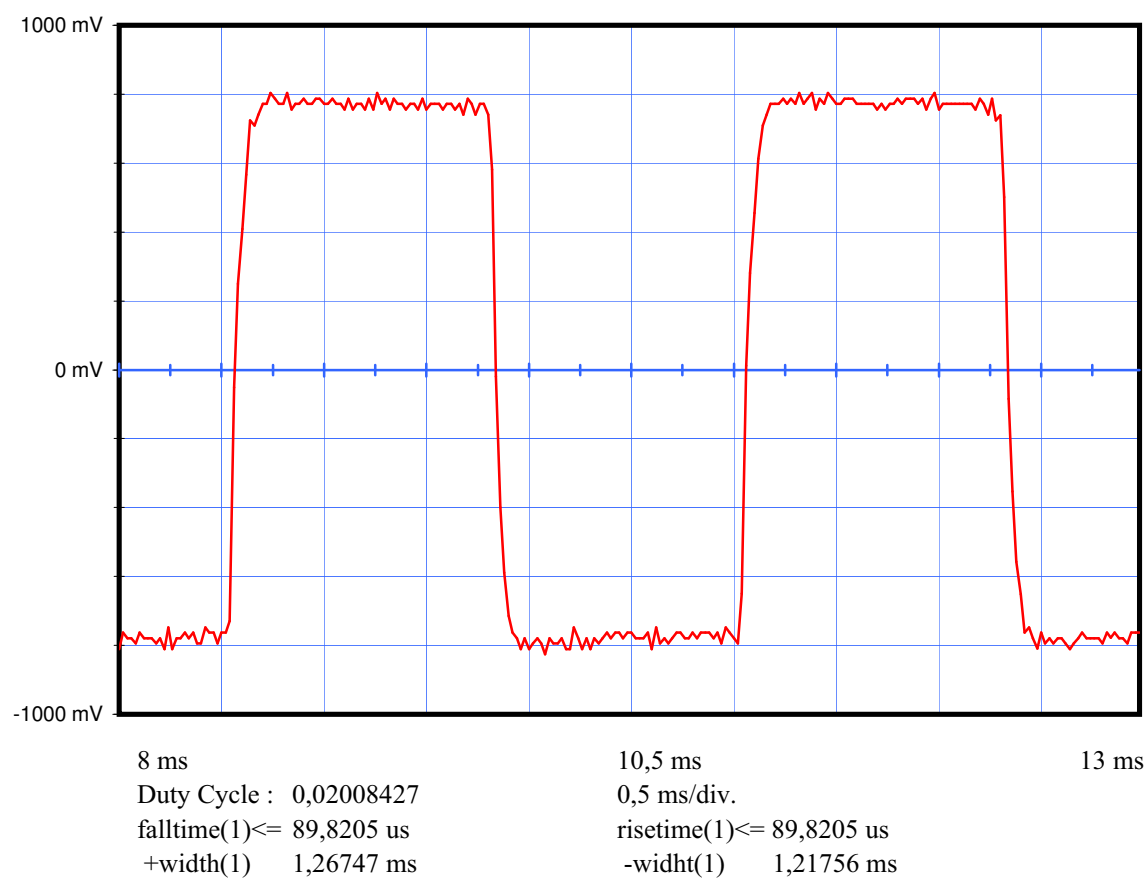
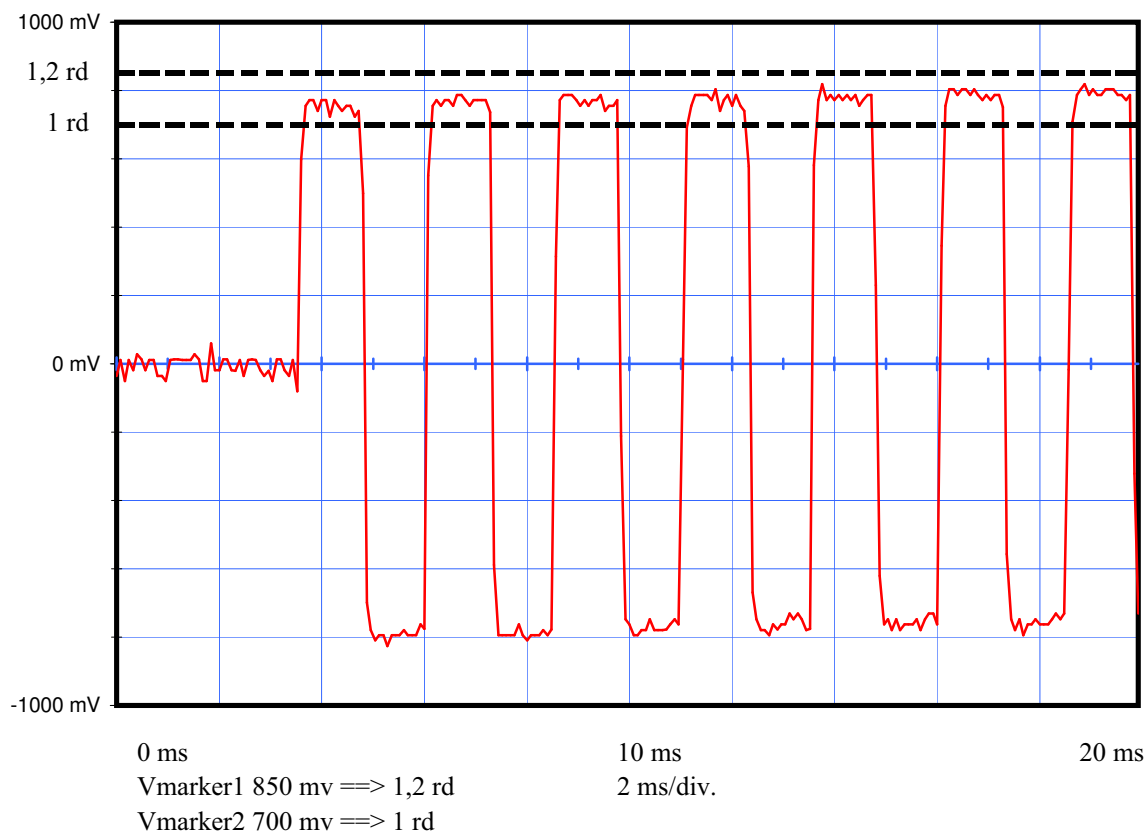
Message

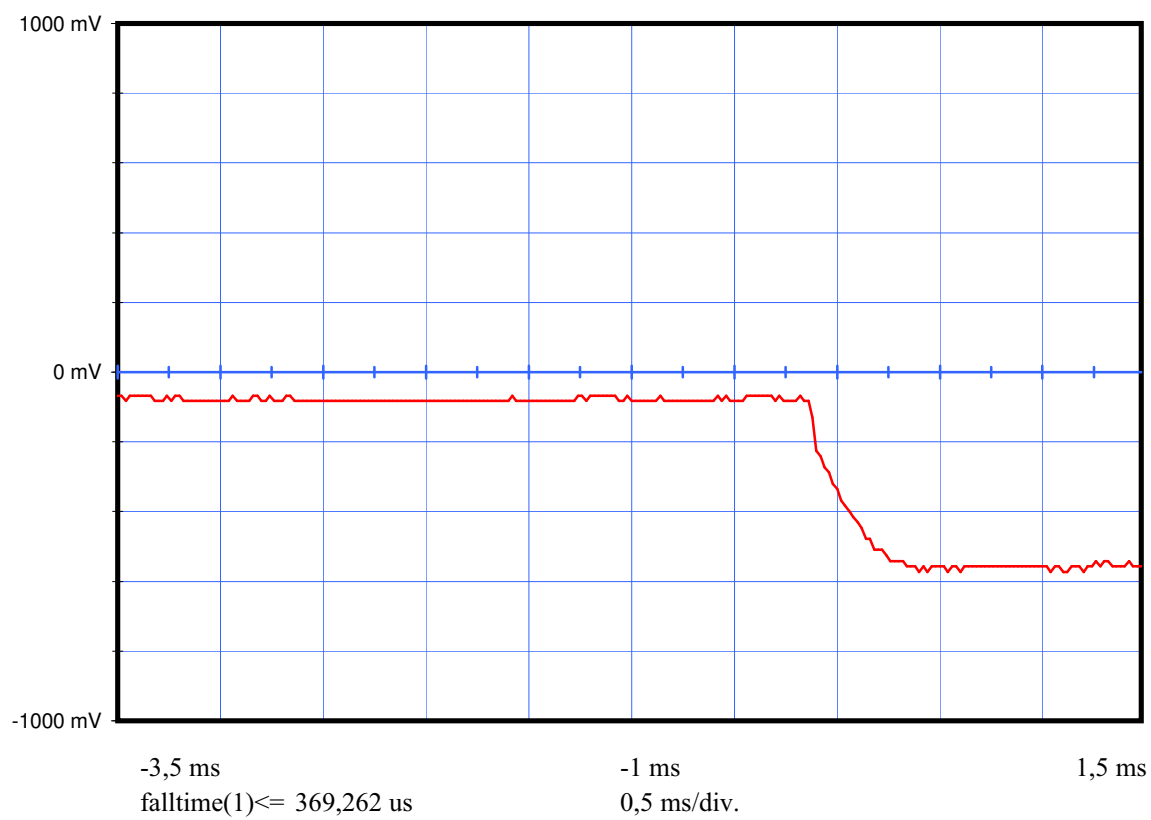
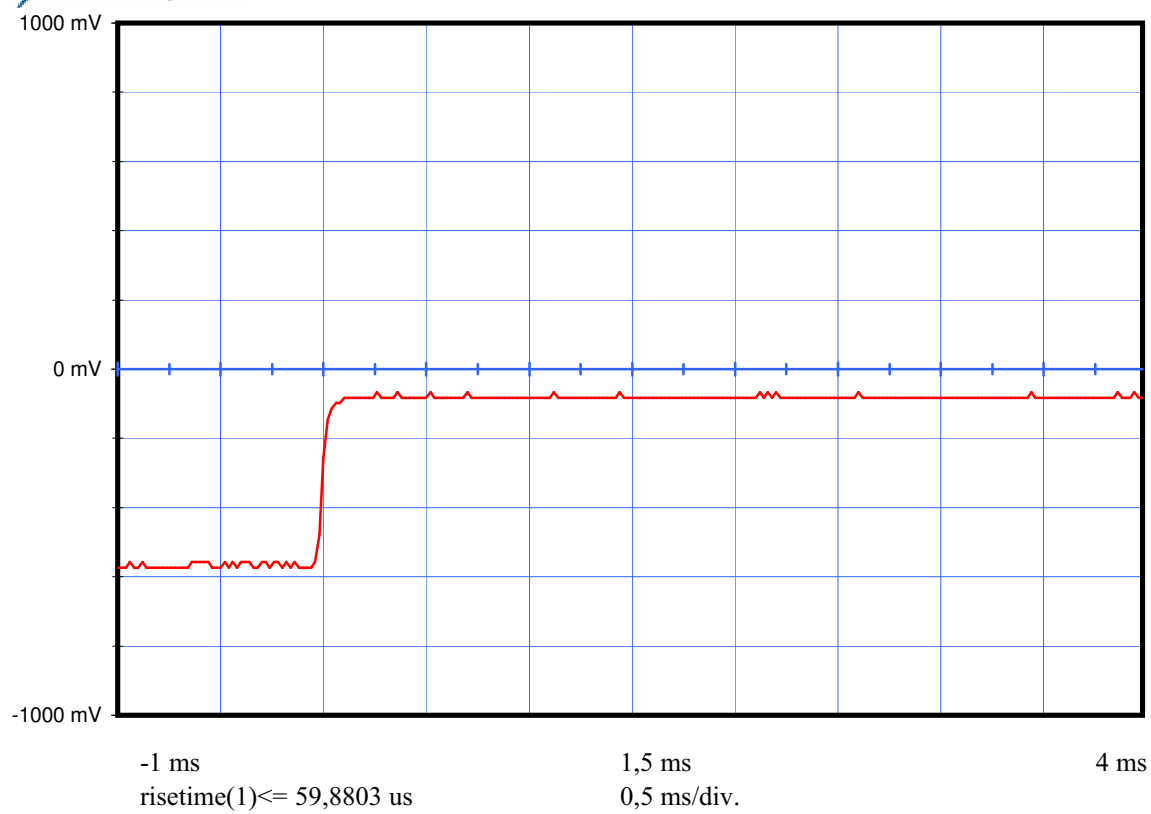
Message received		FFFE2F4C9269B7380BA60B571C1F
Format Flag	25	0
Protocol flag	26	1
Ident./Position code	27-85	9924D36E70174C1
Country Code/Country	27-36	0201 / ALBANIA
Protocol Code : U/Std-Nat	37-39/37-40	001
Protocol Code Used	37-39/37-40	User -
Identification Data	40-85/41-64/41-58	9924D36E70174C1
Identification Used		00C7518
Calculated BCH1	25-85	0D5C70
Encoded BCH1	86-106	0D5C70
Homing	84-85	01
Em.cod/nat.use/supp.data	107-112	011111
Emer cod / Encod pos data	107	0
Activation type	108	1 Manual and Automatic
Calculated BCH2	N/A	
Encoded BCH2	N/A	
Latitude position	N/A	
Longitude position	N/A	
Delta position	N/A	

Electrical and other parameters

CW preamble	ms	158,4 < < 161,6	159,84
Total transmission time	ms	435,6 < < 444,4	440,27
Modulation frequency	Hz	396 < < 404	399,69
Phase deviation : total	rd	<=2,40	2,29
Phase deviation : positive	rd	1,00 < < 1,20	1,14
Phase deviation : negative	rd	-1,20 < < -1,00	-1,15
Symmetry measurement	%	<=5 %	2,01
Nominal frequency : F2	Hz		406027689,00
Short term2			3,15E-10
Short term3			4,15E-10
Slope			1,67E-11
Residual			7,46E-10
406 MHz power output	dBm		35,3
Homing frequency	MHz		121,50
121,5 MHz power output	dBm		21,5
Soak temperature	°C		25,3
Extra feature			No







Certification Test at 55°C

Date of test : 21-Jun-07

Manufacturer : Ameri-King

Beacon Type : AK-451 ()Series ELT (AF)(AP)(S) & PLB

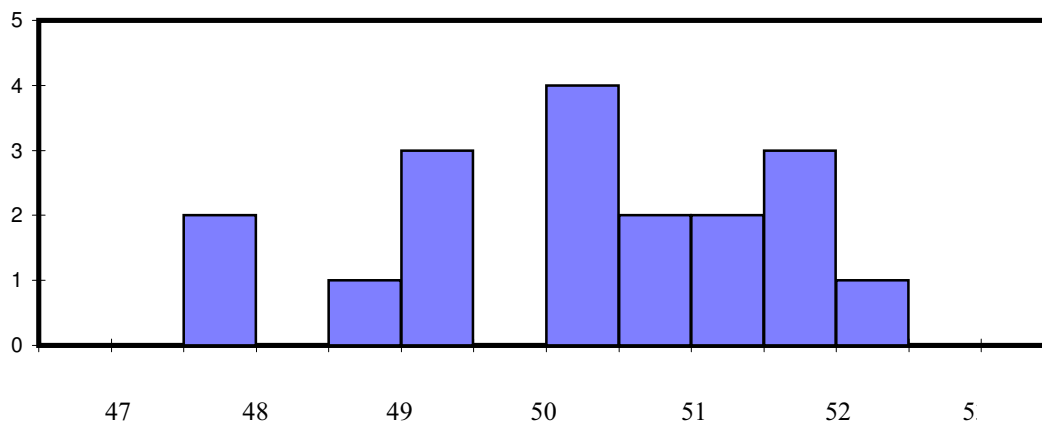
Number : C/S 09 (But n° 1)

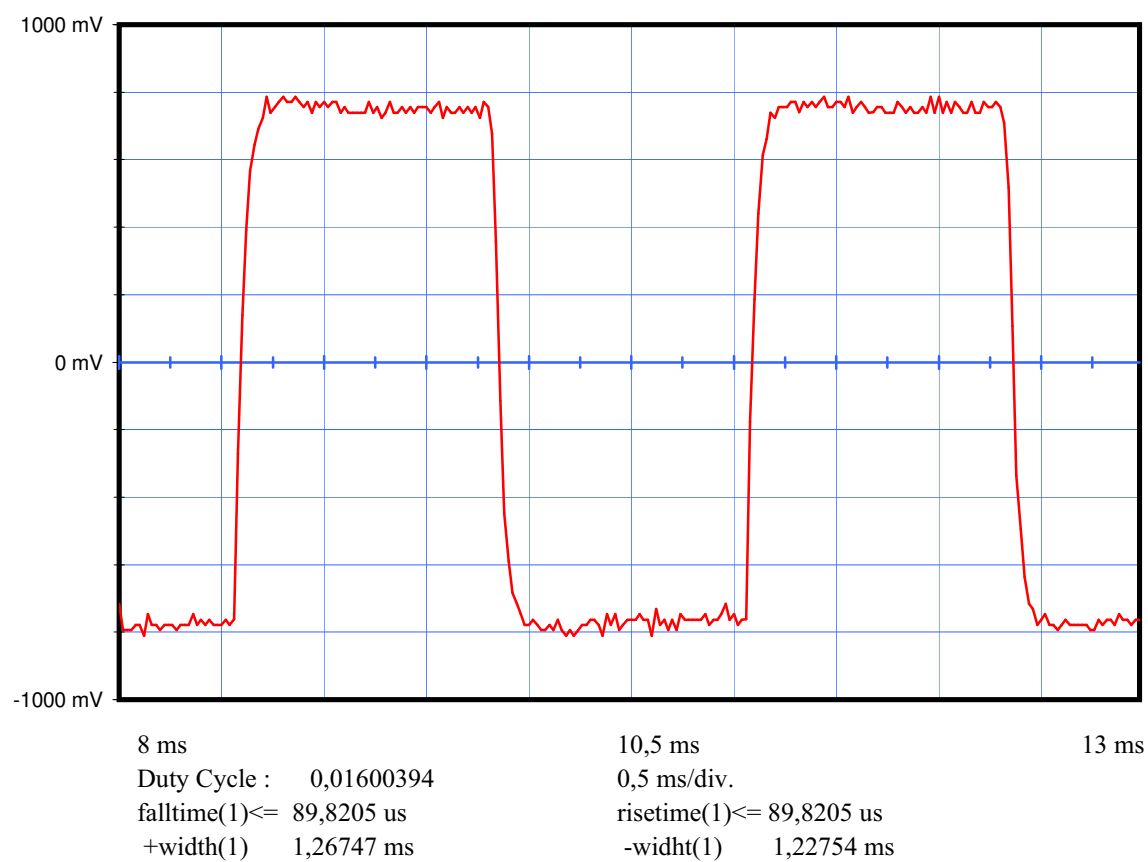
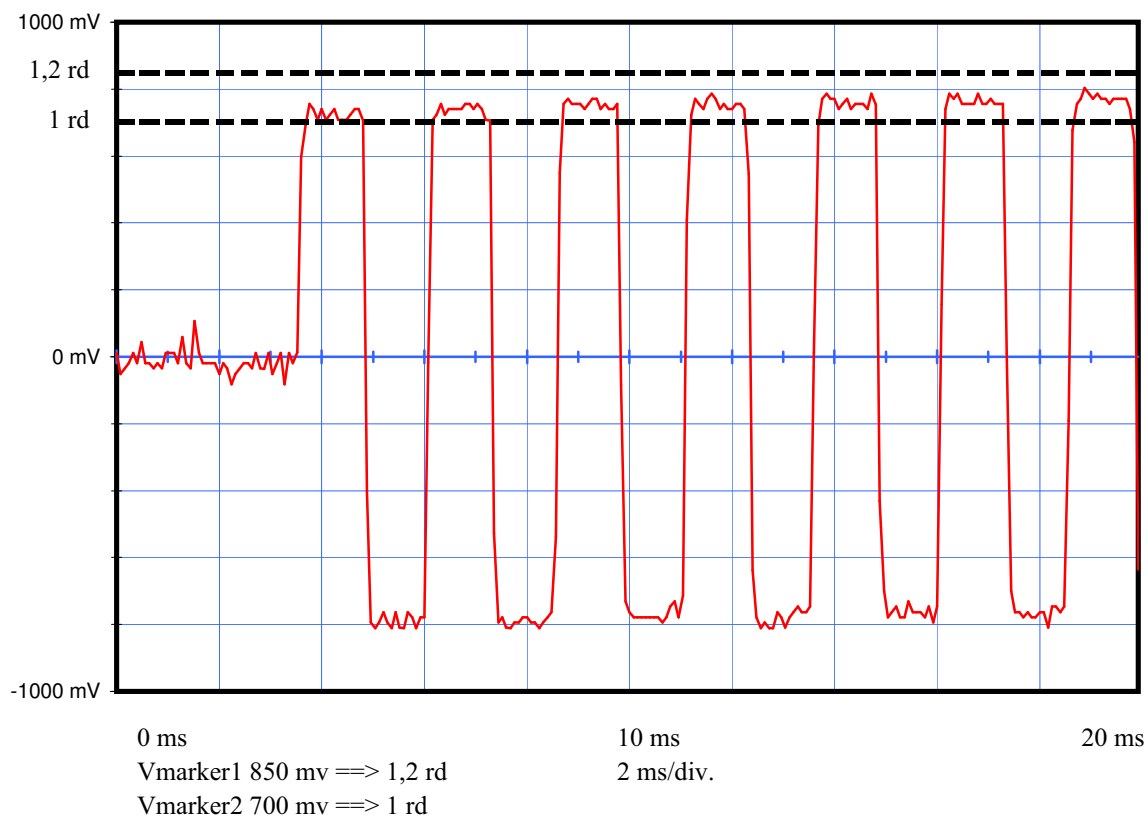
Message

