CHAPTER 10

COSPAS–SARSAT TESTS REPORT

10.1 - ADMINISRATION

10.1.1. WORK ORDER

Manufacturer : MARTEC / KANNAD
Address : Z.I. des Cinq Chemins
56520 GUIDEL

Represented by : Mr Stephane JINCHELEAU

10.1.2. INTESPACE TEST CENTER

The test operations have been conducted by : François ESQUEVIN & Gerard PEYROU

10.1.3. SCHEDULE

Start of test:	11 septembre 2007
End of test :	30 novembre 2007

10.1.4. WORK REFERENCE : **E7555-CS-RTCM-ETSI**

10.1.5. EQUIPMENT UNDER TEST

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

- Commercial designation : KANNAD XS3 GPS
- Model : XS3 GPS
- Sérial number: UT1

10.2 - TEST FACILITIES

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

10.3 - 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 Caracteristic Antenna Test " Réf. ITS : 566 AP/QA
- " Radio Beacon Test Report " Réf. ITS : 579 AP/QA-f

10.4 - RESULTS

For the beacon above indicated the test program hereby ran concern only the C/S T.007 Test:
-A2.1 Electrical and Functional Tests at Constant Temperature (test no. 1 to 8 in Tabe F.1)
-A2.2 Thermal Shock Test (test no.9 in Table F.1)
-A.2.3 Operating Lifetime at Minimum Temperature (test no. 10 in Table F.1)
-A2.4 Frequency Stability Test with Temperatuire Gradient (test no. 11 in Table F.1)

The test results are reported following pages in:
- Annex G.1 : Information provided by the beacon manufacturer
- Table F.1 : Overall Summary of 406 MHz Beacon Test Results and
- Data and graphs Test results

The other C/S T.007 test has been ran with identitical beacon model during the previous
C/S T.A. test campaign (November 2006 to May 2007). The C/S T.A.C. no. 180 has been issued in October 2007
See the C/S T.A. Test Report " E7555-CS Rev 1" with Manufacturer technical data in Appendix A

ANNEX G.1 : INFORMATION PROVIDED BY THE BEACON MANUFACTUREUR

Beacon manufacturer	MARTEC Serpe-lesm
Beacon model	KANNAD XS3 GPS

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	X
	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)		

Beacon characteristics

Characteristic	Specification
Operating temperature range	-20 °C / +55°C
Operating lifetime	24 hours
Battery chemistry	Lithium
Battery cell size and number of cells	DL123 / 6
Battery manufacturer	DURACELL
Battery pack manufacturer and part number	Williamson / WILPA1655
Oscillator type (e.g. OCXO, MCXO, TCXO)	TCXO (see § 10)
Oscillator manufacturer	C-MAC (see § 10)
Oscillator part name and number	E4217LF
Oscillator satisfies long-term frequency stability requirements (Yes or No)	YES (see § 10)
Antenna type (Integrated or External)	Integrated
Antenna manufacturer	MARTEC
Antenna part name and number	0143563A
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 (see § 2.4.2)
Features in beacon that ensures erroneous position data is not encoded into the beacon message (Yes, No or N/A)	NO
Navigation device capable of supporting global coverage (Yes, No or N/A)	YES
For internal navigation devices - geodetic reference system (WGS84 or GTRF) - GNSS receiver cold start forced at every beacon activation (Yes or No) - Navigation device manufacturer - Navigation device model name and part number - GNSS system supported (e.g. GPS, GLONASS, Galileo)	See § 2.4 WGS84 YES FASTRAX ITRAX03-8 GPS

For external navigation devices - Data protocol for GNSS receiver to beacon interface - Physical interface for beacon to navigation device - Electrical interface for beacon to navigation device - Navigation device model and manufacturer (if beacon designed to use specific devices)	NOT APPLICABLE
Self-test mode characteristics - self-test has separate switch position (Yes or No) - Self-test switch automatically returns to normal position when released (Yes or No) - Self-test activation can cause an operational mode transmission (Yes or 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) - Results of self-test indicated by (e.g. Pass / Fail indicator Light, Strobe light, etc.) - Self-test can be activated from beacon remote activation points (Yes or 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) - Self-test transmits a signal(s) other than at 406 MHz (Yes & details or No) - Self-test can be activated directly at beacon (Yes or No) - List of items checked by self-test - Self-test transmission burst duration (440 or 520 ms) - Self-test format bit ("0" or "1")	 YES YES NO YES Pass / fail indicator light NO YES NO YES Battery voltage RF power at 406 MHz Phase locked loop 520ms 1
Beacon includes a homer transmitter (if yes identify frequency of transmission) - Homer transmit power - Homer duty cycle - Duty cycle of homer swept tone	121.5 MHz ±3kHz 50mW ± 3dB PERP 100 % 50 %
Beacon includes a strobe light (Yes or No) - Strobe light intensity - Strobe light flash rate	NO
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 distributer on the interval 47.5 to 52.5 seconds (Yes or No)	YES (see § 11.5)
Other ancillary devices (e.g. voice transceiver). List details on a separate sheet if insufficient space to describe	NO
Beacon includes automatic activation mechanism (Yes or No)	NO