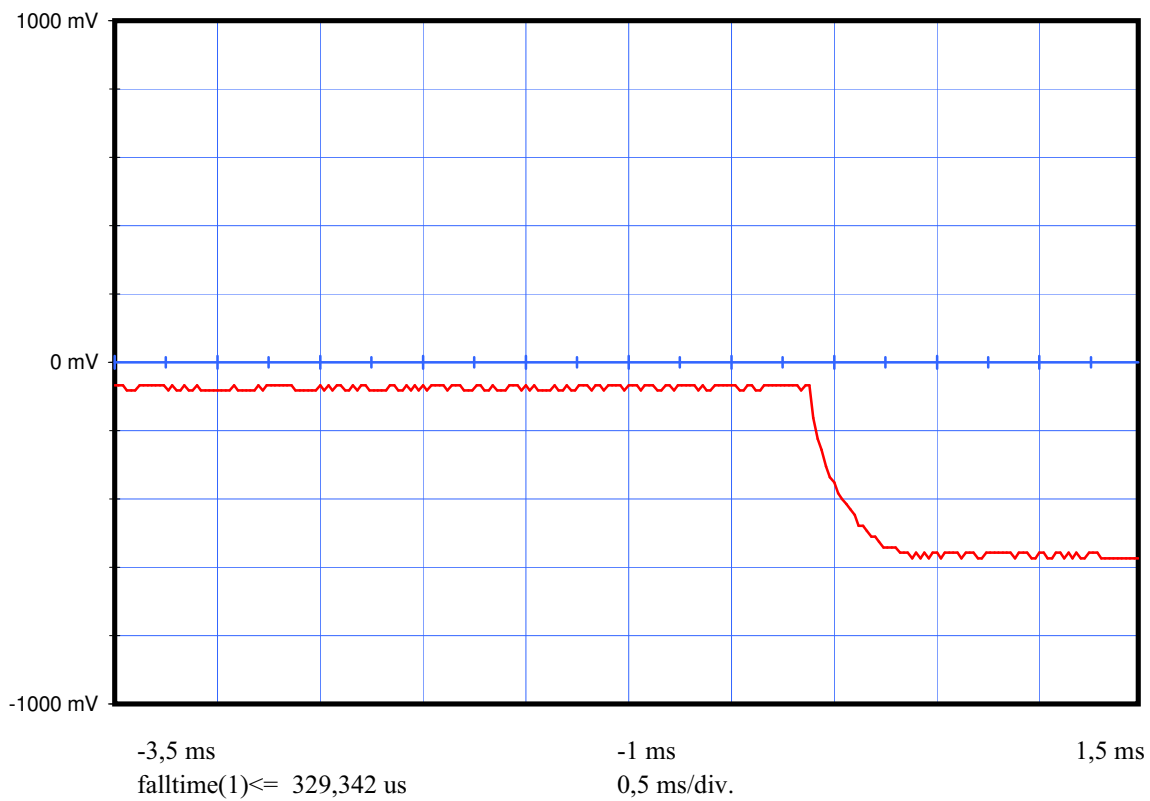
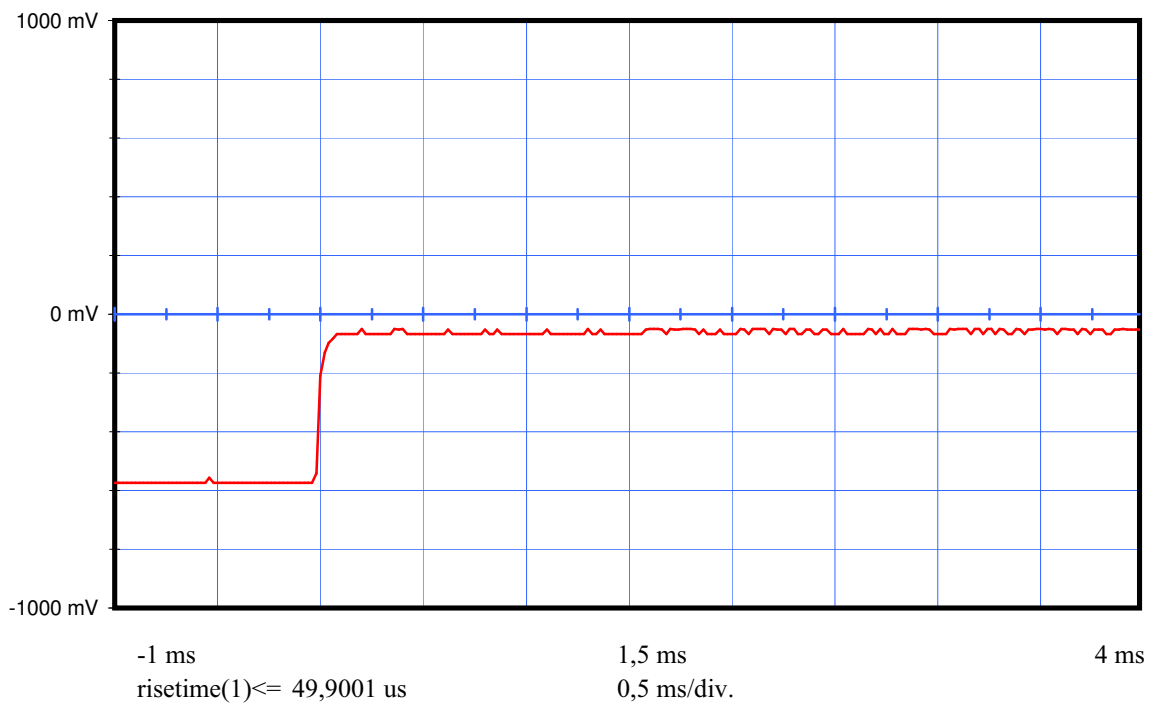
Message received		FFFE2F4C9269B7380BA60B571C1F
Format Flag	25	0
Protocol flag	26	1
Ident./Position code	27-85	9924D36E70174C1
Country Code/Country	27-36	0201 / ALBANIA
Protocol Code : U/Std-Nat	37-39/37-40	001
Protocol Code Used	37-39/37-40	User -
Identification Data	40-85/41-64/41-58	9924D36E70174C1
Identification Use		00C7518
Calculated BCH1	25-85	0D5C70
Encoded BCH1	86-106	0D5C70
Homing	84-85	01
Em.cod/nat.use/supp.data	107-112	011111
Emer cod / Encod pos data	107	0
Activation type	108	1 Manual and Automatic
Calculated BCH2	N/A	
Encoded BCH2	N/A	
Latitude position	N/A	
Longitude position	N/A	
Delta position	N/A	

Electrical and other parameters

CW preamble	ms	158,4 < < 161,6	159,80
Total transmission time	ms	435,6 < < 444,4	440,24
Modulation frequency	Hz	396 < < 404	399,68
Phase deviation : total	rd	<= 2,40	2,26
Phase deviation : positive	rd	1,00 < < 1,20	1,14
Phase deviation : negative	rd	-1,20 < < -1,00	-1,11
Symmetry measurement	%	<= 5 %	1,60
Nominal frequency : F2	Hz		406027695,31
Short term2			2,60E-10
Short term3			2,58E-10
Slope			4,55E-10
Residual			1,38E-09
406 MHz power output	dBm		35,9
Homing frequency	MHz		121,50
121,5 MHz power output	dBm		20,9
Soak temperature	°C		55,5
Extra feature			No







SELF-TEST MODE CONTROL ON
Ameri-King Corp
AK-451 ()Series ELT (AF)(AP)(S) & PLB
N° C/S 09 (But n° 1)
at 22° C

User Protocol : Short message

Message at 22°C

Manufacturer	Ameri-King
Beacon model	AK-451 ()Series ELT (AF)(AP)(S) & PLB
Serial number	C/S 09 (But n° 1)
Date of test	20-juin-07
Temperature	24,9
Message received	FFFED04C9269B7380BA60B571C1F
Frame synchro. Pattern	011010000
ID Code	9924D36E70174C1

Total transmission time	ms 435.6<	ms 444.4<	440,27
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First burst at 25 sec

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Aviation User	37-39	001
Aircraft Identification: 00C7518	40-81	001101001101101110011100000001011101001100
Spare	82-83	00
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	011010101110001110000
Calculated BCH 1:	N/A	011010101110001110000
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	1111
15 Hex ID:	N/A	9924D36E70174C1

RESULTS OF OPERATING LIFE TEST ON
Ameri-King Corp ELT & PLB
AK-451 ()Series (AF)(AP)(S)(PLB)
N° C/S 09 (But n° 1) U10014 Ultralife batteries
-20 °C

Note 1: Prior the Operating Life Test and following manufacturer Batteries Discharge Calculation the battery pack charge has been reduced by the test laboratory during 11,07 hours with full loads at 22°C

Following the table below this discharge is more than the laboratory calculation

In this condition the operating lifetime with the Ultralife U10014 battery pack is :

- 24 hours for 406 MHz and
- around 78 hours for 121,5/243 MHz

AMERI-KING CALCULATION	INTESPACE Lab Contr (note 2)
VHF(121,5/243,0) 0,100 Amp	0,109 Amp
UHF 406 1,70 Amp x (0,52/50) 0,01768 Amp	1,63 Amp x (0,52/50) = 0,016952 Amp
Total I_{ave} = 0,11768 Amp	0,12595 Amp
Self Test: 5sec / month for 5 YRS = 300sec	
Self Test Discharge =	
0,11768 x [300 sec / 3600 sec (HR)] 0,0098066 AH	0,12595 x (300 / 3600) = 0,010496 AH
Self Test Discharge with 1,65 COEF. 0,01618 AH	0,01732 AH
Batteries 450-0010-1 Ultralife U10014 (LiMnO₂)	
Bat self discharge: 1,5%(10,4AH)(5yrs)(1.65) = 1,287 AH	1,287 AH
AH total must be discharged 0,01618+1,287 = 1,303 AH	0,01732 + 1,287 = 1,304 AH
Duration of discharge with UHF & VHF Loads	
1,303 AH / 0,11768 A = 11,07 hours	1,304 AH / 0,12595 A = 10,36 hours
Duration of discharge with VHF Loads only	
1,303 AH / 0,100 A = 13,03 hours	1,303 AH / 0,109 A = 11,97hours

Note 2: The Lab current consumption measurement have been check with :

- Tektronix Scope TDS 3052 S/N B011837 Validity date : 29 Jan 2008
- and Tektronix probe TCP 202 Validity date : 6 June 2008

Warm Up	D Frequency (Hz)	Temp. (°C)	P406 (dBm)	P121.5 (dBm)
1	49743,38	-20,5	36,5	21,7
2	49742,99	-20,4	36,5	21,7
3	49741,68	-20,3	36,4	21,7
4	49741,65	-20,2	36,4	21,7
5	49741,01	-20,2	36,5	21,7
6	49740,95	-20,2	36,4	21,8
7	49740,36	-20,3	36,4	21,8
8	49739,87	-20,5	36,4	21,8
9	49739,76	-20,3	36,4	21,8
10	49739,38	-20,3	36,4	21,8
11	49739,12	-20,2	36,4	21,8
12	49739,09	-20,3	36,4	21,8
13	49739,19	-20,3	36,4	21,8
14	49739,00	-20,3	36,4	21,8
15	49738,70	-20,2	36,4	21,9
16	49738,63	-20,2	36,4	21,9
17	49738,87	-20,3	36,4	21,8
18	49738,30	-20,4	36,4	21,9

No	Temp.	Slope	Sigma	P406	Short term	P121.5
1	-20,2	-6,8E-10	1,1E-09	36,4	1,9E-10	21,8
18	-20,3	-1,5E-10	4,7E-10	36,3	2,3E-10	21,9
31	-20,3	2,4E-11	4,9E-10	36,2	2,2E-10	21,9
61	-20,3	4,0E-11	4,4E-10	36,1	3,2E-10	21,9
91	-20,4	1,0E-11	4,4E-10	36,0	2,7E-10	21,9
121	-20,3	2,3E-11	3,6E-10	35,9	1,8E-10	21,9
151	-20,2	5,1E-11	5,3E-10	35,8	2,7E-10	22,0
181	-20,4	4,6E-11	5,8E-10	35,8	2,6E-10	22,0
211	-20,3	2,8E-11	5,7E-10	35,8	3,4E-10	22,0
241	-20,3	2,9E-12	5,0E-10	35,8	1,9E-10	21,9
271	-20,4	-4,5E-11	5,1E-10	35,7	2,4E-10	21,9
301	-20,4	-2,2E-11	5,3E-10	35,7	2,5E-10	21,9
331	-20,3	7,3E-11	6,7E-10	35,7	2,7E-10	21,9
361	-20,4	2,2E-11	4,1E-10	35,7	3,1E-10	21,9
391	-20,5	4,5E-11	5,7E-10	35,7	2,8E-10	21,9
421	-20,5	5,9E-11	4,5E-10	35,8	2,3E-10	22,0
451	-20,6	-2,6E-11	3,7E-10	35,8	2,6E-10	21,9
481	-20,7	5,3E-12	3,8E-10	35,8	2,9E-10	22,0
511	-20,4	8,0E-12	5,6E-10	35,8	2,7E-10	21,9
541	-20,5	3,0E-11	4,2E-10	35,8	2,5E-10	21,9
571	-20,6	-4,7E-11	4,3E-10	35,8	2,2E-10	22,0
601	-20,4	-4,6E-11	3,7E-10	35,7	2,0E-10	21,9
631	-20,6	5,4E-11	3,6E-10	35,7	2,7E-10	21,9
661	-20,6	-4,5E-11	5,4E-10	35,6	1,9E-10	21,9
691	-20,7	7,0E-12	4,7E-10	35,6	2,4E-10	21,9
721	-20,5	-1,1E-11	4,6E-10	35,6	2,8E-10	22,0
751	-20,5	2,1E-12	3,4E-10	35,6	2,9E-10	21,9
781	-20,6	1,0E-12	5,3E-10	35,6	2,9E-10	21,9
811	-20,7	2,3E-11	3,5E-10	35,6	2,3E-10	22,0
841	-20,5	1,1E-11	3,7E-10	35,7	3,4E-10	22,0

No	Temp.	Slope	Sigma	P406	Short term	P121.5
871	-20,8	1,7E-11	4,2E-10	35,7	2,7E-10	21,9
901	-20,6	-2,2E-11	4,1E-10	35,7	2,2E-10	22,0
931	-20,7	-8,0E-12	4,1E-10	35,7	2,5E-10	21,9
961	-20,7	1,9E-11	5,3E-10	35,6	2,8E-10	22,0
991	-20,7	-3,2E-11	5,4E-10	35,7	2,5E-10	21,9
1021	-20,7	-1,0E-11	5,7E-10	35,7	2,2E-10	22,0
1051	-20,6	2,7E-11	5,2E-10	35,7	2,3E-10	22,0
1081	-20,6	-1,5E-11	5,2E-10	35,7	2,4E-10	22,0
1111	-20,6	-5,5E-11	4,4E-10	35,7	2,1E-10	22,0
1141	-20,5	1,7E-11	6,1E-10	35,7	2,1E-10	22,0
1171	-20,5	4,9E-11	4,2E-10	35,7	2,5E-10	22,0
1201	-20,6	-3,4E-11	3,5E-10	35,7	2,3E-10	22,0
1231	-20,7	1,1E-11	5,1E-10	35,7	2,6E-10	22,0
1261	-20,7	-4,0E-11	3,7E-10	35,7	2,6E-10	22,0
1291	-20,7	-6,8E-11	3,7E-10	35,7	2,3E-10	22,0
1321	-20,5	6,5E-12	3,5E-10	35,7	2,3E-10	21,9
1351	-20,6	2,9E-12	5,2E-10	35,7	2,4E-10	22,0
1381	-20,6	4,6E-11	5,1E-10	35,7	1,9E-10	21,9
1411	-20,7	-8,0E-12	5,2E-10	35,6	2,7E-10	22,0
1441	-20,6	-1,9E-11	3,9E-10	35,6	3,0E-10	21,9
1471	-20,6	2,4E-11	4,4E-10	35,6	2,3E-10	21,9
1501	-20,9	-1,8E-11	5,0E-10	35,6	3,0E-10	22,0
1531	-20,7	-1,0E-11	5,8E-10	35,6	2,9E-10	21,9
1561	-20,6	-4,4E-11	3,7E-10	35,6	2,6E-10	22,0
1591	-20,7	-5,7E-12	4,9E-10	35,6	2,5E-10	22,0
1621	-20,6	-1,6E-11	5,2E-10	35,6	2,6E-10	22,0
1651	-20,7	-3,2E-11	5,2E-10	35,6	2,4E-10	22,0
1681	-20,6	6,0E-12	4,6E-10	35,6	2,6E-10	22,0
1711	-20,7	5,9E-11	4,5E-10	35,6	2,3E-10	21,9
1741	-20,3					21,9
1771	-20,4					21,9
1801	-20,3					21,9
1831	-20,4					21,9
1861	-20,4					22,0
1891	-20,3					22,0
1921	-20,4					22,0
1951	-20,5					22,0
1981	-20,6					21,9
2011	-20,5					22,0
2041	-20,5					22,0
2071	-20,6					21,9
2101	-20,4					22,0
2131	-20,6					22,0
2161	-20,4					21,9
2191	-20,5					21,9
2221	-20,6					22,0
2251	-20,4					22,0
2281	-20,6					21,9
2311	-20,6					22,0
2341	-20,6					22,0
2371	-20,6					21,9

24h

No	Temp.	Slope	Sigma	P406	Short term	P121.5
2401	-20,5					22,0
2431	-20,6					21,9
2461	-20,7					22,0
2491	-20,8					22,0
2521	-20,6					21,9
2551	-20,7					22,0
2581	-20,6					22,0
2611	-20,7					22,0
2641	-20,5					21,9
2671	-20,8					22,0
2701	-20,6					21,9
2731	-20,6					22,0
2761	-20,6					22,0
2791	-20,6					22,0
2821	-20,6					22,0
2851	-20,5					22,0
2881	-20,6					22,0
2911	-20,6					21,9
2941	-20,7					22,0
2971	-20,6					22,0
3001	-20,6					21,9
3031	-20,7					22,0
3061	-20,8					22,0
3091	-20,6					22,0
3121	-20,7					21,9
3151	-20,7					21,9
3181	-20,6					21,9
3211	-20,7					22,0
3241	-20,9					22,0
3271	-21,0					21,9
3301	-20,2					22,0
3331	-20,3					22,0
3361	-20,4					22,0
3391	-20,3					21,9
3421	-20,3					22,0
3451	-20,3					21,9
3481	-20,4					22,0
3511	-20,6					21,9
3541	-20,5					22,0
3571	-20,4					21,9
3601	-20,4					22,0
3631	-20,4					21,9
3661	-20,5					22,0
3691	-20,6					22,0
3721	-20,5					22,0
3751	-20,5					21,9
3781	-20,4					22,0
3811	-20,5					22,0
3841	-20,6					22,0
3871	-20,8					22,0
3901	-20,6					21,9

48h

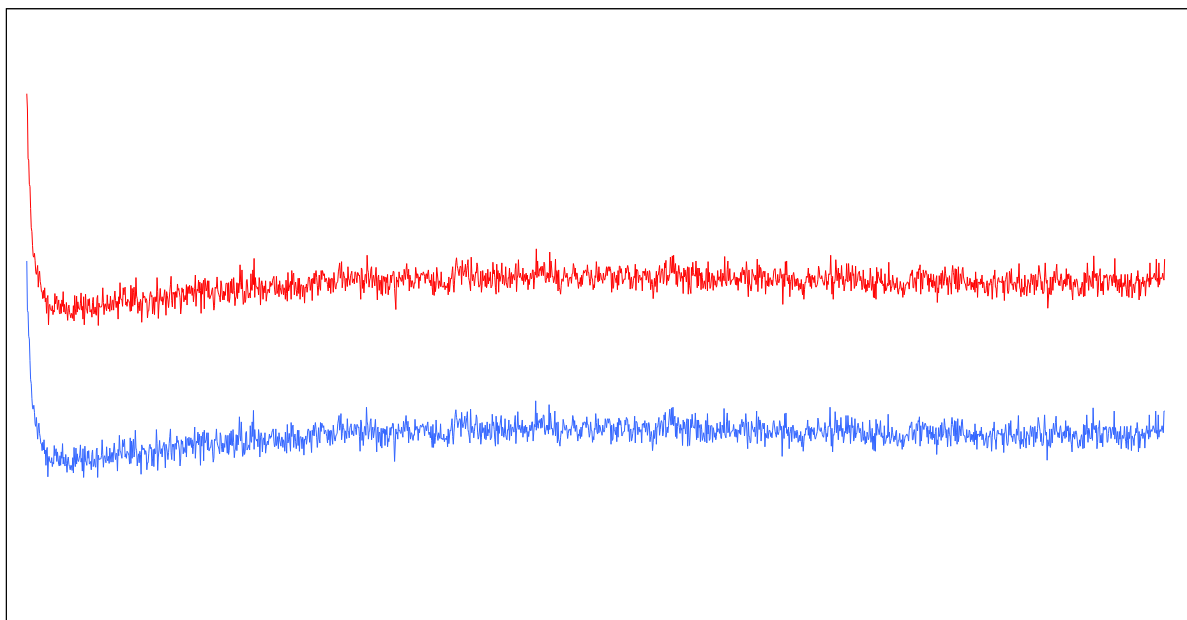
No	Temp.	Slope	Sigma	P406	Short term	P121.5
3931	-20,5					21,9
3961	-20,6					21,9
3991	-20,7					21,9
4021	-20,6					21,9
4051	-20,7					22,0
4081	-20,6					21,9
4111	-20,6					22,0
4141	-20,6					22,0
4171	-20,7					21,9
4201	-20,6					22,0
4231	-20,5					22,0
4261	-20,6					21,9
4291	-20,7					22,0
4321	-20,5					22,0
4351	-20,5					21,9
4381	-20,5					21,9
4411	-20,7					21,9
4441	-20,7					21,9
4471	-20,5					21,9
4501	-20,7					22,0
4531	-20,7					21,9
4561	-20,7					21,9
4591	-20,6					21,9
4621	-20,5					21,9
4651	-20,6					22,0
4681	-20,7					22,0
4711	-20,7					22,0
4741	-20,6					22,0
4771	-20,6					21,9
4801	-20,7					22,0
4831	-20,9					21,9
4861	-20,9					22,0
4891	-21,0					22,0
4921	-20,9					21,9
4951	-20,9					22,0
4981	-20,9					21,9
5011	-20,9					22,0
5041	-21,0					22,0
5071	-21,0					22,0
5101	-21,0					21,9
5131	-20,9					22,0
5161	-21,0					21,9
5191	-20,9					22,0
5221	-21,0					22,0
5251	-20,9					22,0
5281	-21,0					22,0
5311	-21,0					22,0
5341	-20,9					22,0
5371	-21,0					21,9
5401	-20,9					22,0
5431	-20,9					21,9

No	Temp.	Slope	Sigma	P406	Short term	P121.5
5461	-20,9					22,0
5491	-21,0					21,9
5521	-20,9					22,0
5551	-20,9					21,8
5581	-21,1					21,6
5611	-21,0		78 hours			21,2
5641	-20,9					20,8
5671	-21,0					20,3
5701	-21,1					19,8
5731	-21,1					19,1
5761	-21,0					17,6
5791	-21,0					17,3
5821	-21,0					2,7

5616

Frequency variation

406027,743 kHz



406027,737 kHz

— Initial tracing — Smoothed tracing

Sample of beacon message during the Operating Lifetime Test :

FFFE2F8C9EAF0F0F2B80348B18758E01401E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	101011110000111100001111
Latitude Sign: North	65	0
Latitude Degrees: 43	66-72	0101011
Latitude Minutes: 30	73-74	10
Longitude Sign: East	75	0
Longitude Degrees: 1	76-83	00000001
Longitude Minutes: 30	84-85	10
BCH 1 Encoded:	86-106	100100010110001100001
BCH 1 Calculated:	N/A	100100010110001100001
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From External Navigation Device	111	0
Aux Device: 121.5 MHz homer	112	1
Latitude Offset Sign: +	113	1
Latitude Offset Minutes: 3	114-118	00011
Latitude Offset Seconds: 32	119-122	1000
Longitude Offset Sign: -	123	0
Longitude Offset Minutes: 1	124-128	00001
Longitude Offset Seconds: 16	129-132	0100
BCH 2 Encoded:	133-144	000000011110
BCH 2 Calculated:	N/A	000000011110
Composite Latitude: 43.5588888888889 Degrees North	N/A	Composite Longitude: 1.47888888888889 Degrees East
15 Hex ID:	N/A	193D5E1E1E1E1E1E1E1E1E1E1E1E1E1E

FFFE2F8C9EAF0F0F2B80348B18758E414D34
FFFE2F8C9EAF0F0F2B80348B18758E814F73
FFFE2F8C9EAF0F0F2B80348B18758E015527
FFFE2F8C9EAF0F0F2B80348B18758E41580D

See message decode in document Ref : E6557-CS_ws (Life test message)

LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

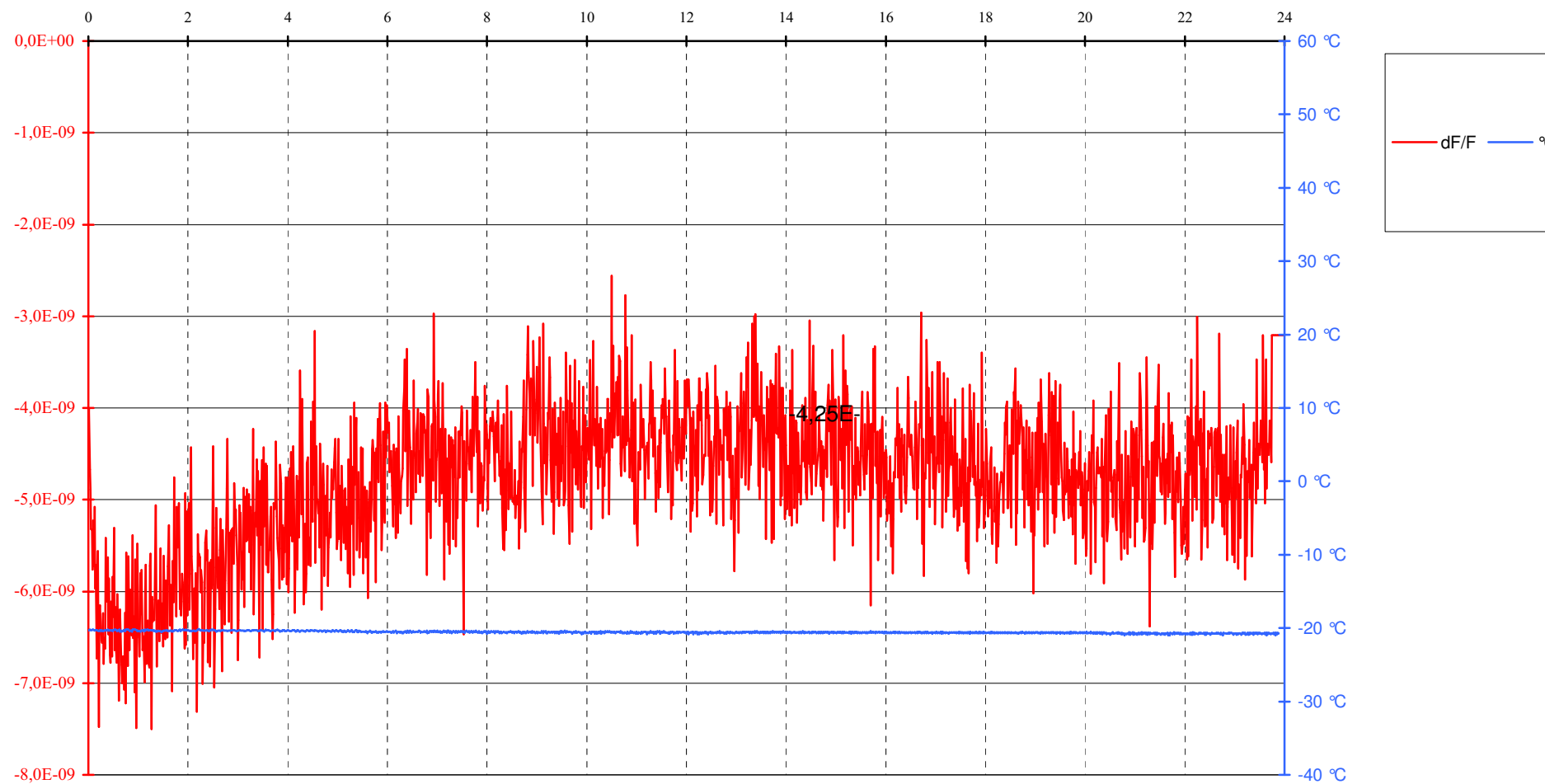
Model : AK-451 ()Series ELT (AF)(AP)(S) & PLB

Number : C/S 09 (But n° 1) Ultralife U10014 battery pack

Date : 8 Jun 2007

Time : 17:05:17

FREQUENCY VARIATION



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

Model : AK-451 ()Series ELT (AF)(AP)(S) & PLB

Number : C/S 09 (But n° 1) Ultralife U10014 battery pack

Date : 8 Jun 2007

Time : 17:05:17

MEDIUM TERM STABILITY : MEAN SLOPE /mn (-1,0E-9 to 1,0E-9)



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

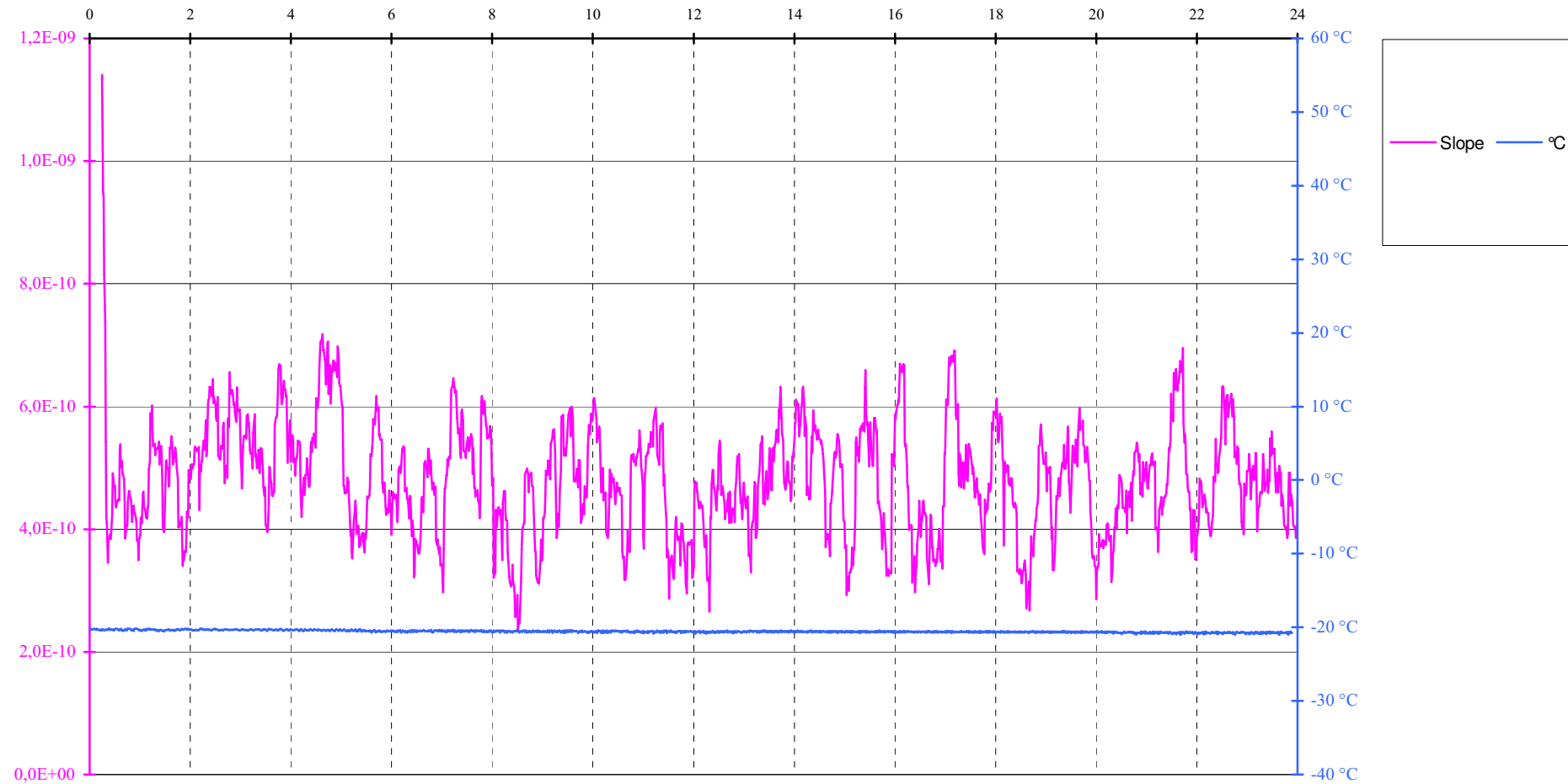
Model : AK-451 ()Series ELT (AF)(AP)(S) & PLB

Number : C/S 09 (But n° 1) Ultralife U10014 battery pack

Date : 8 Jun 2007

Time : 17:05:17

MEDIUM TERM STABILITY : RESIDUAL ($\leq 3,0E-9$)



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

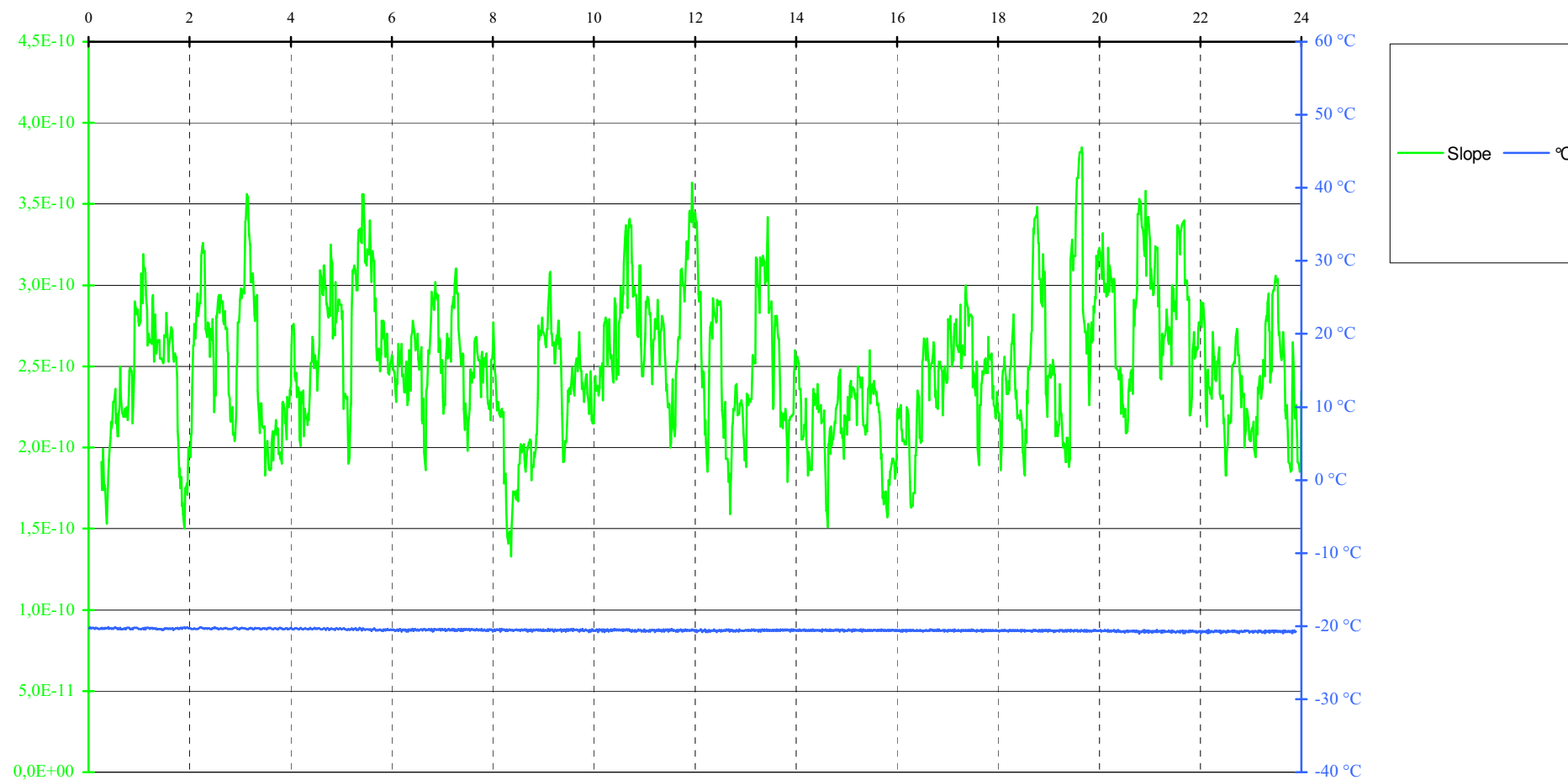
Model : AK-451 ()Series ELT (AF)(AP)(S) & PLB

Number : C/S 09 (But n° 1) Ultralife U10014 battery pack

Date : 8 Jun 2007

Time : 17:05:17

SHORT TERM STABILITY /100 mS ($\leq 2,0E-9$)



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

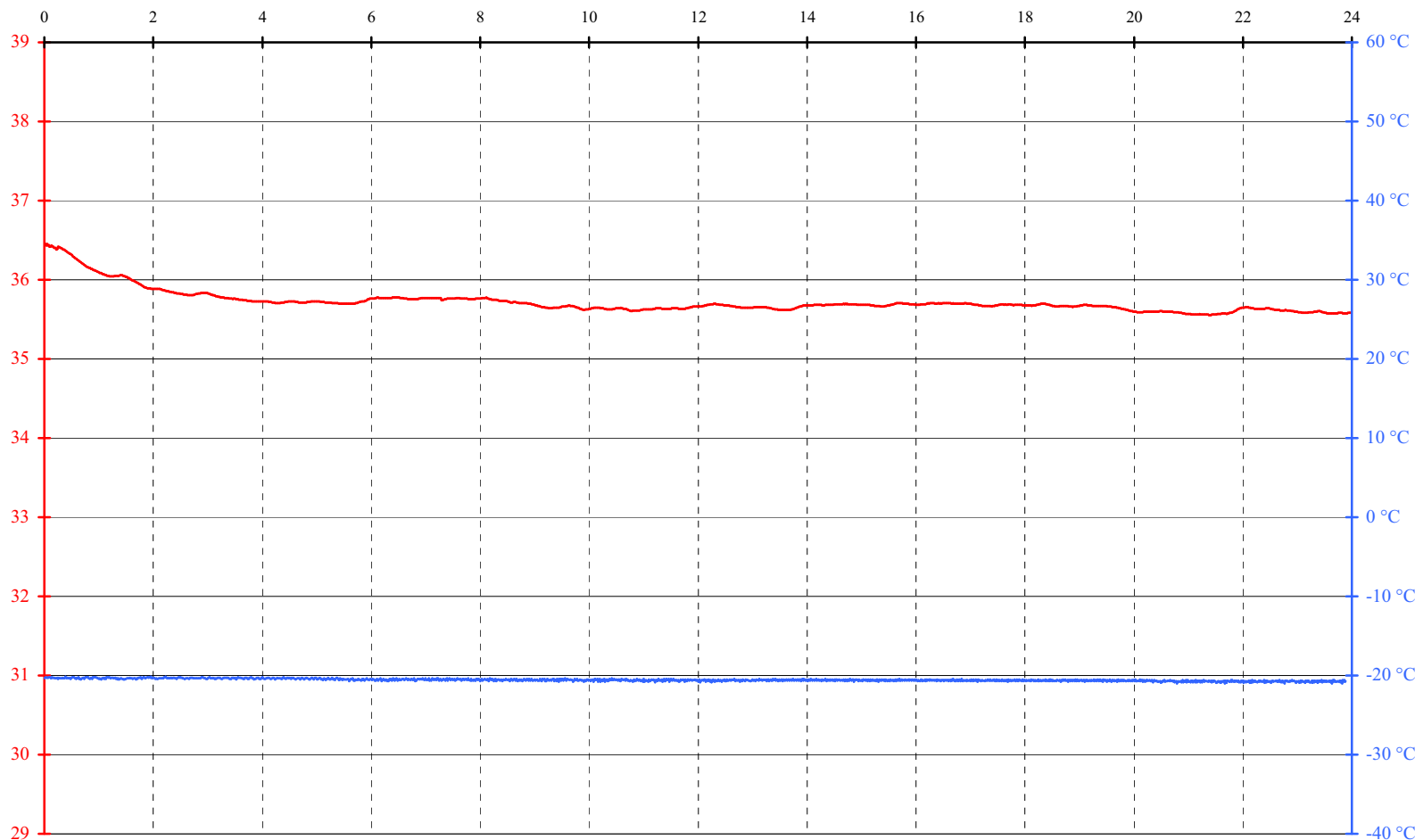
Model : AK-451 ()Series ELT (AF)(AP)(S) & PLB

Numero : C/S 09 (But n° 1) Ultralife U10014 battery pack

Date : 8 Jun 2007

Time : 17:05:17

OUTPUT POWER (35 to 39 dBm)



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

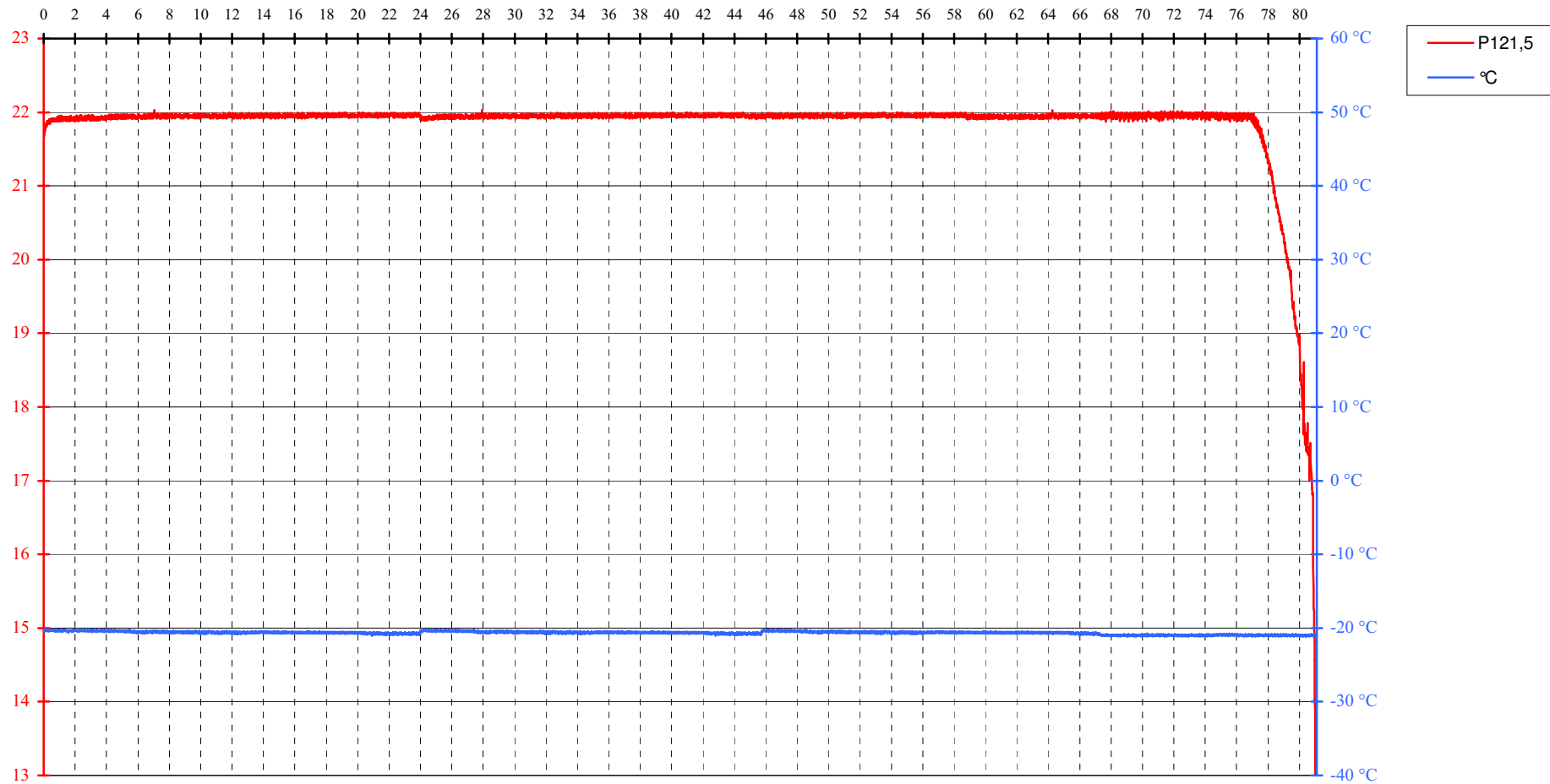
Model : AK-451 ()Series ELT (AF)(AP)(S) & PLB