	Equipment in test PLB : Kannad XS3-GPS	INTESPACE Reference E7555-RTCM

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	36,5	36,8	35,6	
o Power output rise time		< 5	ms	0,02	0,02	0,01	Graphs next pages
o power output 1 ms before burst		< -10 dBm	√ *	√	√	√	
2 - DIGITAL MESSAGE	Bits number						Data and graphs pages 16 to 25
o bit sync	1-15	15 bits "1"	√	√	√	√	
o frame sync	16-24	9 bits (000101111)	√	√	√	√	
o format flag	25	1 bit	√	1	1	1	
o protocol flag	26	1 bit	√	0	0	0	
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	110111	110111	110111	
o additional data/BCH (if applicable)	113-144	32 bits	√	√	√	√	
o position error (if applicable)		< 0.5	km	0,076 km	0,076 km	0,076 km	

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS T min. -20°C (±3)	TEST RESULTS T amb. 22°C (±3)	TEST RESULTS T max. 55°C (±3)	COMMENTS
3 - DIGITAL MESSAGE GENERATOR						Data and graphs pages 16 to 25
o repetition rate T_R :						
average T_R =	48,5 - 51,5	seconds	49,8	49,6	49,8	
minimum T_R =	$47,5 \leq T_R \leq 48,0$	seconds	47,5	47,5	47,5	
maximum T_R =	$52,0 \leq T_R \leq 52,5$	seconds	52,5	52,5	52,5	
standard deviation =	0,5 - 2,0		1,32	1,47	1,26	
o bit rate						
minimum f_b =	396	bits/sec.	401,31	401,46	401,84	
maximum f_b =	404	bits/sec.	401,34	401,50	401,87	
o total transmission time :						
short message =	435.6 - 444.4	ms				
long message =	514.8 - 525.2	ms	519,83	519,62	519,16	
o unmodulated carrier						
minimum T_1 =	158,4	ms	160,32	160,25	160,33	
maximum T_1 =	161,6	ms	160,54	160,47	160,34	
o first burst delay	> 47,5	seconds	> 50 sec	> 50 sec	> 50 sec	

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS T min. -20°C (±3)	T amb. 22°C (±3)	T max. 55°C (±3)	COMMENTS
4 – MODULATION						Data and graphs pages 16 to 25
o biphase-L		√	√	√	√	
o rise time	50 – 250	microsec.	140	150	150	
o fall time	50 – 250	microsec.	150	140	150	
o phase deviation : positive	+ (1.0 to 1.2)	radians	+ 1,08	+ 1,08	+ 1,09	
o phase deviation : negative	- (1.0 to 1.2)	radians	- 1,07	- 1,08	- 1,06	
o symmetry measurement	≤ 0.05		+ 0,0040	+ 0,0040	+ 0,0040	
5 – 406 MHz TRANSMITTED FREQUENCY						Data pages 16 to 25
o nominal value	as specified in C/S T.001 and C/S T.012	MHz	406,0278691	406,0278341	406,0278049	
o short term stability	≤ 2×10^{-9}	/100 ms	$2{,}11^{E-10}$	$1{,}59^{E-10}$	$8{,}86^{E-11}$	
o medium term stability . slope	(-1 to +1) $\times 10^{-9}$	/minute	$-2{,}87^{E-12}$	$-6{,}26^{E-11}$	$-1{,}43^{E-10}$	
. residual frequency variation	≤ 3×10^{-9}		$8{,}46^{E-11}$	$2{,}80^{E-10}$	$1{,}20^{E-09}$	
6 – SPURIOUS EMISSION [1] (into 50 ohms) o in-band (406.0 – 406.1 MHz)	C/S T.001 mask	√	√	√	√	See graphs pages 26 to 29

[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 T min. -20°C (±3)	T amb. 22°C (±3)	T max. 55°C (±3)	COMMENTS
7 - 406 MHz VSWR CHECK after open circuit, short cicuit, then while VSWR is 3:1, measure :						See data and graphs pages 30 to 37
o nominal transmitted frequency	as specified in C/S T.001	MHz	406,0278598	406,0278314	406,0278113	
o Modulation :						
- rise time	50 - 250	microsec.	149,7	149,7	149,7	
- fall time	50 - 250	microsec.	149,7	149,7	139,7	
- phase deviation : positive	+ (1.0 to 1.2)	radians	1,08	1,09	1,08	
- phase deviation : negative	- (1.0 to 1.2)	radians	-1,09	-1,07	-1,07	
- symmetry measurement	≤ 0.05	√	+ 0,0040	+ 0,0040	+ 0,0081	
- digital message	must be correct	√	√	√	√	
8 - SELF-TEST MODE (if applicable)						Data pages 38 to 39
o frame sync	9 bits (011010000)	√	√	√	√	
o format flag	1/0	bit	1	1	1	
o single radiated burst	≤ 440 /520 (+1%)	ms	519,63	519,40	519,16	
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	√	√	√	√	Manufacturer doc. Chapter 13: Appendix A
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
9 - THERMAL SHOCK[1] (30° C change)				Data and graphs Pages 40 to 45
o Soak temperature :		°C	Tsoak = 23	
o Measurement temperature :		°C	TMeas = -10	
the following parameters are to be met within 15 minutes of beacon and maintained for 2 hours				
o Transmitted frequency :				
- nominal value	as specified in C/S T.001 and C/S T.012	MHz	406,027865 / 406,027879	
- short term stability	≤ 2 x 10^{-9}	/100 ms	6,40E-11	
- medium term stability :				
. slope	(-2 to +2) x 10^{-9}	/minute	-4E-10 / 2E-11	
. residual frequency variation	≤ 3 x 10^{-9}		6,30E-10	
o Transmitted power output	35 - 39	dBm	36,3 / 36,4	
o Digital message	must be corect	√	√	