Numero : C/S 09 (But n° 1) Ultralife U10014 battery pack

Date : 8 Jun 2007

Time : 17:05:17

121,5 MHz OUTPUT POWER



RESULTS OF OPERATING LIFE TEST ON

Ameri-King Corp ELT & PLB
AK-451 (Series (AF)(AP)(S)(PLB)
N° C/S 09 (But n° 1) Saft LO26SXC
-20 °C

Note 1: Prior the Operating Life Test and following manufacturer Batteries Discharge Calculation the battery pack charge has been reduced by the test laboratory during 19,49 hours with full loads at 22°C

Following the table below this discharge is more than the laboratory calculation

In this condition the operating lifetime with the Saft LO26SXC battery pack is :

- 24 hours for 406 MHz and
- around 63 hours for 121,5/243 MHz

AMERIKING CALCULATION	INTESPACE Lab Contrc(note 2)
VHF(121,5/243,0) 0,100 Amp	0,109 Amp
UHF 406 1,70 Amp x (0,52/50) = 0,01768 Amp	1,63 Amp x (0,52/50) = 0,016952 Amp
Total I_{ave} = 0,11768 Amp	0,12595 Amp
Self Test: 5sec / month for 5 YRS = 300sec	
Self Test Discharge =	
0,11768 x [300 sec / 3600 sec (HR)] = 0,0098066 AH	0,12595 x (300 / 3600) = 0,010496 AH
Self Test Discharge with 1,65 COEFF 0,01618 AH	0,01732 AH
Batteries 450-0010-2 Saft LO26SXC (LiSO₂)	
Bat self discharge: 3%(9,2AH)(5yrs)(1.65) = 2,277 AH	2,277 AH
AH total must be discharged 0,01618+2,277 = 2,293 AH	0,01732 + 2,277 = 2,294 AH
Duration of discharge with UHF & VHF Loads	
2,293 AH / 0,11768 A = 19,49 hours	2,294 AH / 0,12595 A = 18,21 hours
Duration of discharge with VHF Loads only	
2,293 AH / 0,100 A = 22,93 hours	1,294 AH / 0,109 A = 21,05 hours

Note 2: The Lab current consumption measurement have been check with :

- Tektronix Scope TDS 3052 S/N B011837 Validity date : 29 Jan 2008
- and Tektronix probe TCP 202 Validity date : 6 June 2008

Warm Up	Δ Frequency (Hz)	Temp. (°C)	P406 (dBm)	P121.5 (dBm)
1	49727,25	-20,4	36,2	21,6
2	49727,43	-20,5	36,3	21,6
3	49728,21	-20,6	36,2	21,6
4	49728,32	-20,6	36,3	21,6
5	49728,40	-20,7	36,2	21,6
6	49729,02	-20,7	36,2	21,6
7	49729,03	-20,8	36,1	21,6
8	49729,03	-20,8	36,0	21,6
9	49729,31	-20,9	36,1	21,6
10	49730,11	-20,8	36,0	21,6
11	49730,12	-20,9	36,0	21,6
12	49729,55	-20,9	35,9	21,6
13	49730,38	-20,9	36,0	21,6
14	49730,24	-20,8	36,0	21,6
15	49730,36	-20,9	35,9	21,6
16	49730,18	-20,9	36,0	21,6
17	49730,48	-20,8	35,9	21,6
18	49730,96	-20,9	35,9	21,6

No	Temp.	Slope	Sigma	P406	Short term	P121.5
1	-20,8	5,4E-10	7,3E-10	36,1	1,8E-10	21,6
18	-20,8	1,9E-10	4,9E-10	36,0	2,3E-10	21,5
31	-20,8	5,0E-11	4,7E-10	36,1	1,5E-10	21,5
61	-20,9	1,4E-12	6,2E-10	36,2	2,6E-10	21,5
91	-20,7	-3,1E-11	5,0E-10	35,4	2,6E-10	21,5
121	-20,8	4,5E-11	3,3E-10	36,3	1,8E-10	21,6
151	-20,9	4,2E-11	4,3E-10	36,3	1,9E-10	21,6
181	-20,9	2,3E-11	3,3E-10	36,3	2,5E-10	21,6
211	-20,9	-3,9E-12	7,4E-10	36,3	2,8E-10	21,6
241	-20,9	2,2E-12	4,4E-10	36,4	1,3E-10	21,6
271	-20,9	3,3E-11	4,1E-10	36,4	2,4E-10	21,6
301	-20,9	-5,8E-12	4,4E-10	36,4	1,8E-10	21,6
331	-20,9	7,6E-12	3,2E-10	36,4	2,4E-10	21,5
361	-21,0	-1,3E-11	5,0E-10	36,4	2,1E-10	21,6
391	-21,0	-5,2E-11	4,5E-10	36,4	2,6E-10	21,6
421	-21,0	-2,0E-12	5,7E-10	36,4	2,9E-10	21,5
451	-21,0	4,9E-11	3,6E-10	36,4	2,4E-10	21,6
481	-20,9	4,0E-12	5,8E-10	36,4	2,5E-10	21,5
511	-21,0	2,2E-11	4,6E-10	36,4	2,9E-10	21,6
541	-21,0	-1,5E-11	4,0E-10	36,4	1,7E-10	21,6
571	-21,0	-2,5E-11	4,2E-10	36,4	1,5E-10	21,6
601	-21,1	-1,7E-11	4,3E-10	36,4	3,2E-10	21,6
631	-21,0	1,9E-12	3,8E-10	36,4	2,9E-10	21,6
661	-21,2	-5,0E-11	5,5E-10	36,4	2,9E-10	21,6
691	-21,1	3,4E-11	5,7E-10	36,4	3,1E-10	21,6
721	-21,2	3,3E-12	2,7E-10	36,4	1,2E-10	21,6
751	-21,2	6,5E-12	4,4E-10	36,4	2,9E-10	21,6
781	-21,1	1,2E-11	4,2E-10	36,4	2,7E-10	21,6
811	-21,2	5,0E-11	5,4E-10	36,4	2,3E-10	21,6
841	-21,2	-2,5E-11	4,9E-10	36,4	2,9E-10	21,6

No	Temp.	Slope	Sigma	P406	Short term	P121.5
871	-21,1	-2,8E-11	4,7E-10	36,4	1,5E-10	21,6
901	-21,2	3,3E-11	4,5E-10	36,4	3,1E-10	21,6
931	-21,0	-1,3E-11	3,3E-10	36,3	2,9E-10	21,6
961	-21,1	-4,3E-11	6,4E-10	36,3	1,7E-10	21,6
991	-21,1	4,6E-11	5,7E-10	36,3	3,3E-10	21,6
1021	-21,0	4,2E-11	4,0E-10	36,3	1,6E-10	21,6
1051	-21,0	-2,6E-11	3,8E-10	36,3	2,5E-10	21,6
1081	-21,0	-1,7E-11	4,5E-10	36,3	2,0E-10	21,5
1111	-21,1	-3,0E-11	4,5E-10	36,4	2,2E-10	21,6
1141	-21,1	-1,1E-11	5,4E-10	36,4	2,3E-10	21,6
1171	-21,0	5,5E-11	4,6E-10	36,4	4,0E-10	21,6
1201	-21,0	-3,0E-11	2,6E-10	36,4	2,3E-10	21,6
1231	-21,0	9,1E-12	3,0E-10	36,4	2,7E-10	21,6
1261	-21,1	3,4E-11	4,8E-10	36,4	3,1E-10	21,6
1291	-21,0	-2,4E-11	4,2E-10	36,4	3,9E-10	21,6
1321	-21,1	1,2E-11	6,2E-10	36,4	3,2E-10	21,6
1351	-21,0	-1,2E-11	4,8E-10	36,4	2,5E-10	21,6
1381	-21,0	1,6E-11	4,3E-10	36,4	3,4E-10	21,6
1411	-21,1	-1,6E-11	5,0E-10	36,4	1,3E-10	21,6
1441	-21,1	-9,5E-12	4,7E-10	36,4	1,9E-10	21,6
1471	-21,0	2,9E-11	4,7E-10	36,4	3,1E-10	21,6
1501	-21,1	2,9E-11	6,7E-10	36,4	3,3E-10	21,6
1531	-21,1	-9,4E-12	5,7E-10	36,4	3,7E-10	21,6
1561	-21,0	2,3E-11	5,0E-10	36,4	1,5E-10	21,6
1591	-21,0	-2,5E-11	3,7E-10	36,4	2,1E-10	21,6
1621	-21,1	-1,1E-11	3,6E-10	36,4	2,0E-10	21,6
1651	-21,1	-8,5E-12	5,6E-10	36,4	3,0E-10	21,6
1681	-21,0	-3,2E-12	5,5E-10	36,4	3,0E-10	21,6
1711	-21,1	-9,1E-12	4,0E-10	36,4	1,7E-10	21,6
1741	-21,1					21,5
1771	-21,0					21,5
1801	-21,1					21,5
1831	-21,1					21,5
1861	-21,1					21,5
1891	-21,1					21,5
1921	-21,1					21,4
1951	-21,0					21,5
1981	-21,1					21,4
2011	-21,1					21,5
2041	-21,1					21,5
2071	-21,1					21,5
2101	-21,1					21,4
2131	-21,1					21,5
2161	-21,1					21,5
2191	-21,0					21,5
2221	-21,1					21,5
2251	-21,1					21,5
2281	-21,1					21,5
2311	-21,1					21,5
2341	-21,1					21,5
2371	-21,1					21,5

24h

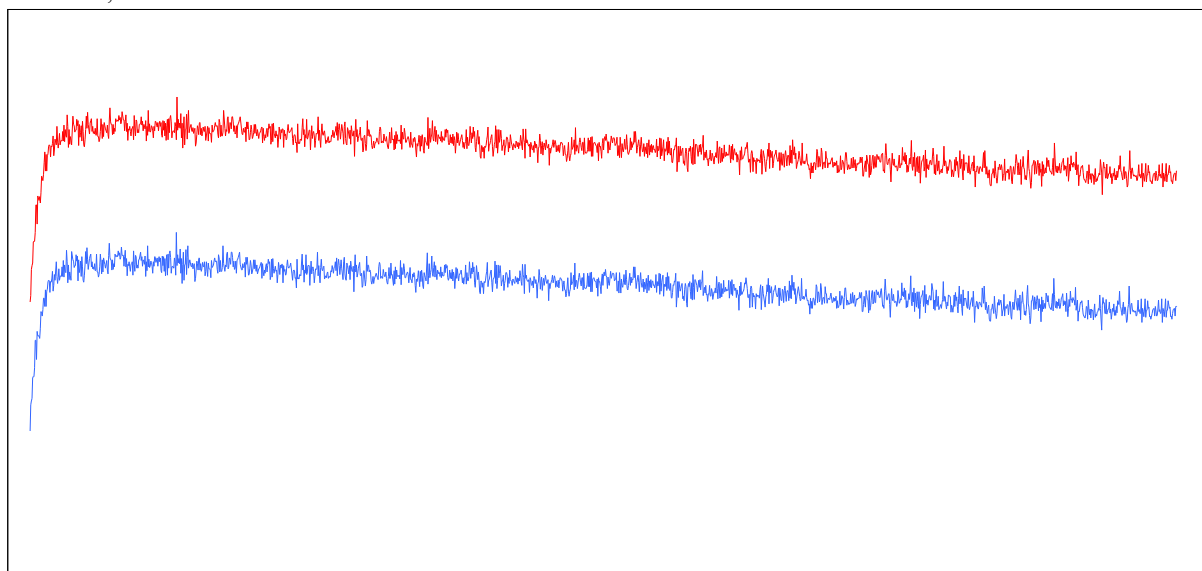
No	Temp.	Slope	Sigma	P406	Short term	P121.5
2401	-21,1					21,5
2431	-21,1					21,5
2461	-21,1					21,5
2491	-21,1					21,5
2521	-21,1					21,5
2551	-21,1					21,5
2581	-21,1					21,5
2611	-21,1					21,5
2641	-21,1					21,5
2671	-21,1					21,5
2701	-21,1					21,5
2731	-21,1					21,5
2761	-21,1					21,5
2791	-21,1					21,4
2821	-21,1					21,5
2851	-21,2					21,4
2881	-21,1					21,5
2911	-21,2					21,5
2941	-21,2					21,5
2971	-21,2					21,4
3001	-21,2					21,5
3031	-21,2					21,5
3061	-21,2					21,5
3091	-21,2					21,5
3121	-21,2					21,5
3151	-21,2					21,5
3181	-21,2					21,5
3211	-21,2					21,5
3241	-21,1					21,5
3271	-21,2					21,5
3301	-21,2					21,5
3331	-21,2					21,5
3361	-21,1					21,5
3391	-21,2					21,5
3421	-21,2					21,5
3451	-21,2					21,5
3481	-21,2					21,5
3511	-21,1					21,5
3541	-21,2					21,5
3571	-21,2					21,5
3601	-21,2					21,5
3631	-21,2					21,5
3661	-21,1					21,5
3691	-21,1					21,5
3721	-21,0					21,5
3751	-21,1					21,5
3781	-21,1					21,5
3811	-21,1					21,5
3841	-21,0					21,5
3871	-21,1					21,5
3901	-21,0					21,5

48h

No	Temp.	Slope	Sigma	P406	Short term	P121.5
3931	-21,1					21,5
3961	-21,1					21,5
3991	-21,1					21,5
4021	-21,1					21,5
4051	-21,1					21,5
4081	-21,1					21,5
4111	-21,1					21,5
4141	-21,1					21,5
4171	-21,1					21,5
4201	-21,1					21,5
4231	-21,1					21,5
4261	-21,1					21,5
4291	-21,1					21,5
4321	-21,1					21,5
4351	-21,1					21,5
4381	-21,1					21,5
4411	-21,1					21,5
4441	-21,1					21,5
4471	-21,2					21,5
4501	-21,1					21,5
4531	-21,1		63 hours			21,2
4561	-21,2					20,2
4591	-21,2					18,5
4621	-21,2					16,3
4651	-21,2					15,1
4681	-21,2					10,6
4711	-21,2					6,2

Frequency variation

406027,733 kHz



406027,727 kHz



Sample of beacon message during the Operating Lifetime Test :

FFFE2F8C9EAF0F0F2B80348B18758E41580D

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	101011110000111100001111
Latitude Sign: North	65	0
Latitude Degrees: 43	66-72	0101011
Latitude Minutes: 30	73-74	10
Longitude Sign: East	75	0
Longitude Degrees: 1	76-83	00000001
Longitude Minutes: 30	84-85	10
BCH 1 Encoded:	86-106	100100010110001100001
BCH 1 Calculated:	N/A	100100010110001100001
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From External Navigation Device	111	0
Aux Device: 121.5 MHz homer	112	1
Latitude Offset Sign: +	113	1
Latitude Offset Minutes: 3	114-118	00011
Latitude Offset Seconds: 36	119-122	1001
Longitude Offset Sign: -	123	0
Longitude Offset Minutes: 1	124-128	00001
Longitude Offset Seconds: 20	129-132	0101
BCH 2 Encoded:	133-144	100000001101
BCH 2 Calculated:	N/A	100000001101
Composite Latitude: 43.559999999999995 Degrees North	N/A	Composite Longitude: 1.4777777777777778 Degrees East
15 Hex ID:	N/A	193D5E1E1EFFBFF

FFFE2F8C9EAF0F0F2B80348B18758E414D34
FFFE2F8C9EAF0F0F2B80348B18758E01401E
FFFE2F8C9EAF0F0F2B80348B18758EC1682B
FFFE2F8C9EAF0F0F2B80348B18758E4133A2
FFFE2F8C9EAF0F0F2B80348B18758E015527
FFFE2F8C9EAF0F0F2B80348B18758E41727F

See message decode in document Ref : E6557-CS_ws (Life test message)

LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

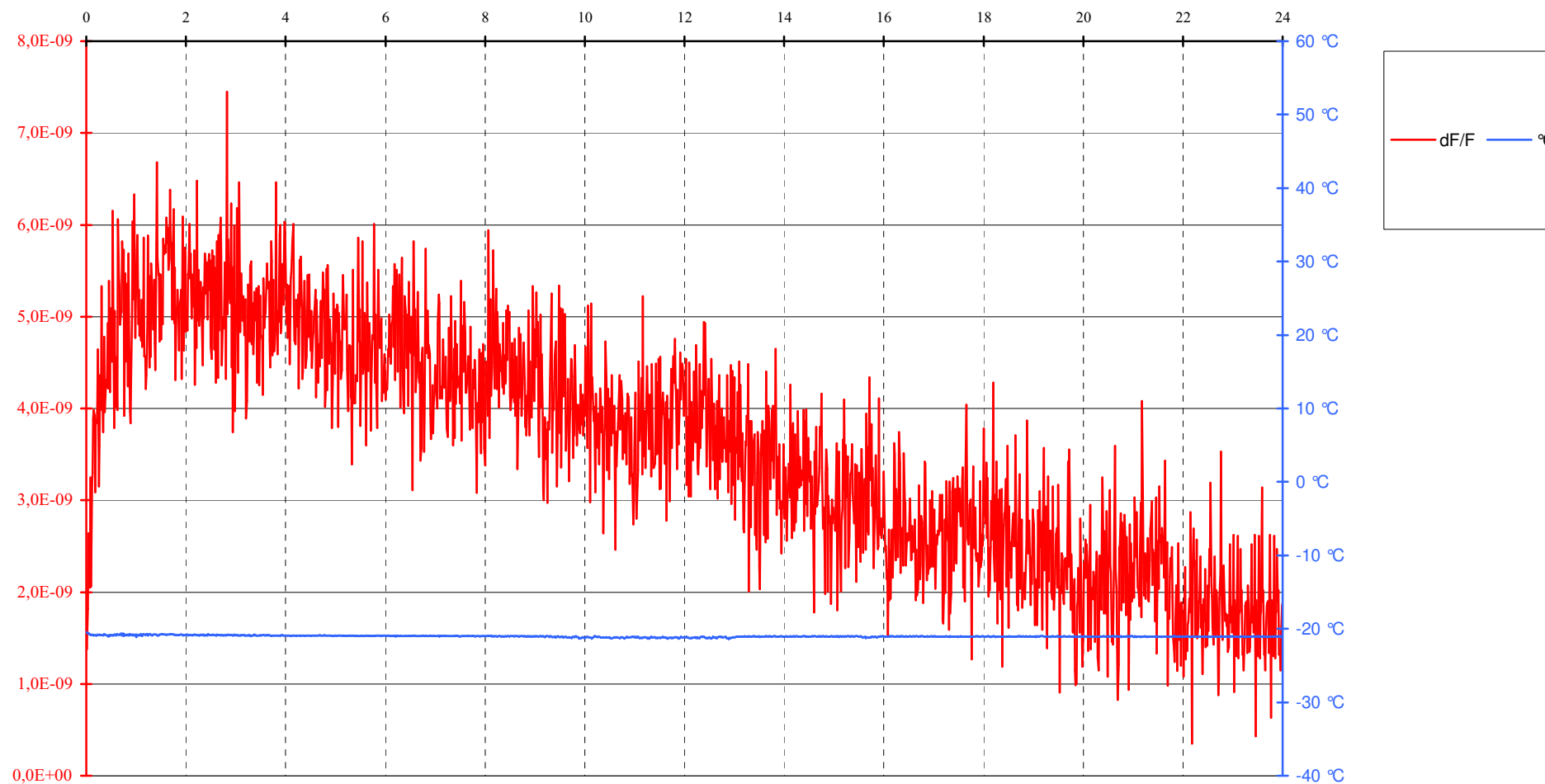
Model : AK-451 ()Series (AF)(AP)(S)(PLB)

Number : C/S 09 (But n° 1) Saft LO26SXC

Date : 21/06/2007

Time : 19:43:55

FREQUENCY VARIATION



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

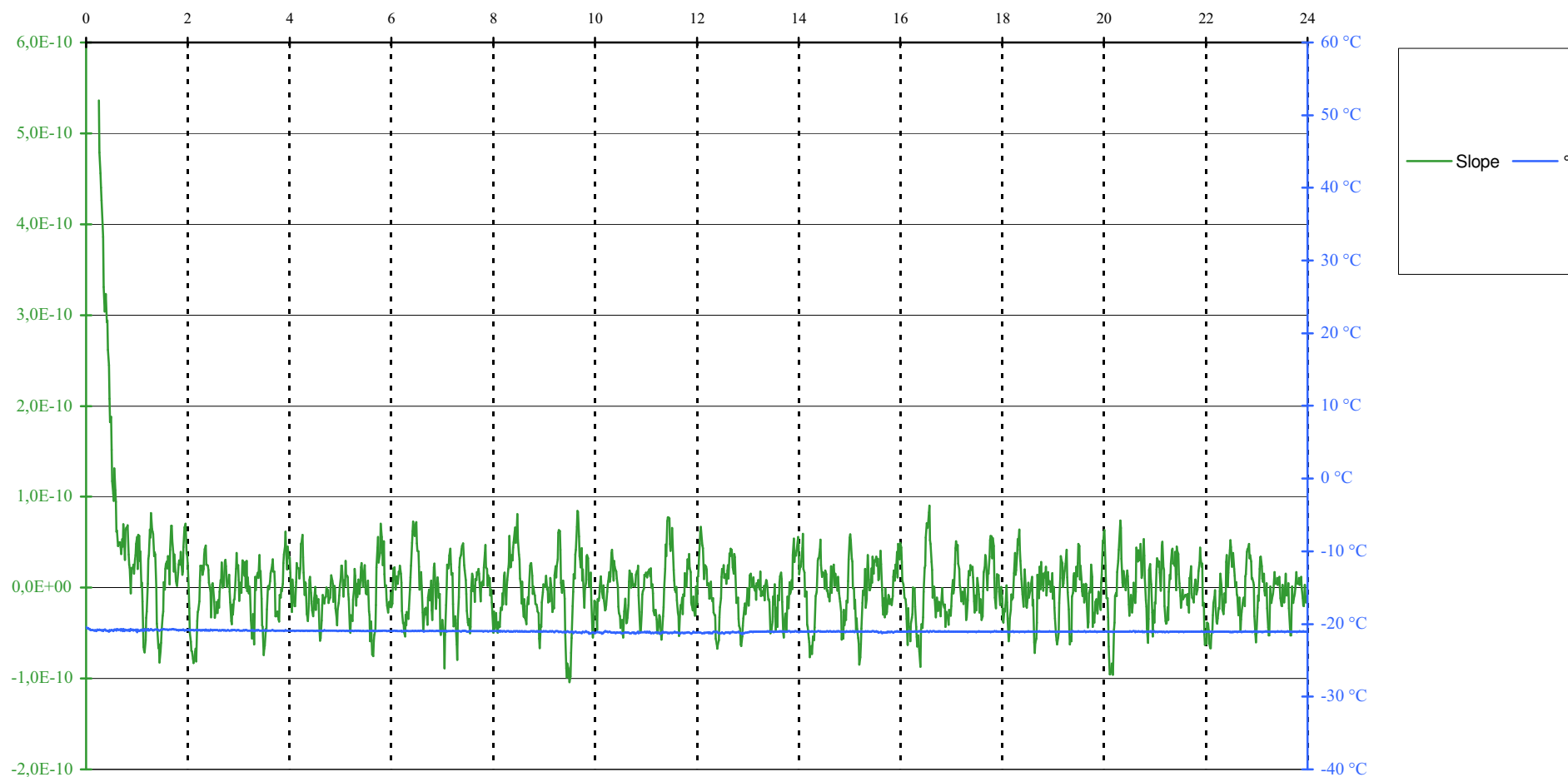
Model : AK-451 ()Series (AF)(AP)(S)(PLB)