1 Attach graphs depicting test results.

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS	COMMENTS
10 - OPERATING LIFETIME AT MINIMUM TEMPERATURE[1]				Data and graphs Pages 46 to 59
o Duration	> 24	hours	28 hours at Tmin = -20°C (36 dBm)	
o Transmitted frequency :				
- nominal value	as specified in C/S T.001 and C/S T.012	MHz	406,027864 / 406,027921	
- short term stability	≤ 2 x 10^{-9}	/100 ms	< 2E-9	
- medium term stability				
. slope	(-1 to +1) x 10^{-9}	/minute	-9E-10 / 6E-11	
. residual frequency variation	≤ 3 x 10^{-9}		2,8E-09	
o Pt_{EOL}=minimum transmitter power output observed during lifetime output at minimum temperatureTransmitted power	35 - 39	dBm	36,5	
o Digital message	must be corect	√	√	

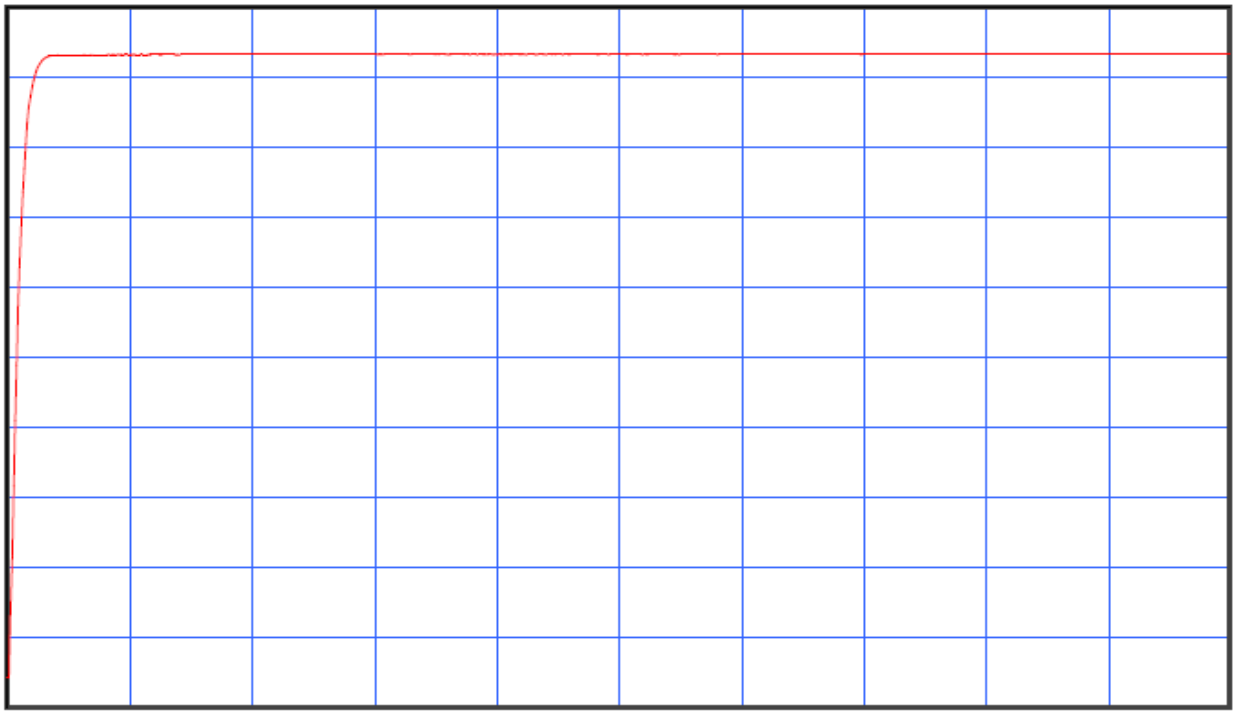
PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS	COMMENTS
11 - TEMPERATURE GRADIENT (5° C/hr)[1]				Data and graphs Pages 46 to 80
o Transmitted frequency :				
- nominal value	as specified in C/S T.001 and C/S T.012	MHz	406,027762 / 406,027881	
- short term stability	≤ 2 x 10^{-9}	/100 ms	< 3E-10	
- medium term stability				
. Slope (A to B, C+15 to D, and E+15 to F)	(-1 to +1) x 10^{-9}	/minute	-4E-10 /< 1E-9	
. Slope (B to C+15, and D to E+15)	(-2 to +2) x 10^{-9}	/minute	-1,3E-9 /1,3E-9	
. residual frequency variation	≤ 3 x 10^{-9}			
o Transmitted power output	35 - 39	dBm	35,7 / 36,5	
o Digital message	must be corect	√	√	
12 - OSCILLATOR AGING (data provided)	C/S T.001	MHz	-2,030E-03	Manufacturer explanations in appendix A