Number : C/S 09 (But n° 1) Saft LO26SXC

Date : 21/06/2007

Time : 19:43:55

MEDIUM TERM STABILITY : MEAN SLOPE /mn (-1,0E-9 to 1,0E-9)



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

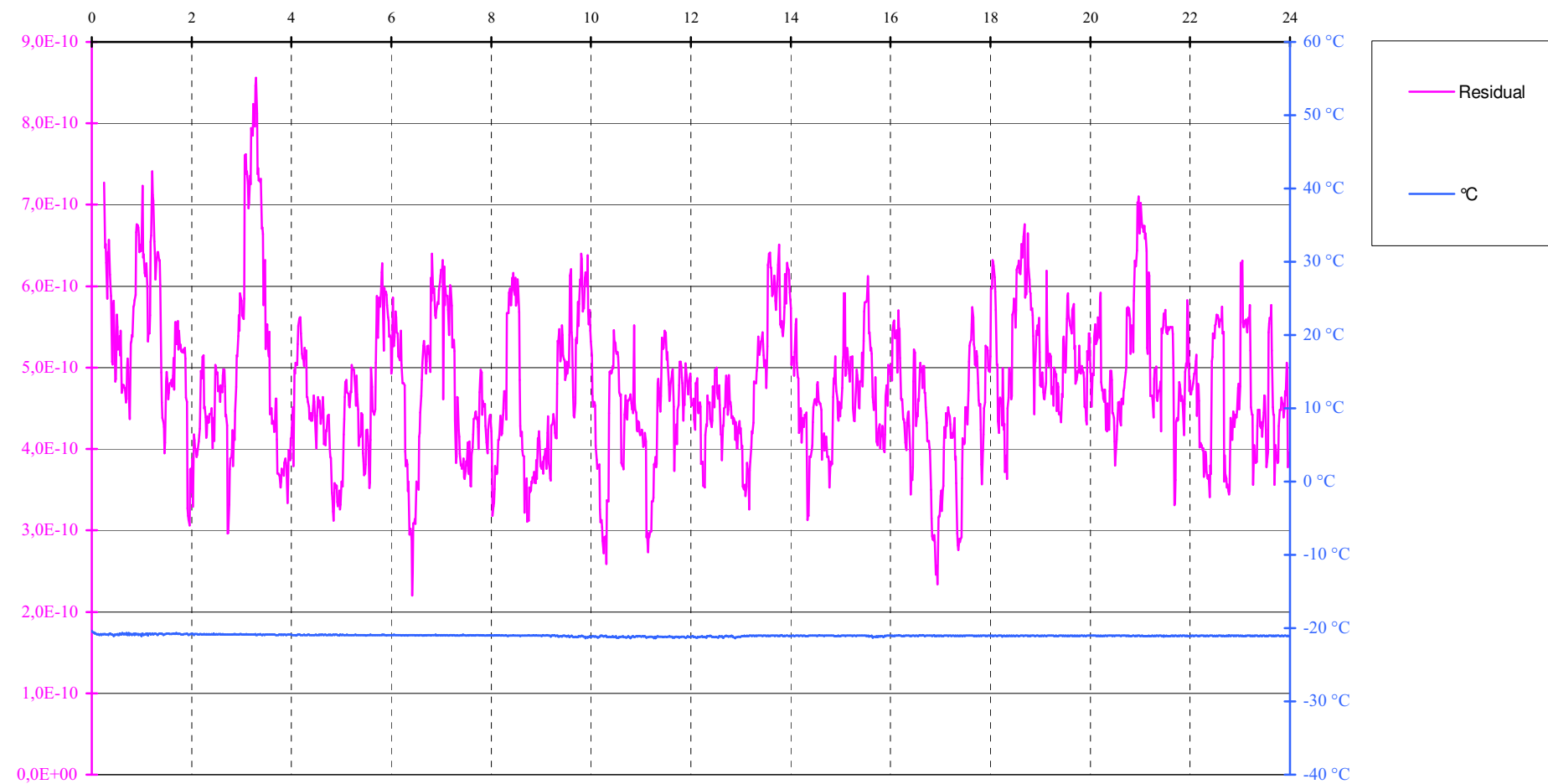
Model : AK-451 ()Series (AF)(AP)(S)(PLB)

Number : C/S 09 (But n° 1) Saft LO26SXC

Date : 21/06/2007

Time : 19:43:55

MEDIUM TERM STABILITY : RESIDUAL ($\leq 3,0E-9$)



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

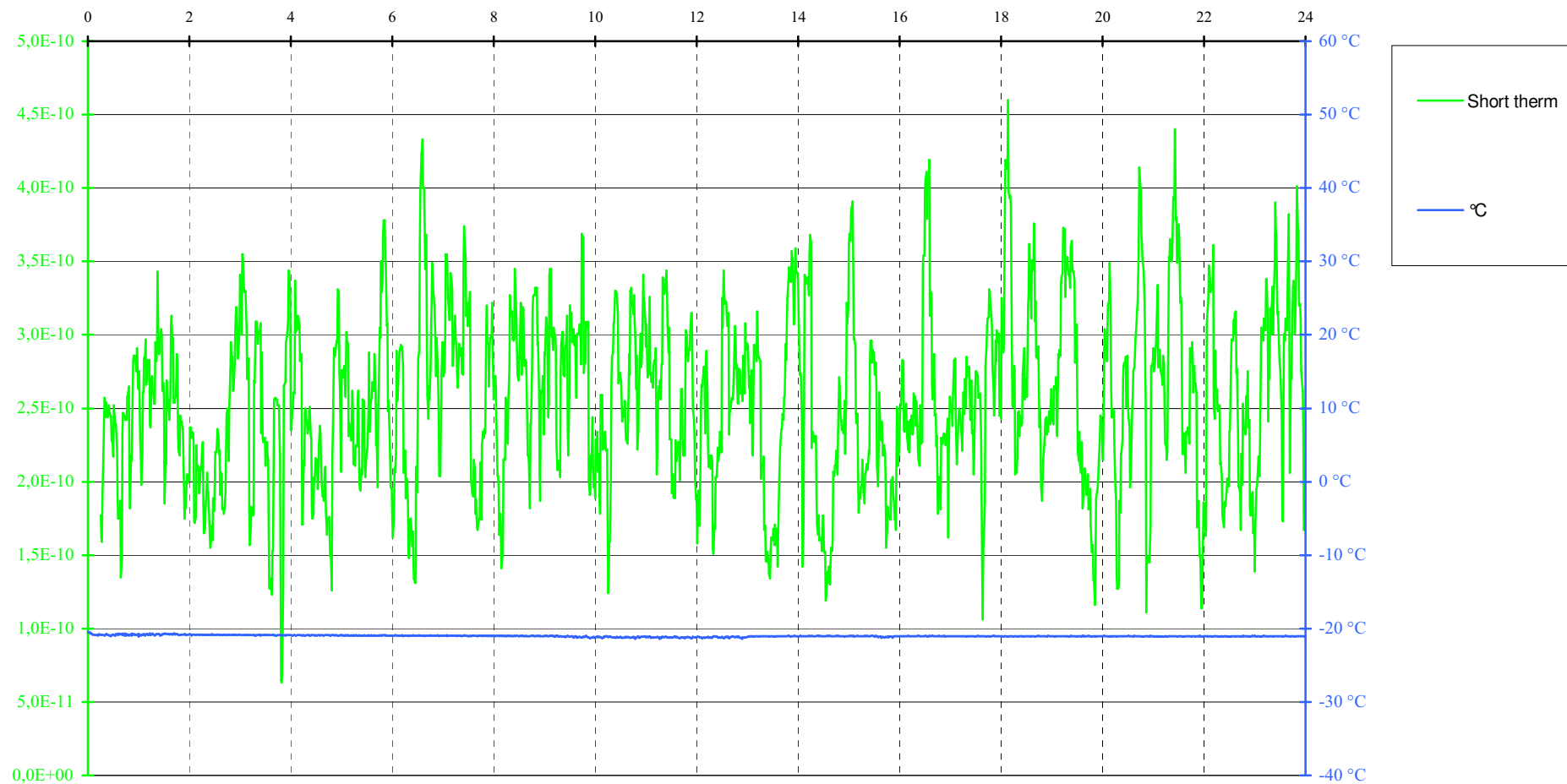
Model : AK-451 ()Series (AF)(AP)(S)(PLB)

Number : C/S 09 (But n° 1) Saft LO26SXC

Date : 21/06/2007

Time : 19:43:55

SHORT TERM STABILITY /100 mS ($\leq 2,0E-9$)



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

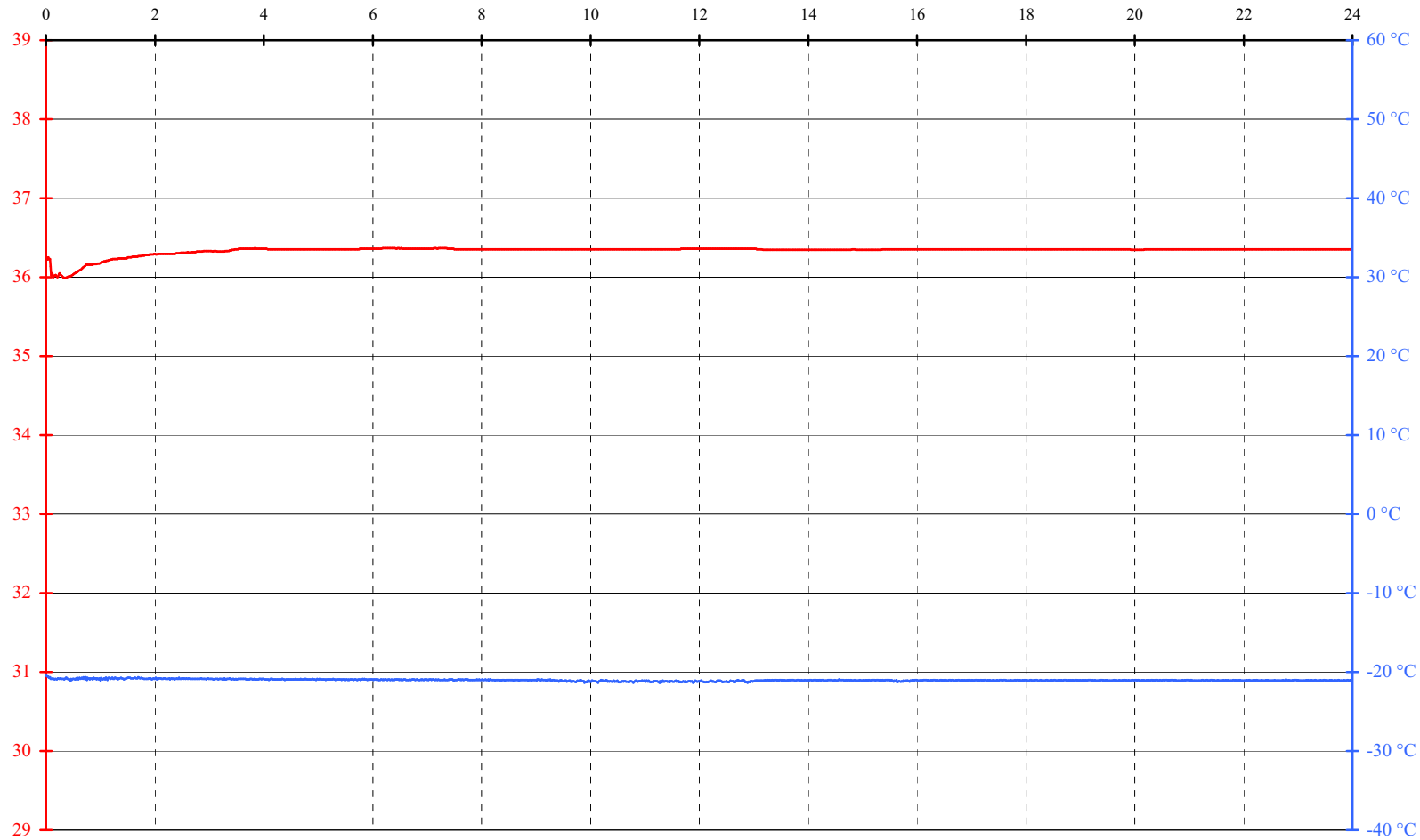
Model : AK-451 ()Series (AF)(AP)(S)(PLB)

Numero : C/S 09 (But n° 1) Saft LO26SXC

Date : 21/06/2007

Time : 19:43:55

OUTPUT POWER (35 to 39 dBm)



LIFE TEST AT -20 °C

Manufacturer : Ameri-King Corp

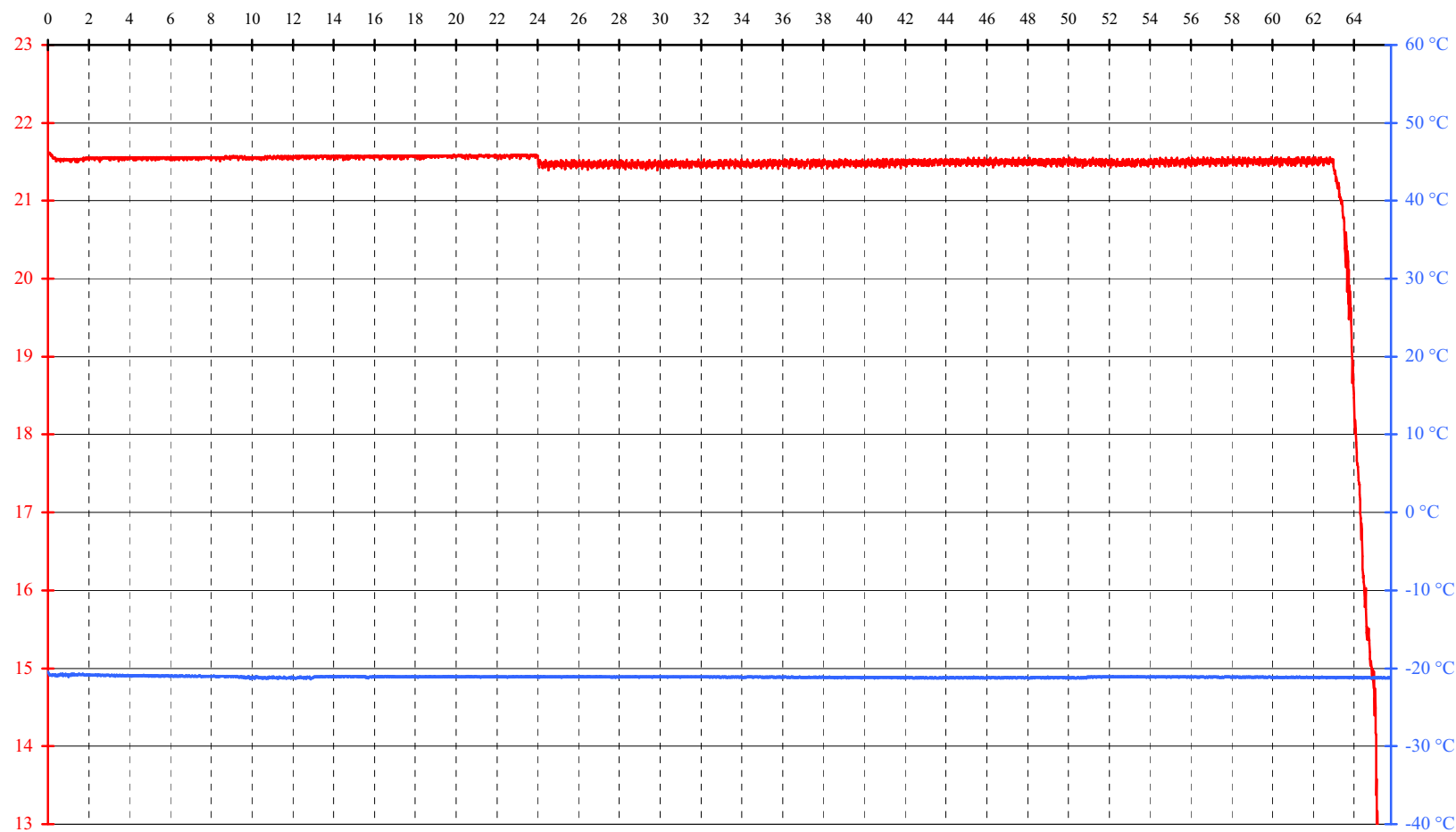
Model : AK-451 ()Series (AF)(AP)(S)(PLB)

Numero : C/S 09 (But n° 1) Saft LO26SXC

Date : 21/06/2007

Time : 19:43:55

OUTPUT POWER (35 to 39 dBm)



406 MHz Beacon Antenna Test Results - Figure B3 Test configuration

Beacon properties

- Manufacturer : Ameri-king Corp
- Type : ELT AK-451() Series (AF)(AP)(S)
- PN / SN : C/S n°8

Beacon antenna model AK 451-017-1(B) Whip Antenna

Search antenna model RHCP Antenna (Spiral Cone)

Test configuration : For "Fixed ELT-like" Devices (Figure B3)

Table F-B.1 : Equivalent Isotropically Radiated Power (dBm) / Antenna Gain (dBi)

Azimuth Angle (degrees)	Elevation Angle(degrees)									
	10		20		30		40		50	
	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi
0	30,60	-4,50	35,11	0,01	41,92	6,82	42,89	7,79	40,91	5,81
30	29,50	-5,60	35,21	0,11	41,92	6,82	42,79	7,69	40,61	5,51
60	33,00	-2,10	34,61	-0,49	41,52	6,42	42,69	7,59	40,71	5,61
90	32,10	-3,00	33,01	-2,09	41,42	6,32	42,79	7,69	40,91	5,81
120	29,30	-5,80	34,51	-0,59	42,22	7,12	42,79	7,69	40,61	5,51
150	30,40	-4,70	34,51	-0,59	41,92	6,82	42,29	7,19	40,71	5,61
180	30,80	-4,30	36,21	1,11	41,62	6,52	42,29	7,19	41,31	6,21
210	29,80	-5,30	35,41	0,31	41,92	6,82	42,49	7,39	40,91	5,81
240	31,10	-4,00	34,71	-0,39	42,02	6,92	42,79	7,69	40,81	5,71
270	30,00	-5,10	35,11	0,01	42,22	7,12	42,89	7,79	40,71	5,61
300	31,40	-3,70	33,41	-1,69	42,02	6,92	42,99	7,89	40,91	5,81
330	32,30	-2,80	34,21	-0,89	41,72	6,62	42,89	7,79	40,91	5,81
Overall Gain Variation (dB)	3,70		3,20		0,80		0,70		0,70	

$$ERP_{\max \text{ EOL}} = \text{MAX} [ERP_{\max}, (ERP_{\max} - ERP_{\text{LOSS}})] = \text{MAX} (\underline{42,99} \quad \underline{42,79}) = \underline{42,99 \text{ dBm}}$$

$$ERP_{\min \text{ EOL}} = \text{MIN} [ERP_{\min}, (ERP_{\min} - ERP_{\text{LOSS}})] = \text{MIN} (\underline{30,80} \quad \underline{30,60}) = \underline{30,60 \text{ dBm}}$$