1 Attach graphs depicting test results.

TRANSMITTER OUTPUT POWER RISE TIME
TEST RESULT ON
MARTEC / KANNAD
XS3-GPS
N° UT1
(1 ms before 10 % of the burst)
at -20° C, 22° C and 55° C

Output Power Risetime at -20°C

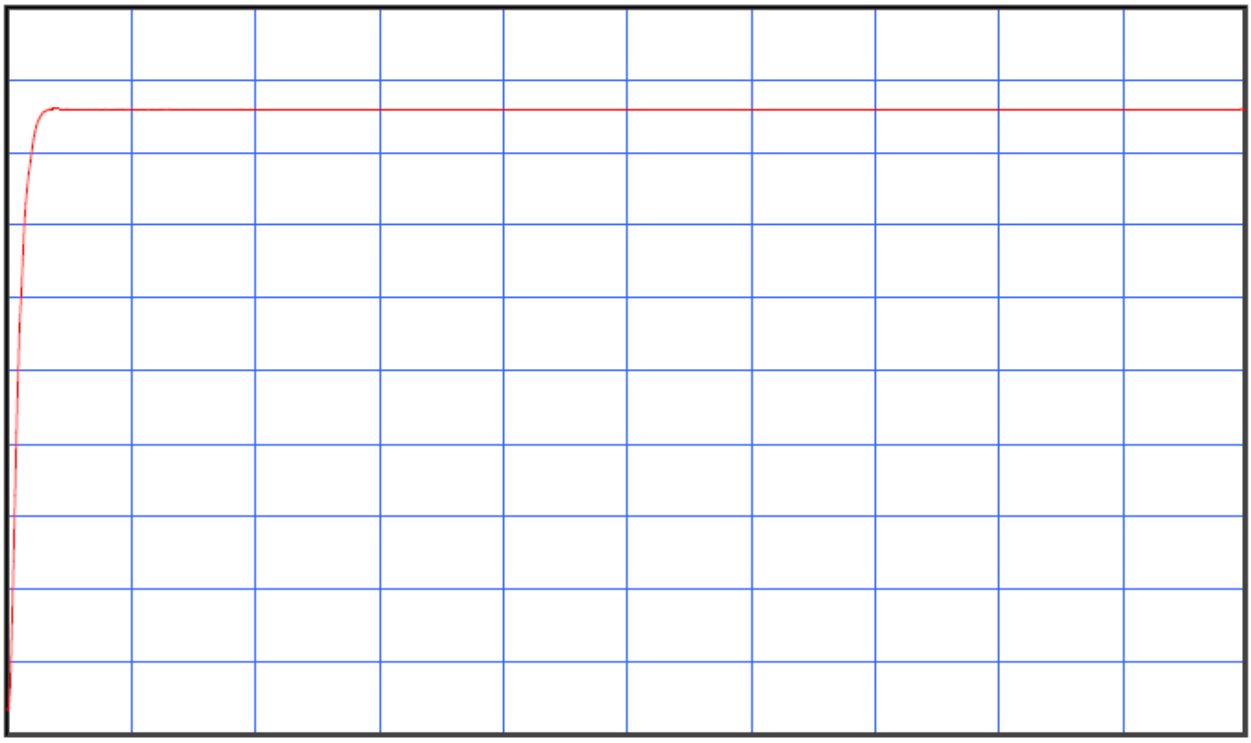
CF : 406,028 MHz Output Power Risetime (1 ms before the burst) : -45,9 dBm SP : 0 KHz



Rb : 1 KHz 10 dB/div. St : 0,05 S

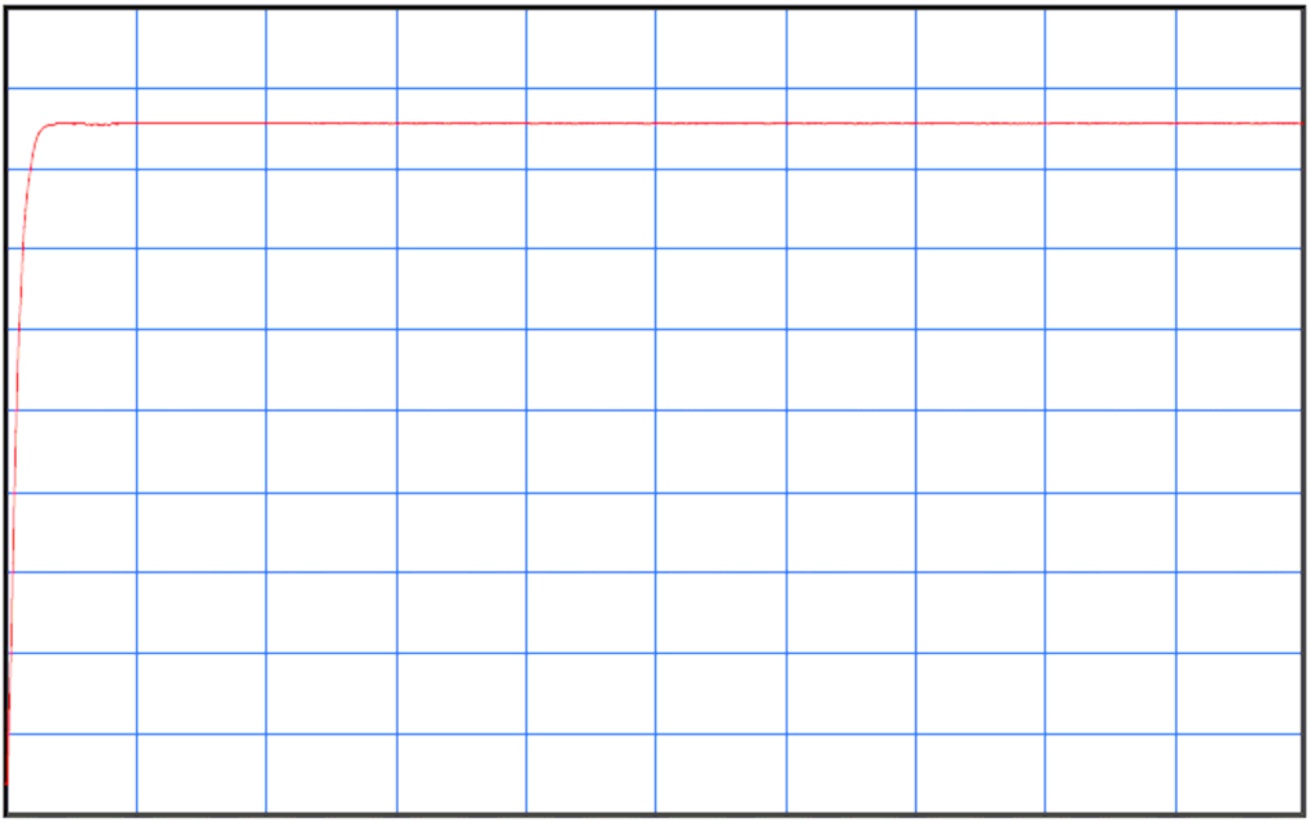
Output Power Risetime at 22°C

CF : 406,028 MHz Output Power Risetime (1 ms before the burst) : -45,7 dBm SP : 0 KHz



Rb : 1 KHz 10 dB/div. St : 0,05 S

Output Power Risetime at 55°C



CERTIFICATION TEST RESULTS ON
MARTEC / KANNAD
XS3-GPS
N° UT1
at -20° C, 22° C and 55° C

Certification Test at -20°C Date of test : 12-oct-07

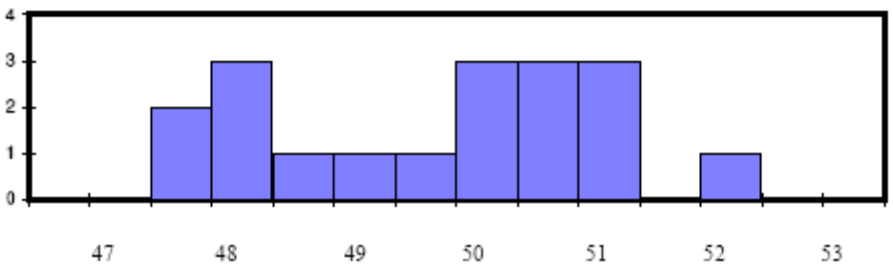
Manufacturer : MARTEC / KANNAD
Beacon Type : XS3-GPS
Number : UT1