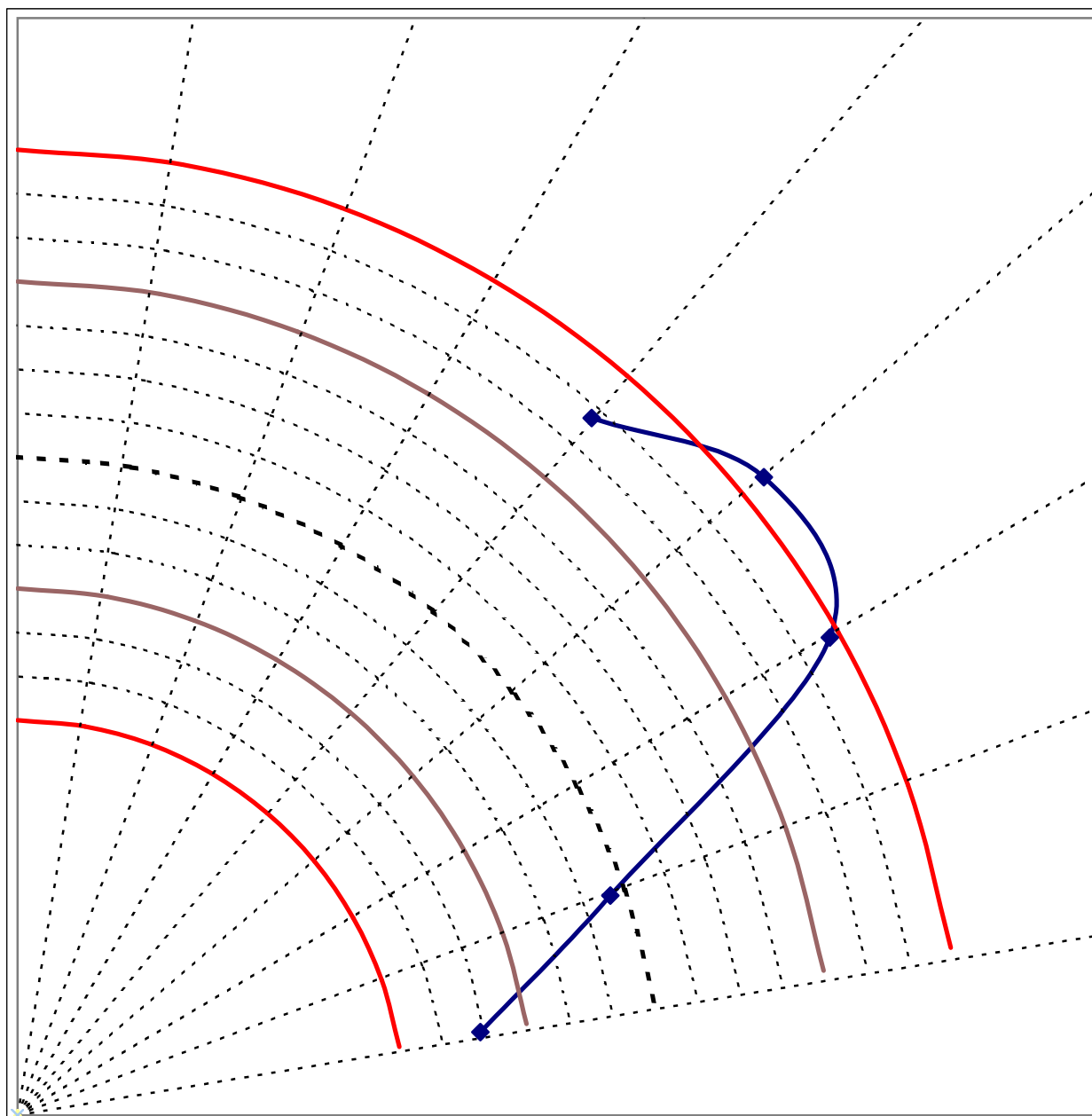
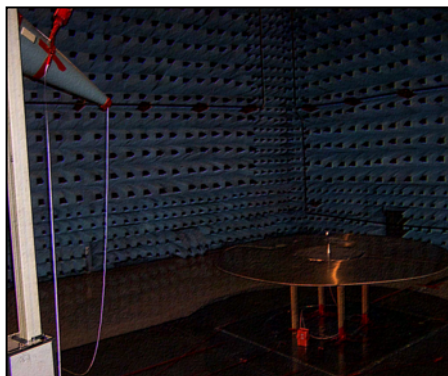
Note : Highlighted text indicate all the EIRP values that are not within the C/S range and stricken-out text indicate any levels that were removed from consideration for calculating the EIRP maximum and minimum values at the end

Antenna diagram versus elevation angle comparison with theoritical limit

Ameri-king Coi ELT AK-451() Series (AF)(AP)(S)

Antenna : Whip Antenna

Test configuration : For "Fixed ELT-like" Devices (Figure B3)



ANNEX A

ANTENNA TEST REPORT OF AMERI-KING

AK-451() Series ELT & PLB

SN : CS-08

ANTENNAS : - AK 451.017-1B (Whip)
- AK 451.017-2A (Rod)
- AK 451.017-3A (Blade)
- AK 451.017-4(S) (Portable Whip)

1 - ADMINISTRATION

1. WORK ORDER : Reference ITS : E6557-CS Annex-A (Ant)
1. TEST TEAM : Benoit HERBERT
1. SCHEDULE : 22 to 27 june 2006

2 - PURPOSE

The radiation tests of the dedicated radio beacon are performed in INTESPACE EMC Laboratory in compliance with the test methods described in the COSPAS-SARSAT 406 MHz distress beacon type approval standard : C/S T 007- Issue 4 November 2005.

Three antennas are checked in "Fixed ELT" Test Configuration and one in "Portable ELT"and "PLB" Configuration

3 - ANTENNAS AND RADIO BEACON IDENTIFICATIONS

- Beacon :** **BUT 3**
- Manufacturer : Ameri-King Corp.
 - Type : ELT(AF)(AP)(S) and PLB
 - PN / SN : AK-451() Series / CS-08

Antennas :

Manufacturer	AUT Type
Ameri-King Corp.	AK 451.017-1B (Whip)
"	AK 451.017-2A (Rod)
"	AK 451.017-3A (Blade)
"	AK 451.017-4(S) (Portable Whip)

Coax cable : 6 feet

Battery manufacturer / type : ULTRALIFE - P/N U 10014

4 - TEST SITE DESCRIPTION

Tests are performed in an anechoic chamber (size 16 m x 10 m x 11 m)

Walls, ceiling and doors are lined with EMERSON CUMING foams VHP 36 and VHP 26 type.

The Beacon and Antennas are placed as shown on figures N° 1, B2, B3, B5 and N° 3.

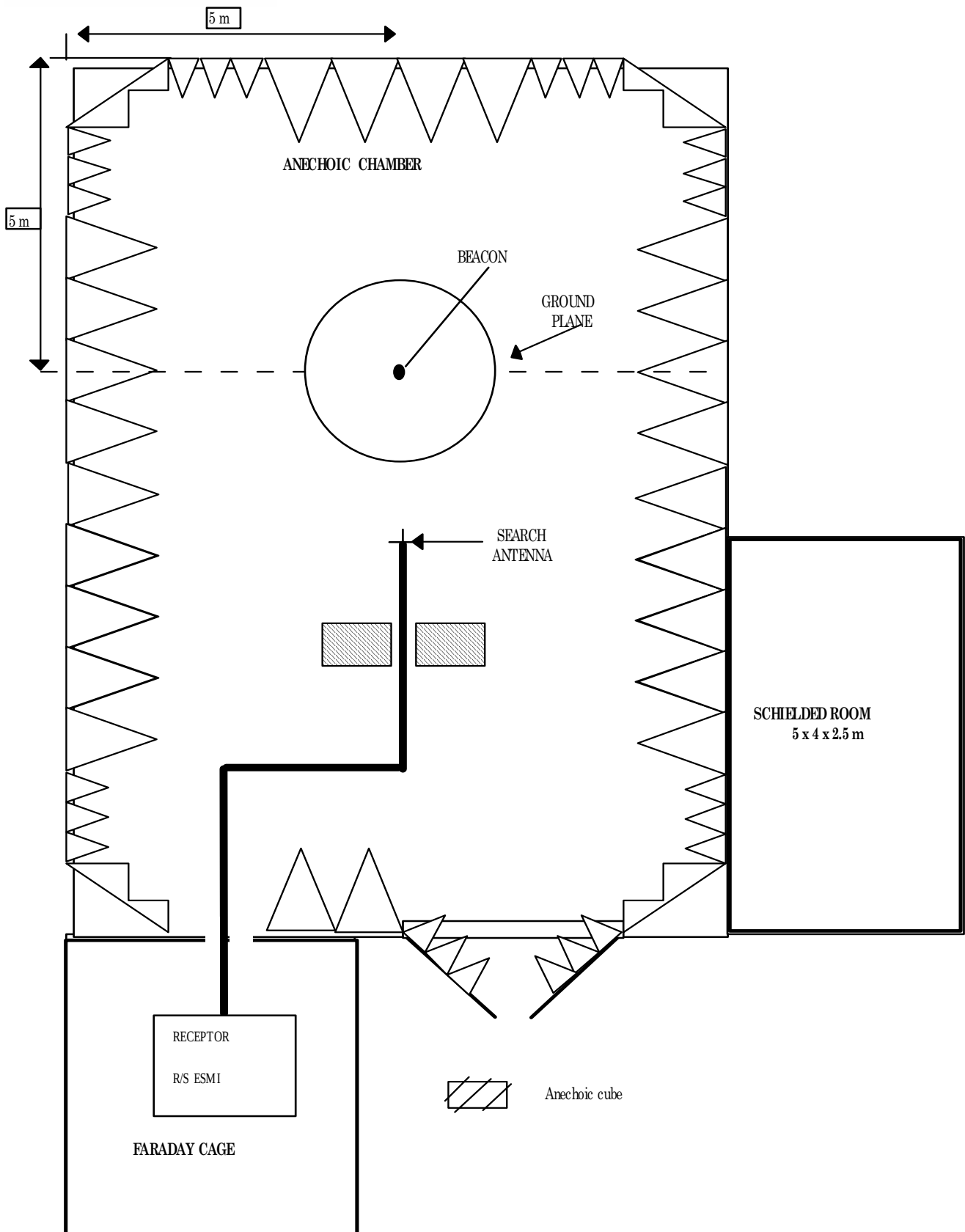


FIGURE 1

Figure B.2: Test Configuration for “PLB-like” Devices
(e.g. PLB, survival ELT, automatic portable ELT)

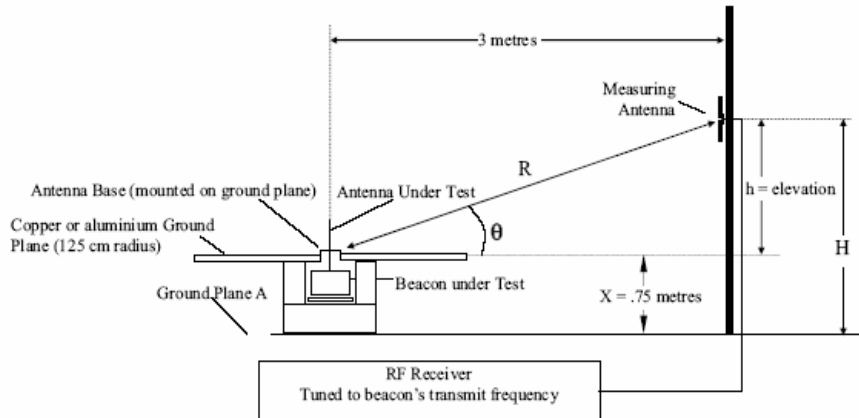
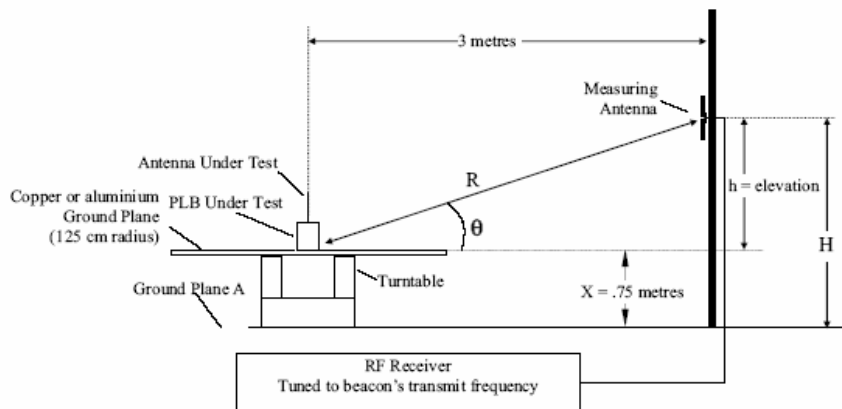


Figure B.3: Test Configuration for “Fixed ELT-like” Devices
(i.e. beacon with an antenna designed to be mounted on a metal surface)

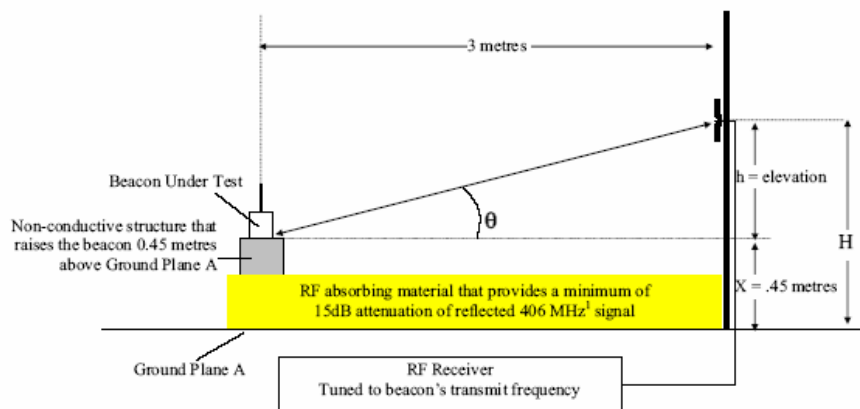


Figure B.5: Additional Test Configuration for all Devices that Might be Required to Operate Without a Ground Plane

5 - TEST METHOD

The test method describes here after, according to "C/S T 007 - Issue 4 November 2005" test sequences is executed for 406 MHz frequency .

The Beacon or the Beacon Antenna placed on center of the electrical ground plane (as show Fig B & Fig 3) the following measurements are performed :

- 1/ Determination of E field strength in term of dB μ V/m at 3 m far from the Beacon Antenna for all direction (0° to 360° by step of 30°) and for all search antenna elevation (10° to 50° by step of 10°).
Lenght of search antenna is adjusted to proper $l/2 \lambda$ conditions .
For alls positions the induced voltage is measured with search antenna in vertical and horizontal direction .
- 2/ Beacon antenna polarization is determined .
- 3/ An EIRP (Equivalent Isotropically Radiated Power) from the Beacon Antenna is calculated
- 4/ EIRP is corrected with EOL (end of life factor)
- 5/ Actual EIRP are compared to specified EIRP to be in the range + 32 dBm to + 43 dBm
for Figures B.2, B.3, and B.4 Test Configuration and + 30 dBm to + 43 dBm for Figure B5 Test Configuration.

6 - TESTS EQUIPMENTS

6.1. SEARCH ANTENNA

	Linear antenna (dipole)	RHCP Antenna (Spiral Cone)
• Manufacturer :	EMCO Ref 3121 C- DB4	Stoddart Electro Systems
P/N / S/N :	9904 /1436	934490-1 / 105
Antenna Factor :	20,9 dB	22 dB
Calibration validity :	dec 2005	may 2006

6.2. SPECTRUM ANALYSER

	Antenna measurements	VSWR measurements
• Manufacturer	HP 8566	HP 8751A
Reference :	RF : 85660B FI : 85662A	8751A
Serial number :	2449A01077 2403A08359	3026500208
Calibration validity :	oct-06	oct-06

6.3. CABLES

• Cable type	2x10 m cable RG 214 type N
Cable loss at 406 MHz	3,5 dB

7 - TESTS OPERATIONS

7.1. EMISSION FIELD STRENGTH FROM BEACON

Beacon electric field strength is obtained from measurement of the output voltage (dBμV RMS) at antenna port (typicals set up are shown figure N° 3 for 406 MHz) and computed with following parameters :

- Antenna factor of dipole search antenna AF = 20,9 at 406 MHz
Antenna factor of spiral cone search antenna AF = 22 dB at 406 MHz
- Directivity factor of the vertical search antenna Dm in dB (N/A for Log Spiral Cone Antenna)
(Theoretical directivity shown paragraph B-5-4 of C/S T007) as :

$$Dm = 20 \log [\cos (90 \times \sin q) / \cos q]$$

- Cable loss used with dipole search antenna : L = 3,5 dB at 406 MHz
Cable loss used with spiral cone search antenna : L = 3,5 dB at 406 MHz
- DF : distance factor in dB - To calculate field at a constant distance (3 m) from Beacon due to the elevation of the search antenna.
- Power correction factor : end of life correction factor EOL is calculated from the difference between RF power measured during test and end of life power after 24/48 hours operation. This factor is applied to correct EIRP as shown on final test result table
- The measurements are performed on the carrier signal, just before to apply the modulation.
- The effective field strength at 3 m from Beacon is computed from :

Linear Antenna (Dipole) : $EdB_{\mu V/m} = UdB_{\mu V} + AF - Dm + L + DF$

RHCP Antenna (Spiral Cone) : $EdB_{\mu V/m} = UdB_{\mu V} + AF + L + DF$ (the search antenna point to the BUT antenna)

7.2. POWER CORRECTION FACTORS

For alls Linear Antenna Tests it has been used a same battery pack and a new one for alls RHCP Antenna Test
In booth case the beacon output power variation between the beginning and the end of the tests at 22 °C
wasn't significative (</= - 0.05dB)

EOL factor

TEST FREQUENCY	RF Power measured at Ambient Temp. Test	RF Power measured at the end of Operating Lifetime Test	Loss Factor EIRPLOSS
406 MHz BEACON	36,1 dBm	36,3 dBm	-0,2 dB

8 - RADIATED POWER CALCULATIONS

8.1. EFFECTIVE ISOTROPICALLY RADIATED POWER OF BEACON

EIRP of Beacon is directly calculated from equation :

$$EIRP = E^2 \times D^2 / 30$$

$$EIRP = W$$

$$E = V/m$$

$$D = m$$

Results shown in table N° C1 are given in dBm where :

$$EIRP \text{ dBm} = 10 \log (EIRP \text{ W}) + 30$$

and apparent antenna gain :

$$GidB = EIRPdBm - RF \text{ PowerdBm}$$

9 - SUCCESS CRITERIA

Test Configurations	EIRP Required
Figures B.2, B.3, and B.4	32 dBm to 43 dBm for at least 90% of the measurement points
Figure B.5	30 dBm to 43 dBm for at least 80% of the measurement points

10 - POLARIZATION AND VSWR OF BEACON ANTENNA

10.1 Beacon Antenna Polarization

Beacon antenna polarization is checked according to C/S T007 procedure paragraph B9 . The Beacon antenna polarization is declared linear when 80 % of induced voltage measurement V_v and V_h differ by at least 10 dB. If 20 % of the induced voltage measurement (V_v , V_h) are within 10 dB of each other the Antenna Polarization is considered like Circular.

Antenna model	C/S T.007 Test Conf.	Min difference ($V_v - V_h$) (See F-B-2 Tables)		Antenna Polarization
		Min	% < 10dB	
AK 451.017-1B (Whip)	B3	9,4 dB	2%	Linear Vertical
AK 451.017-2A (Rod)	B3			Like Circular
AK 451.017-3A (Blade)	B3			Like Circular
AK 451.017-4 (S)(Portable Whip)	B2 & B5	6,8 dB	5%	Linear Vertical

Note : The AK 451 017 -2A (Rod) and AK 451 017 -3A (Blade) are inclined antennas. Following § B.9.4 of C/S T.007 the EIRP measurements have been performed directly using a RHCP measuring antenna with known antenna factor at 406 MHz. And in this case, as the results are in accordance with C/S T.007 requirements, the antenna should be accepted regardless of any circularly polarized component of the signal.

10.2 Beacon Antenna VSWR

10.2.1 Test method

The VSWR tests are performed in an anechoic chamber . The Beacon Antenna is placed on the center of the electrical ground plane as show Fig B & Fig 3.

The Reflection Factor " τ " is directly measured with the network analyser connected to the antenna and placed under the Ground Plane.

The 406 MHz VSWR is computed :

$$VSWR = \frac{1 + \tau}{1 - \tau}$$

10.2.2 VSWR test results

Antenna model	C/S T.007 Test Conf.	VSWR RESULTS
AK 451.017-1B (Whip)	B3	1,33 (-0,04 / +0,05)
AK 451.017-2A (Rod)	B3	1,15 (-0,017 / +0,02)
AK 451.017-3A (Blade)	B3	1,4 (-0,05 / +0,06)
AK 451.017-4 (S)(Portable Whip)	B2 & B5	1,29 (-0,035 / +0,04)

11 - BEACON MECHANICAL SET UP

Beacon 0° axis is identified with 0° azimuth direction of turn table .
Antenna is the center of rotation of azimuth angle.

Fig 3-1 : BEACON POSITION (B.3 Conf.)