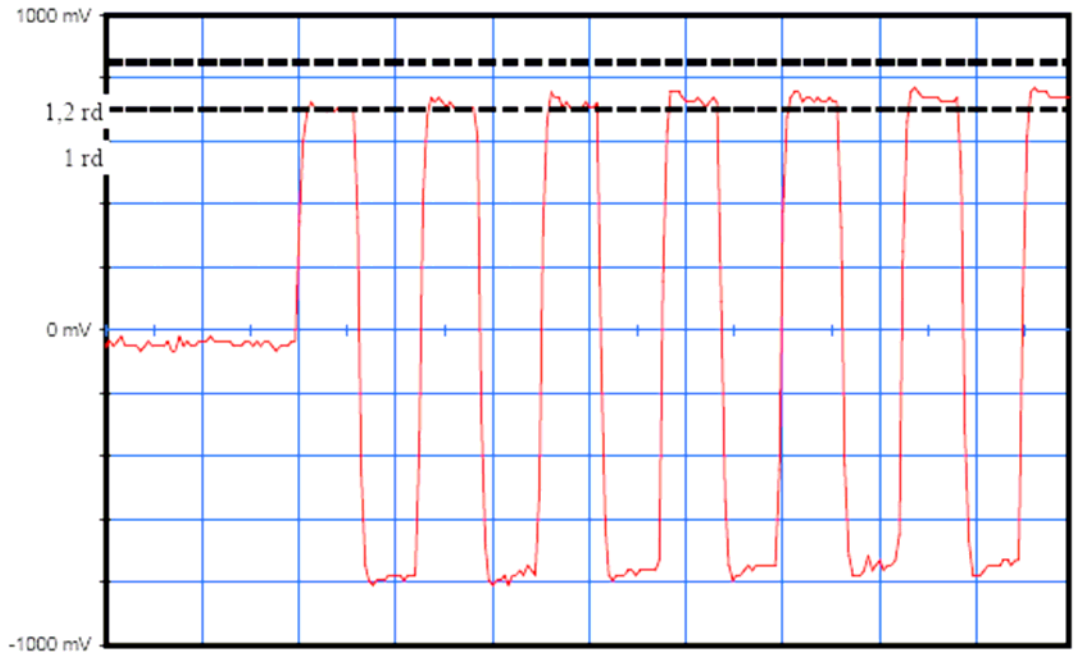
Message

Message received		FFFE2F8E3E2293E02B8036AFFAF78E4154C9	
Format Flag	25	1	
Protocol flag	26	0	
Ident./Position code	27-85	0	
Country Code/Country	27-36	227 / FRANCE	
Protocol Code : U/Std-Nat	37-39/37-40	1110	
Protocol Code Used	37-39/37-40	Test-Standard Location	
Identification Data	40-85/41-64/41-58		
Identification Used		0	
Calculated BCH1	25-85	1ABFEB	
Encoded BCH1	86-106	1ABFEB	
Homing	112	1	
Em.cod/nat.use/supp.data	107-112	110111	
Encod pos data	111	1	Internal
Fixed Data "1"	108	1	OK
Calculated BCH2	107-132	4C9	
Encoded BCH2	133-144	4C9	
Latitude position		North 43° 33' 36"	
Longitude position		East 1° 28' 40"	
Delta position	< 0,5 km	0,076 km	

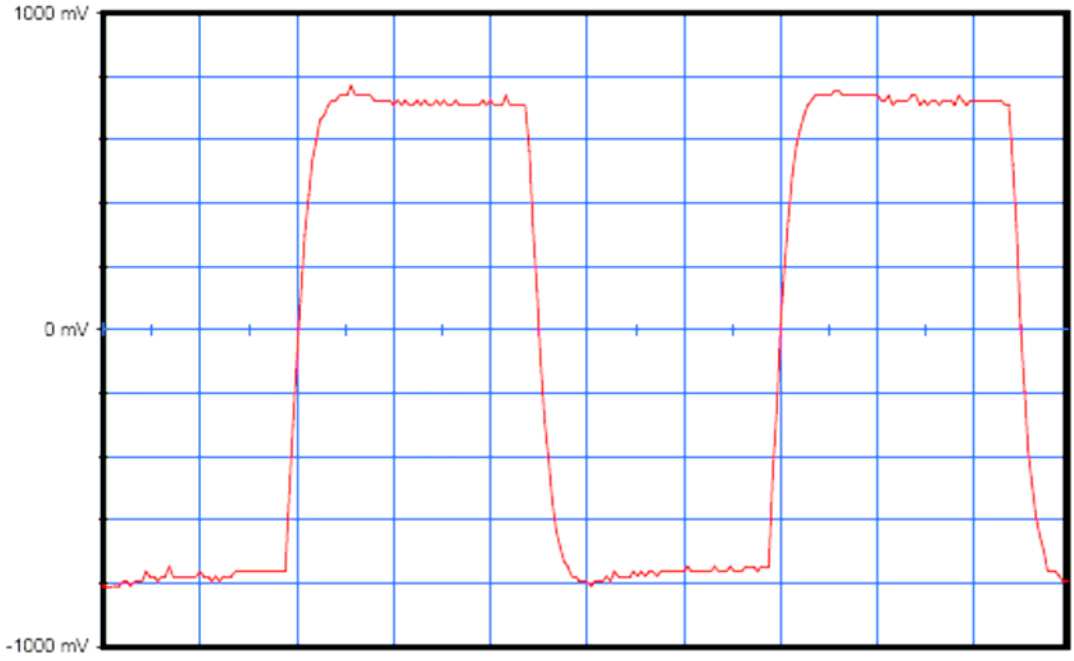
Electrical and other parameters

CW preamble	ms 158,4 <	< 161,6	160,36
Total transmission time	ms 514,8 <	<525,2	519,83
Modulation frequency	Hz 396<	< 404	401,33
Phase deviation : total	rd	<=2,40	2,15
Phase deviation : positive	rd 1,00 <	< 1,20	1,08
Phase deviation : negative	rd -1,20 <	< -1,00	-1,07
Symmetry measurement	%	<=5 %	0,40
Nominal frequency : F2	Hz		406027869,09
Short term2			2,11E-10
Short term3			6,37E-11
Slope			-2,87E-12
Residual			8,46E-11
406 MHz power output	dBm		36,5
Homing frequency	MHz		121,5028
121,5 MHz power output	dBm		18,9
Soak temperature	°C		-20,7
Extra feature			No
First Burst Delay	> 47,5 sec		> 50 sec