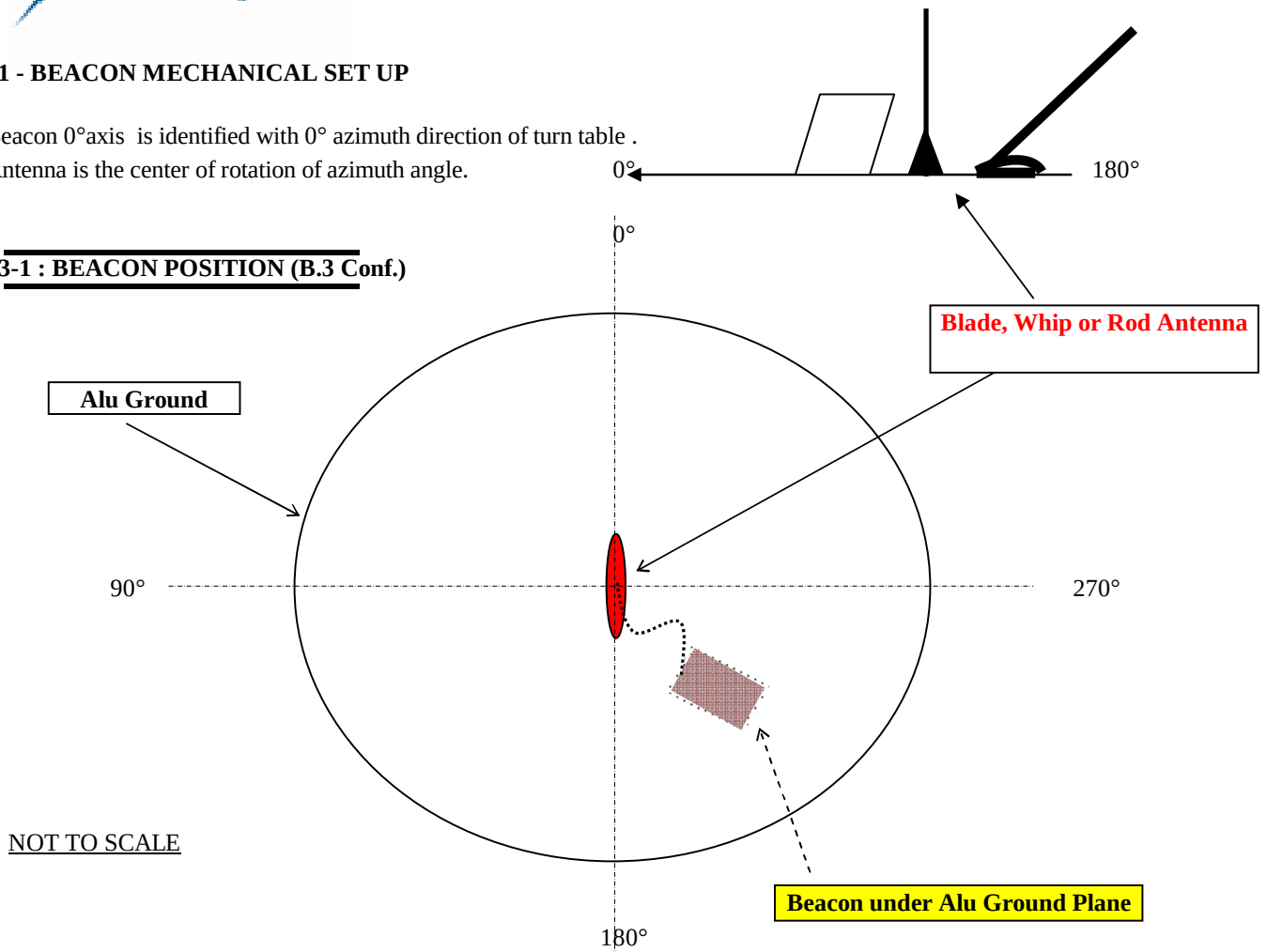
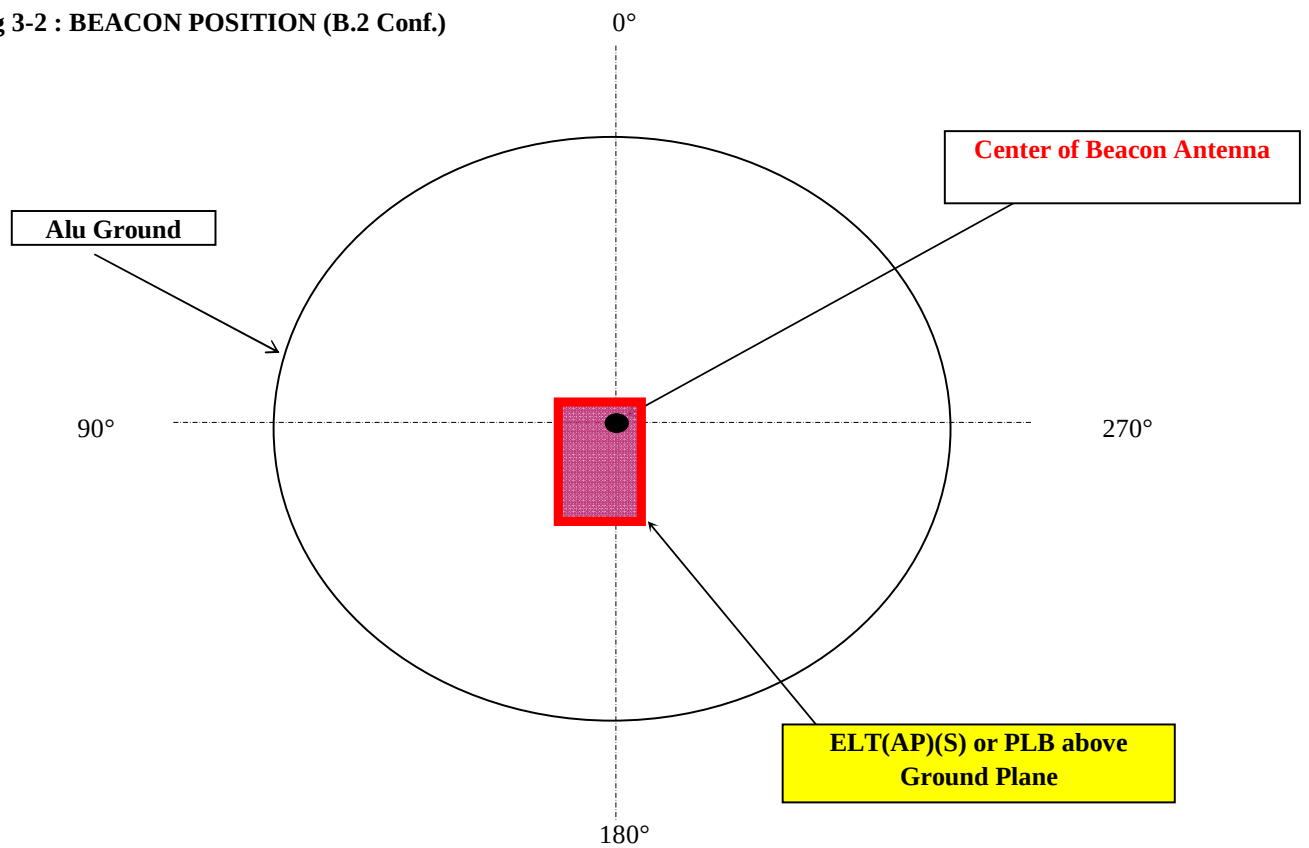


Fig 3-2 : BEACON POSITION (B.2 Conf.)



12 - RESULTS

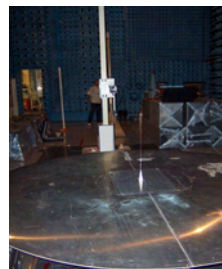
Antenna model / Test Configuration	Polarization	Reference EIRP (dBm)	EIRP checked with Linear Antenna	EIRP checked with Circular Antenna
AK 451.017-1B (Whip) / B3	Like Circular	32 < EIRP Ref< 43	table F-B.1/1	
AK 451.017-2A (Rod) / B3	Inclined Antenna			table F-B.1/2
AK 451.017-3A (Blade) / B3	Inclined Antenna			table F-B.1/3
AK 451.017-4 (S)(Portable Whip) / B2	Linear Vertical	30 < EIRP Ref< 43	table F-B.1/4	
AK 451.017-4 (S)(Portable Whip) / B5	Linear Vertical		table F-B.3	

CONCLUSIONS

According to the C/S T.007 measurement tolerance and measurement uncertainties (+/- 3 db) the 4 Beacon Antennas are declared in EIRP Reference tolerance.

406 MHz BEACON ANTENNA TEST RESULTS - B3 Test Configuration

Beacon Manufacturer : Ameri-King
Beacon Model : ELT AK-451() Series (AF) (AP) (S)
Antenna Model : AK 451.017-1B (Whip)
Test Configuration : For "Fixed ELT-like" Devices (Figure B3)


Table F-B.1/1 : Equivalent Isotropically Radiated Power (dBm) / Antenna Gain (dBi)

Azimuth Angle (degrees)	Elevation Angle(degrees)									
	10		20		30		40		50	
	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi
0	26,07	-10,03	33,65	-2,45	41,29	5,19	42,95	6,85	40,96	4,86
30	26,40	-9,70	33,14	-2,96	41,11	5,01	42,95	6,85	41,07	4,97
60	27,82	-8,28	34,11	-1,99	40,88	4,78	42,85	6,75	41,06	4,96
90	31,47	-4,63	34,80	-1,30	40,69	4,59	42,85	6,75	41,07	4,97
120	31,42	-4,68	33,11	-2,99	40,59	4,49	42,75	6,65	40,97	4,87
150	29,67	-6,43	34,01	-2,09	40,69	4,59	42,65	6,55	40,87	4,77
180	32,34	-3,76	35,30	-0,80	40,49	4,39	42,55	6,45	40,96	4,86
210	32,80	-3,30	36,00	-0,10	40,89	4,79	42,65	6,55	40,96	4,86
240	30,67	-5,43	35,80	-0,30	41,09	4,99	42,65	6,55	40,76	4,66
270	25,91	-10,19	33,79	-2,31	41,39	5,29	42,96	6,86	40,87	4,77
300	30,33	-5,77	32,84	-3,26	40,90	4,80	42,86	6,76	40,87	4,77
330	29,49	-6,61	34,71	-1,39	40,99	4,89	42,75	6,65	40,76	4,66
Overall Gain Variation (dB)	6,89		3,16		0,89		0,40		0,30	

Note : Values crossed aren't took account for EIRP and Gain verification following Section B10.2 of C/S T.007

$$\begin{aligned}
 \text{EIRP}_{\text{LOSS}} &= \text{Pt}_{\text{AMB}} - \text{Pt}_{\text{EOL}} = -0,2 \text{ dB} \\
 \text{EIRP}_{\text{max EOL}} &= \text{MAX} [\text{EIRP}_{\text{max}}, (\text{EIRP}_{\text{max}} - \text{EIRP}_{\text{LOSS}})] = \text{MAX} (\begin{matrix} 42,96 & 43,16 \end{matrix}) = 43,16 \text{ dBm} \\
 \text{EIRP}_{\text{min EOL}} &= \text{MIN} [\text{EIRP}_{\text{min}}, (\text{EIRP}_{\text{min}} - \text{EIRP}_{\text{LOSS}})] = \text{MIN} (\begin{matrix} 30,33 & 30,53 \end{matrix}) = 30,33 \text{ dBm}
 \end{aligned}$$

Table F-B.2/1 : INDUCED Voltage Measurements Vv / Vh (dBμV)

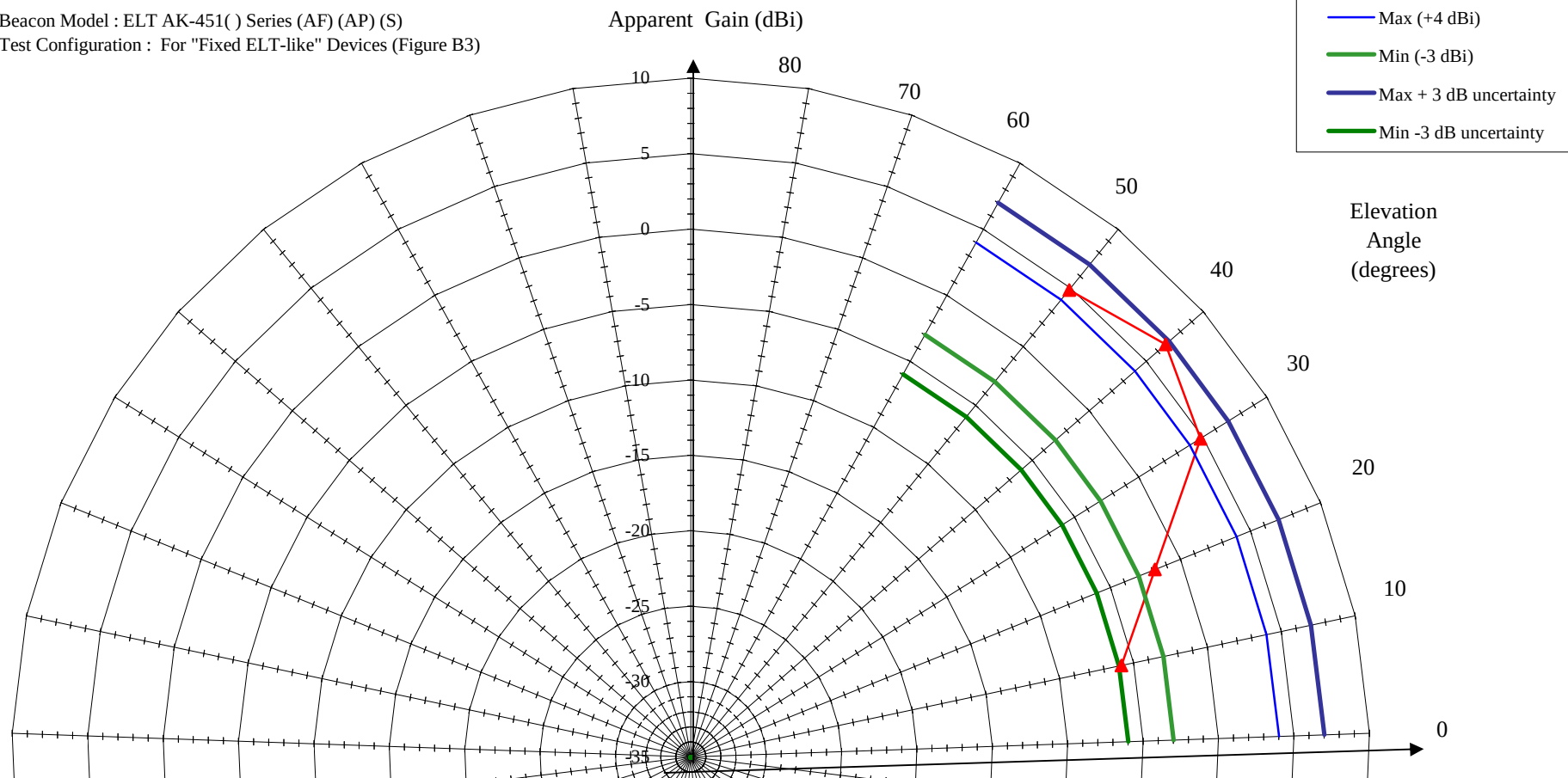
Azimuth Angle (Degrees)	Elevation Angle (Degrees)									
	10		20		30		40		50	
	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh
0	96,29	86,90	103,88	85,30	110,86	84,10	111,46	78,10	107,95	69,40
30	96,69	86,60	103,38	84,20	110,66	89,30	111,46	79,50	108,05	77,10
60	98,19	87,10	104,38	80,60	110,46	78,30	111,36	79,30	108,05	73,90
90	102,09	84,30	105,08	76,60	110,26	81,60	111,36	69,10	108,05	76,00
120	102,09	78,70	103,38	79,70	110,16	83,10	111,26	79,90	107,95	81,00
150	100,29	82,60	104,28	80,50	110,26	83,40	111,16	67,70	107,85	81,00
180	102,99	82,50	105,58	80,20	110,06	84,50	111,06	79,20	107,95	71,60
210	103,39	87,00	106,28	80,00	110,46	80,30	111,16	76,80	107,95	74,00
240	101,29	83,60	106,08	77,10	110,66	79,80	111,16	79,40	107,75	71,60
270	96,59	70,90	104,08	71,00	110,96	82,70	111,46	82,70	107,85	81,00
300	100,99	80,20	103,08	84,10	110,46	86,50	111,36	85,00	107,85	80,50
330	100,09	83,40	104,98	82,00	110,56	83,60	111,26	77,50	107,75	63,40
Min (Vv-Vh)	9,4		18,6		21,4		26,4		26,9	

Antenna Polarization : Linear Vertical

Antenna diagram versus elevation angle comparison with theoretical limits
Ameri-King : AK 451.017-1B (Whip)

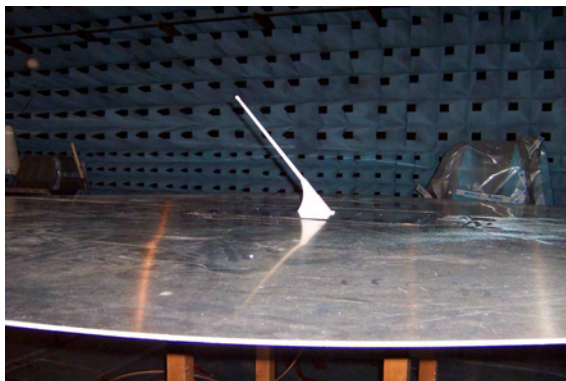
Beacon Model : ELT AK-451() Series (AF) (AP) (S)

Test Configuration : For "Fixed ELT-like" Devices (Figure B3)



406 MHz BEACON ANTENNA TEST RESULTS - B3 Test Configuration

Beacon Manufacturer : Ameri-King
Beacon Model : AK-451() Series
Antenna Model : AK 451.017-2A (Rod)
Test Configuration : For "Fixed ELT-like" Devices (Figure B3)
Search Antenna : Spiral Cone (RHCP)


Table F-B.1/2 : Equivalent Isotropically Radiated Power (dBm) / Antenna Gain (dBi)

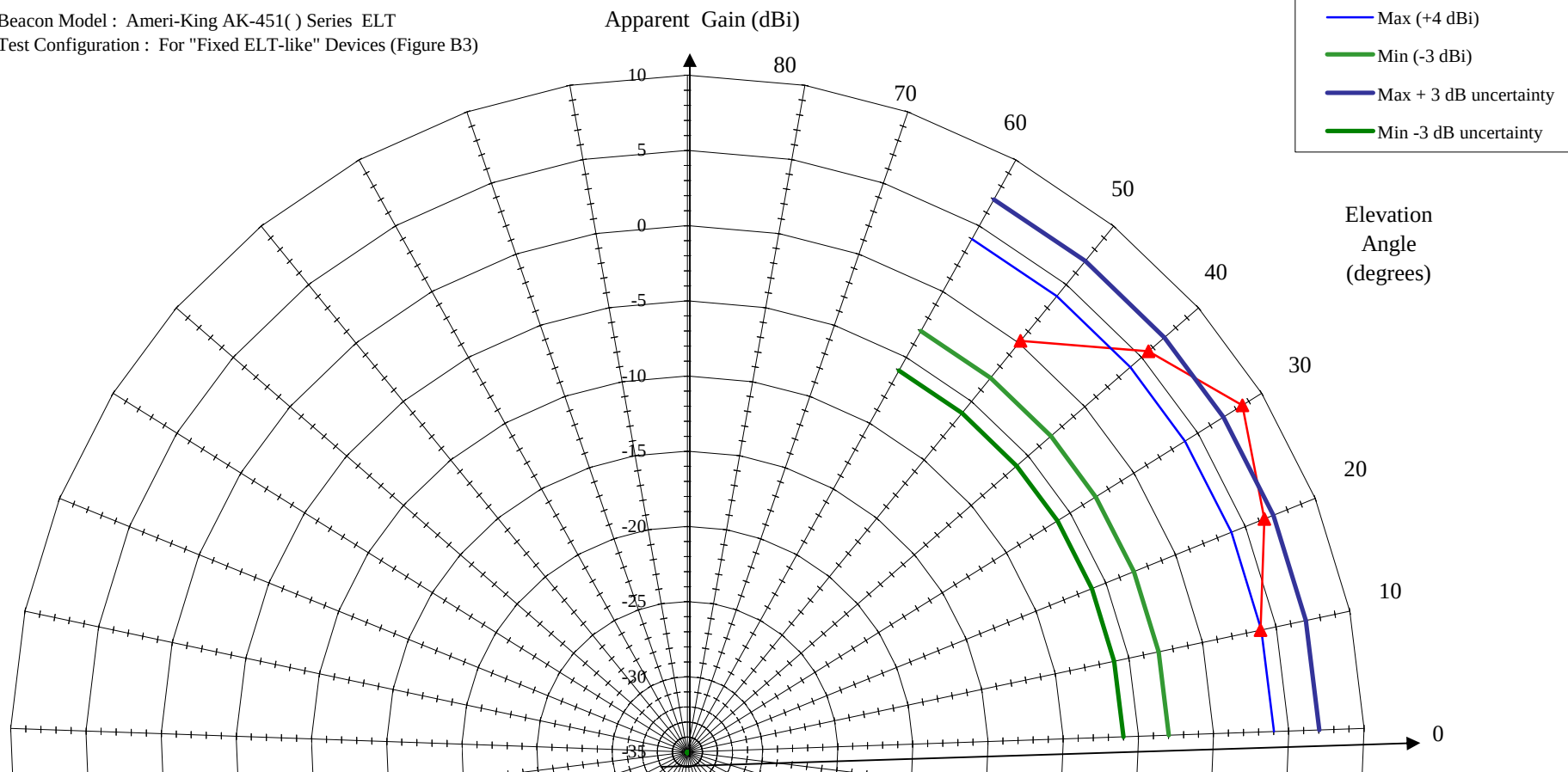
Azimuth Angle (degrees)	Elevation Angle(degrees)									
	10		20		30		40		50	
	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi
0	39,90	3,80	42,71	6,61	44,62	8,52	41,49	5,39	37,31	1,21
30	39,90	3,80	42,31	6,21	44,32	8,22	40,79	4,69	35,31	-0,79
60	39,10	3,00	41,81	5,71	43,82	7,72	40,19	4,09	33,81	-2,29
90	39,40	3,30	42,11	6,01	43,82	7,72	39,79	3,69	32,01	-4,09
120	39,80	3,70	41,61	5,51	43,82	7,72	40,29	4,19	32,31	-3,79
150	39,50	3,40	41,81	5,71	44,12	8,02	41,09	4,99	34,51	-1,59
180	40,20	4,10	42,01	5,91	44,52	8,42	42,09	5,99	36,51	0,41
210	40,70	4,60	42,71	6,61	44,92	8,82	42,79	6,69	37,91	1,81
240	40,50	4,40	42,91	6,81	45,12	9,02	43,09	6,99	38,71	2,61
270	40,20	4,10	43,01	6,91	45,42	9,32	43,31	7,21	39,41	3,31
300	40,90	4,80	43,31	7,21	45,42	9,32	42,99	6,89	38,81	2,71
330	40,40	4,30	43,01	6,91	45,12	9,02	42,49	6,39	38,61	2,51
Overall Gain Variation (dB)	1,80		1,70		1,60		3,52		7,40	

$$\begin{aligned}
 \text{EIRP}_{\text{LOSS}} &= P_{\text{tAMB}} - P_{\text{tEOL}} = -0,2 \text{ dB} \\
 \text{EIRPmax EOL} &= \text{MAX} [\text{EIRPmax}, (\text{EIRPmax} - \text{EIRPLOSS})] = \text{MAX} (\text{44,52} \quad \text{44,72}) = \text{44,72 dBm} \\
 \text{EIRPmin EOL} &= \text{MIN} [\text{EIRPmin}, (\text{EIRPmin} - \text{EIRPLOSS})] = \text{MIN} (\text{32,01} \quad \text{32,21}) = \text{32,01 dBm}
 \end{aligned}$$

Note : Highlighted text indicate all the EIRP values that are not within the C/S range and stricken-out text indicate any EIRP levels that were removed from consideration for calculating the EIRP maximum and minimum values at the end of life.