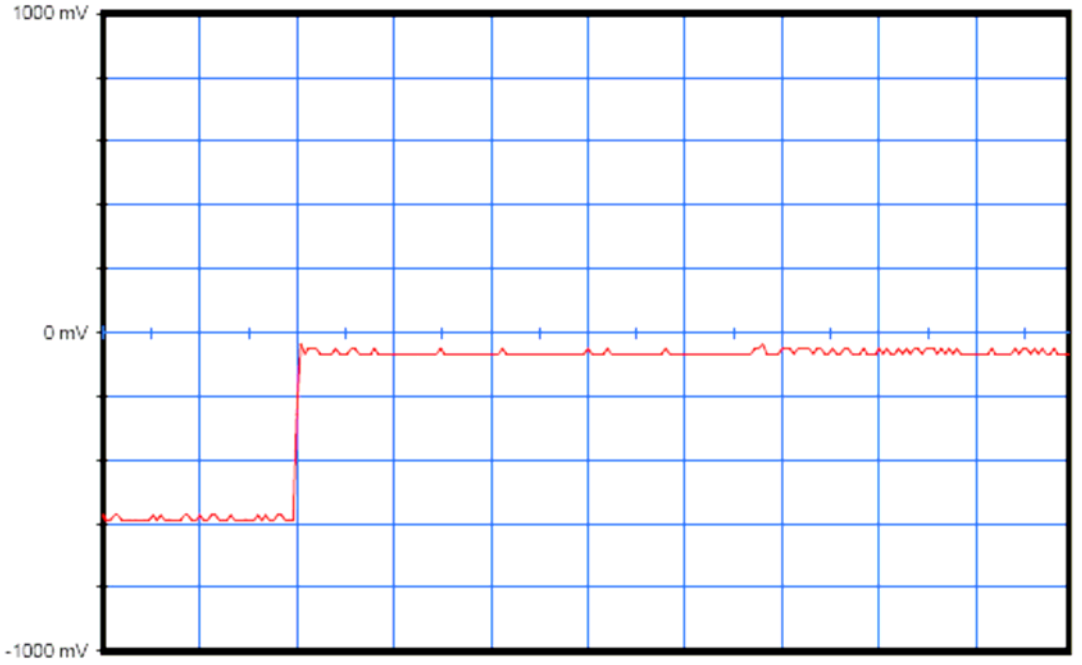


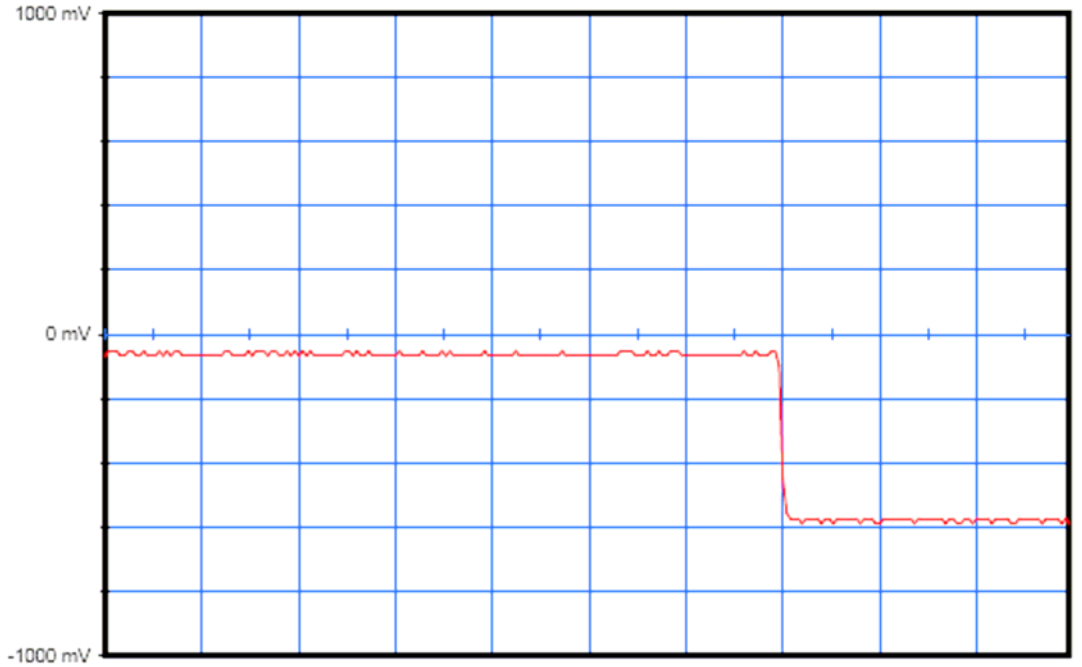


0 ms 10 ms 20 ms
Vmarker1 850 mv ==> 1,2 rd
Vmarker2 700 mv ==> 1 rd



8 ms 10,5 ms 13 ms
Duty Cycle : 0,004012024 0,5 ms/div.
falltime(1)<= 149,701 us risetime(1)<= 139,721 us
+width(1) 1,2475 ms -widht(1) 1,23753 ms


1000 mV
0 mV
-1000 mV
-1 ms
1,5 ms
4 ms
risetime(1)<= 19,9601 us
0,5 ms/div.