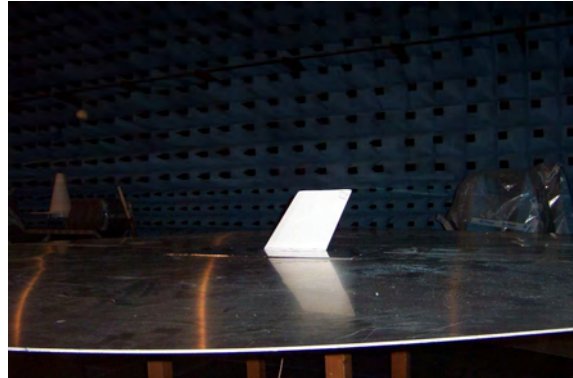
Antenna diagram versus elevation angle comparison with theoretical limits
Ameri-King : AK 451.017-2A (Rod)

Beacon Model : Ameri-King AK-451() Series ELT
Test Configuration : For "Fixed ELT-like" Devices (Figure B3)



406 MHz BEACON ANTENNA TEST RESULTS - B3 Test Configuration

Beacon Manufacturer Ameri-King
Beacon Model : AK-451() Series
Antenna Model : AK 451.017-3A (Blade)
Test Configuration : For "Fixed ELT-like" Devices (Figure B3)
Search Antenna : Spiral Cone (RHCP)


Table F-B.1/3 : Equivalent Isotropically Radiated Power (dBm) / Antenna Gain (dBi)

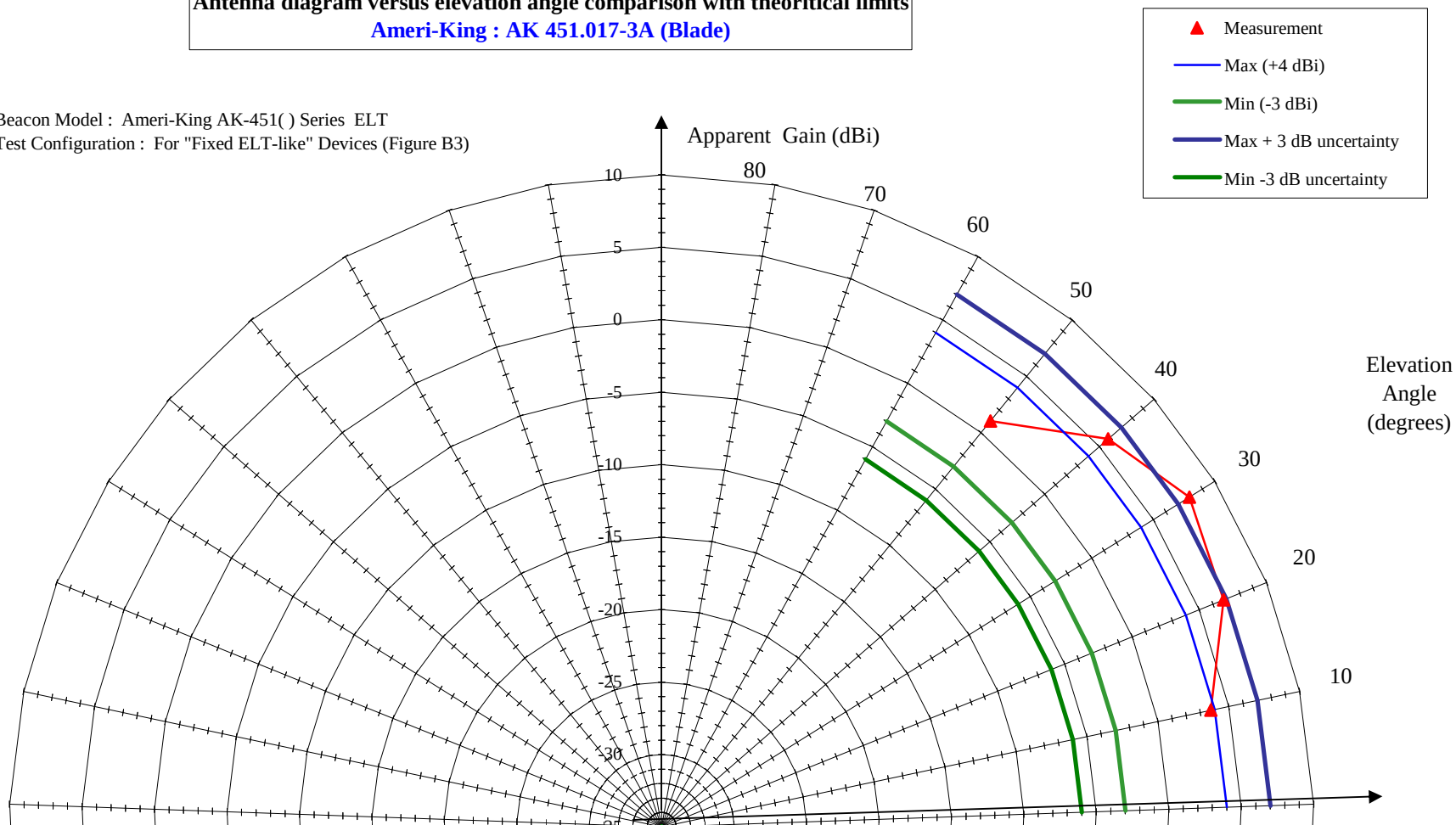
Azimuth Angle (degrees)	Elevation Angle(degrees)									
	10		20		30		40		50	
	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi
0	39,00	2,90	43,51	7,41	44,52	8,42	42,19	6,09	38,61	2,51
30	36,804	0,704	44,01	7,91	43,82	7,72	41,29	5,19	37,31	1,21
60	38,80	2,70	43,51	7,41	43,02	6,92	39,54	3,44	35,31	-0,79
90	38,60	2,50	42,31	6,21	42,52	6,42	38,79	2,69	32,71	-3,39
120	39,80	3,70	41,11	5,01	42,29	6,19	38,99	2,89	31,31	-4,79
150	40,20	4,10	40,41	4,31	42,62	6,52	40,19	4,09	32,71	-3,39
180	40,10	4,00	42,21	6,11	43,62	7,52	41,79	5,69	36,71	0,61
210	38,20	2,10	42,91	6,81	44,64	8,54	43,59	7,49	39,21	3,11
240	40,30	4,20	43,21	7,11	45,22	9,12	44,43	8,33	40,91	4,81
270	41,50	5,40	43,51	7,41	45,42	9,32	44,50	8,40	40,91	4,81
300	42,60	6,50	43,81	7,71	45,39	9,29	44,19	8,09	40,61	4,51
330	41,80	5,70	44,31	8,21	45,12	9,02	43,29	7,19	39,51	3,41
Overall Gain Variation (dB)	5,80		3,90		3,13		5,71		9,60	

$$\begin{aligned}
 \text{EIRP}_{\text{LOSS}} &= \text{Pt}_{\text{AMB}} - \text{Pt}_{\text{EOL}} = -0,2 \text{ dB} \\
 \text{EIRPmax EOL} &= \text{MAX} [\text{EIRPmax}, (\text{EIRPmax} - \text{EIRPLOSS})] = \text{MAX} (\text{44,50} \quad \text{44,70}) = \text{44,70 dBm} \\
 \text{EIRPmin EOL} &= \text{MIN} [\text{EIRPmin}, (\text{EIRPmin} - \text{EIRPLOSS})] = \text{MIN} (\text{31,31} \quad \text{31,51}) = \text{31,31 dBm}
 \end{aligned}$$

Note : Highlighted text indicate all the EIRP values that are not within the C/S range and stricken-out text indicate any EIRP levels that were removed from consideration for calculating the EIRP maximum and minimum values at the end of life.

Antenna diagram versus elevation angle comparison with theoretical limits
Ameri-King : AK 451.017-3A (Blade)

Beacon Model : Ameri-King AK-451() Series ELT
Test Configuration : For "Fixed ELT-like" Devices (Figure B3)



406 MHz BEACON ANTENNA TEST RESULTS - B2 Test Configuration

Beacon Model : Ameri-King AK-451() Series n° CS-08
Antenna Model : P/N AK 451.017-4
Test Configuration : For "PLB-like" Devices (e.g. PLB, survival ELT, automatic portable ELT)
Search Antenna : Dipole (Linear)


Table F-B.1/4 : Equivalent Isotropically Radiated Power (dBm) / Antenna Gain (dBi)

Azimuth Angle (degrees)	Elevation Angle(degrees)									
	10		20		30		40		50	
	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi
0	35,59	-0,51	37,33	1,23	32,20	-3,90	37,52	1,42	39,81	3,71
30	35,93	-0,17	37,47	1,37	32,16	-3,94	37,63	1,53	39,84	3,74
60	36,06	-0,04	37,58	1,48	32,44	-3,66	37,83	1,73	39,98	3,88
90	36,24	0,14	37,78	1,68	32,15	-3,95	37,77	1,67	39,97	3,87
120	36,27	0,17	37,83	1,73	31,62	-4,48	37,78	1,68	40,05	3,95
150	36,24	0,14	37,72	1,62	31,46	-4,64	37,63	1,53	40,11	4,01
180	36,12	0,02	37,63	1,53	31,30	-4,80	37,61	1,51	40,13	4,03
210	35,92	-0,18	37,55	1,45	31,85	-4,25	37,67	1,57	40,26	4,16
240	35,83	-0,27	37,48	1,38	32,01	-4,09	37,72	1,62	40,28	4,18
270	35,53	-0,57	37,37	1,27	32,18	-3,92	37,69	1,59	40,18	4,08
300	35,22	-0,88	37,23	1,13	32,19	-3,91	37,56	1,46	40,05	3,95
330	35,43	-0,67	37,22	1,12	31,95	-4,15	37,55	1,45	39,91	3,81
Overall Gain Variation (dB)	1,05		0,61		1,15		0,31		0,47	

$$EIRP_{LOSS} = P_{tAMB} - P_{tEOL} = -0,2 \text{ dB}$$

$$EIRP_{max} \text{ EOL} = \text{MAX} [EIRP_{max}, (EIRP_{max} - EIRP_{LOSS})] = \text{MAX} (\underline{40,28} \quad \underline{40,48}) = \underline{40,48 \text{ dBm}}$$

$$EIRP_{min} \text{ EOL} = \text{MIN} [EIRP_{min}, (EIRP_{min} - EIRP_{LOSS})] = \text{MIN} (\underline{32,15} \quad \underline{32,35}) = \underline{32,15 \text{ dBm}}$$

Note : Highlighted text indicate all the EIRP values that are not within the C/S range and stricken-out text indicate any EIRP levels that were removed from consideration for calculating the EIRP maximum and minimum values at the end of life.

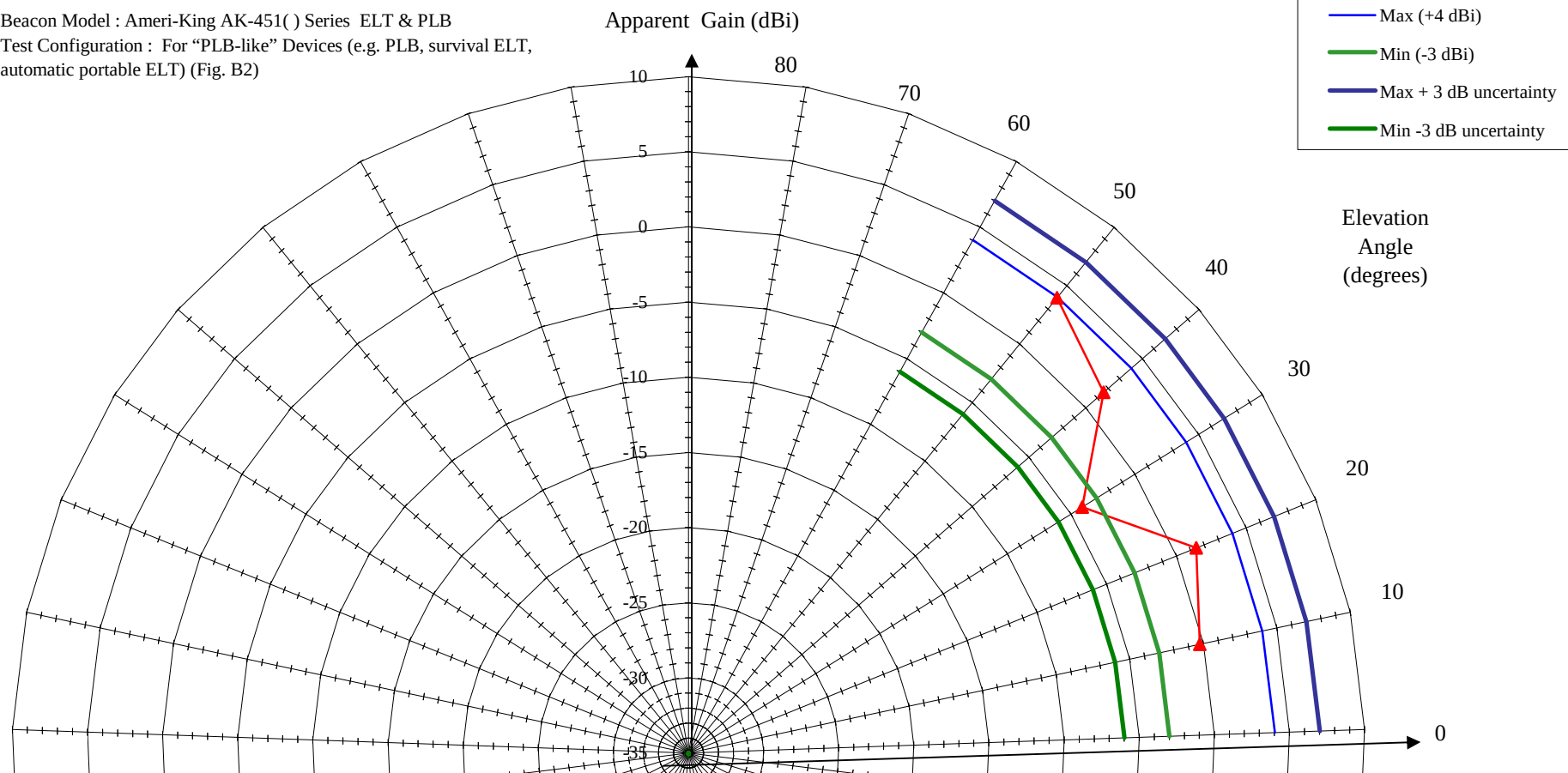
Table F-B.2/4 : INDUCED Voltage Measurements Vv / Vh (dBuV)

Azimuth Angle (Degrees)	Elevation Angle (Degrees)									
	10		20		30		40		50	
	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh
0	106,20	89,20	107,60	83,00	101,50	89,80	105,90	91,00	106,80	77,30
30	106,50	91,10	107,70	89,20	101,10	93,10	105,90	93,60	106,80	85,80
60	106,60	92,10	107,80	89,70	101,20	94,40	106,00	95,20	106,90	88,90
90	106,80	91,90	108,00	90,00	101,00	93,60	106,00	94,30	106,90	88,50
120	106,90	88,70	108,10	85,40	100,80	90,60	106,10	92,60	107,00	86,30
150	106,90	85,90	108,00	80,00	101,00	80,40	106,10	86,00	107,10	74,10
180	106,80	82,10	107,90	83,60	100,80	83,30	106,10	84,30	107,10	84,60
210	106,60	82,80	107,80	87,10	101,20	88,50	106,10	88,90	107,20	87,70
240	106,50	84,40	107,70	89,70	101,20	90,90	106,10	91,10	107,20	89,40
270	106,20	83,80	107,60	88,70	101,40	90,80	106,10	90,10	107,10	88,90
300	105,90	80,00	107,50	83,60	101,50	89,60	106,00	88,20	107,00	86,50
330	106,10	83,90	107,50	81,50	101,40	86,10	106,00	87,70	106,90	77,20
Min (Vv-Vh)	14,5		18,0		6,8		10,8		17,8	

Antenna Polarization : Linear Vertical

Antenna diagram versus elevation angle comparison with theoritical limits
Ameri-King : AK 451.017-4(S) (Whip) (Conf. B2)

Beacon Model : Ameri-King AK-451() Series ELT & PLB
Test Configuration : For "PLB-like" Devices (e.g. PLB, survival ELT, automatic portable ELT) (Fig. B2)



406 MHz BEACON ANTENNA TEST RESULTS - B5 Test Configuration

Beacon Model : Ameri-King AK-451() Series n° CS-08 ELT & PLB
Antenna Model : P/N AK 451.017-4
Test Configuration : For all Devices that Might be Required to Operate Without a Ground Plane
Search Antenna : Dipole (Linear)



Table F-B.3 : Equivalent Isotropically Radiated Power (dBm) / Antenna Gain (dBi)

Azimuth Angle (degrees)	Elevation Angle(degrees)									
	10		20		30		40		50	
	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi	dBm	dBi
0	37,31	1,21	37,60	1,50	36,99	0,89	38,25	2,15	36,57	0,47
90	38,18	2,08	37,77	1,67	37,81	1,71	38,27	2,17	37,12	1,02
180	38,16	2,06	37,85	1,75	37,54	1,44	39,17	3,07	37,68	1,58
270	37,90	1,80	37,69	1,59	37,65	1,55	38,39	2,29	37,00	0,90
Overall Gain Variation (dB)	0,87		0,25		0,82		0,12		1,11	

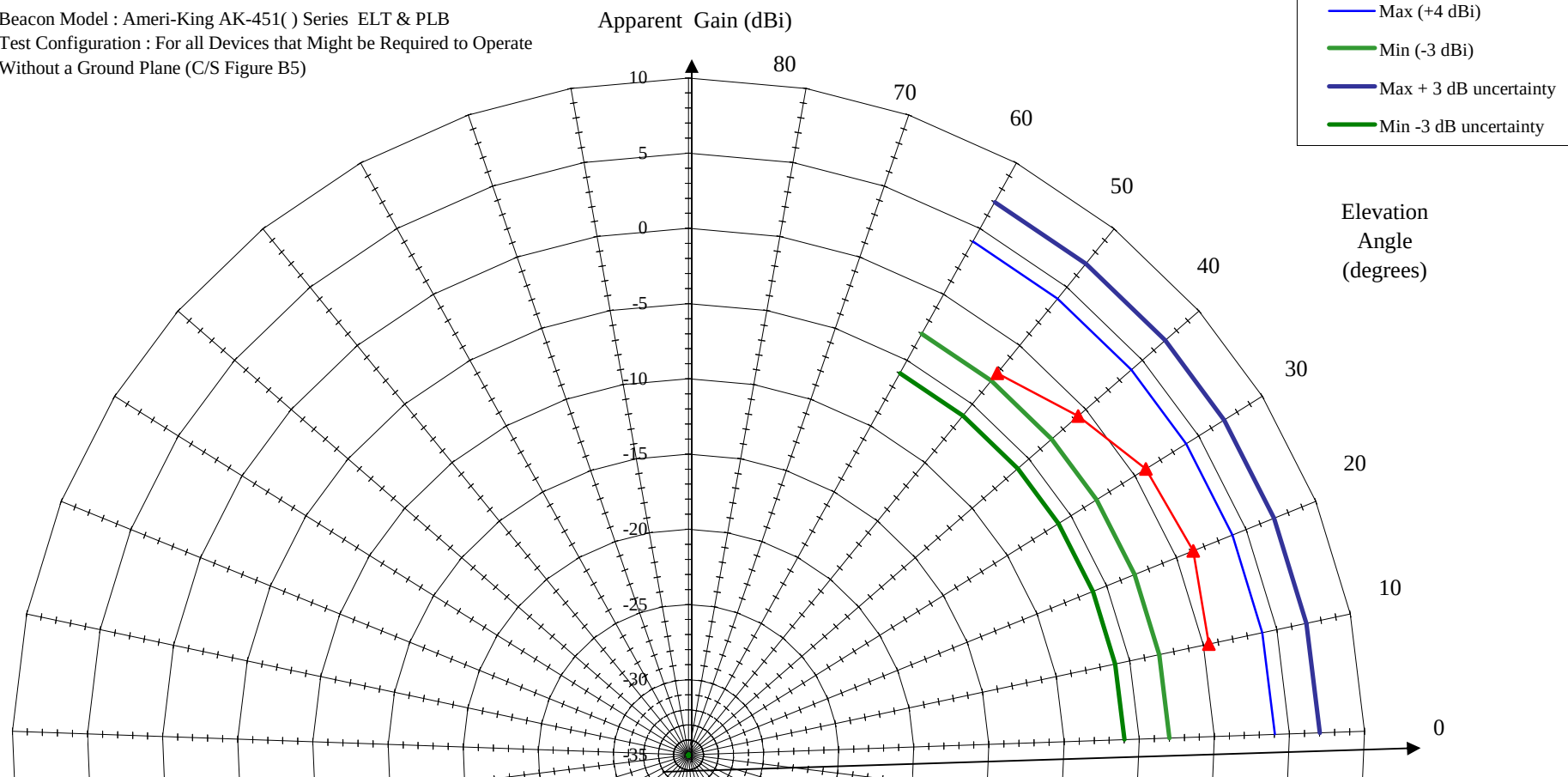
$$ERP_{LOSS} = P_{t_{AMB}} - P_{t_{EOL}} = -0,2 \text{ dB}$$

$$ERP_{max \text{ EOL}} = \text{MAX} [ERP_{max}, (ERP_{max} - ERP_{LOSS})] = \text{MAX} (\underline{39,17} \quad \underline{39,37}) = \underline{39,37 \text{ dBm}}$$

$$ERP_{min \text{ EOL}} = \text{MIN} [ERP_{min}, (ERP_{min} - ERP_{LOSS})] = \text{MIN} (\underline{36,57} \quad \underline{36,77}) = \underline{36,57 \text{ dBm}}$$

Antenna diagram versus elevation angle comparison with theoretical limits
Ameri-King : AK 451.017-4(S) (Whip) (Conf. B5)

Beacon Model : Ameri-King AK-451() Series ELT & PLB
Test Configuration : For all Devices that Might be Required to Operate
Without a Ground Plane (C/S Figure B5)



E6557-CS_ws (Add_Sat)

REPORT OF ADDITIONAL SATELLITE QUALITATIVE TEST

OF

AMERI-KING AK-451() Series ELT & PLB - SN : CS-08

WITH

ANTENNA : AK 451.017-4(S) (Portable Whip)

1 - ADMINISTRATION

1. WORK ORDER : Reference ITS : E6557-CS_ws (Add _Sat)

1. TEST TEAM : F. ESQUEVIN - G. PEYROU

1. SCHEDULE : 26 to 30 june 2007

2 - PURPOSE

The Satellite Qualitative Tests are performed complementary of the tests done on july 2006 and reported in the Annex B of the E6557-CS test report

The antenna and beacon in "Portable ELT" / "PLB" Dry Ground Configuration is checked three times with Ultralife U 10014 (LiMnO₂), Saft LO26SXC (LiSO₂) and Saft LM33600 (LiMnO₂) battery packs

3 - ANTENNAS AND RADIO BEACON IDENTIFICATIONS

Beacon : **BUT 2**

- Manufacturer : Ameri-King Corp.

- Type : ELT(AF)(AP)(S) and PLB

- PN / SN : AK-451() Series / CS-08

Antenna :

Manufacturer	AUT Type
Ameri-King Corp.	AK 451.017-1B (Whip)

Battery used	Manufacturer / Type
For main C/S SatelliteTest	ULTRALIFE / U 10014 (LiMnO ₂)
For additional C/S Satellite Test	SAFT / LO26SXC (LiSO ₂)
	SAFT / LM33600 (LiMnO ₂)

4 - TEST SITE DESCRIPTION

The tests are performed outside in "Mars Land " site of CNES Toulouse.