1000 mV
0 mV
-1000 mV
-3,5 ms
-1 ms
1,5 ms
falltime(1)<= 29,9399 us
0,5 ms/div.

Certification Test at 22°C Date of test : 11-oct-2007

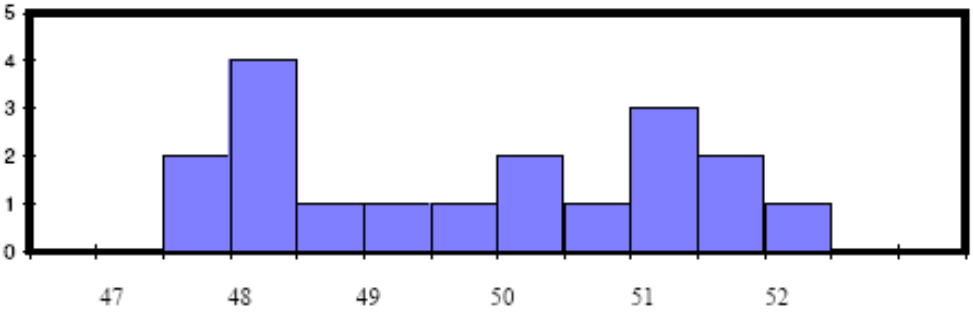
Manufacturer : MARTEC / KANNAD
Beacon Type : XS3-GPS
Number : UT1

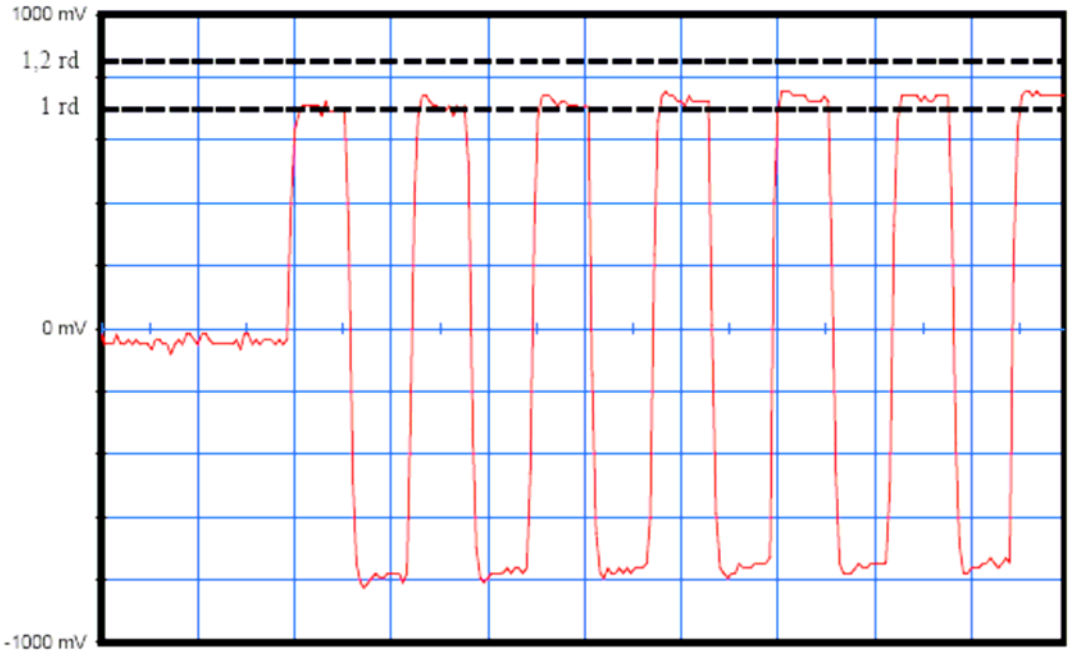
Message

Message received		FFFE2F8E3E2293E02B8036AFFAF78E0159E3	
Format Flag	25	1	
Protocol flag	26	0	
Ident./Position code	27-85	0	
Country Code/Country	27-36	227 / FRANCE	
Protocol Code : U/Std-Nat	37-39/37-40	1110	
Protocol Code Used	37-39/37-40	Test-Standard Location	
Identification Data	40-85/41-64/41-58		
Identification Used		0	
Calculated BCH1	25-85	1ABFEB	
Encoded BCH1	86-106	1ABFEB	
Homing	112	1	
Em.cod/nat.use/supp.data	107-112	110111	
Encod pos data	111	1	Internal
Fixed Data "1"	108	1	OK
Calculated BCH2	107-132	9E3	
Encoded BCH2	133-144	9E3	
Latitude position		North 43° 33' 32"	
Longitude position		East 1° 28' 40"	
Delta position	< 0,5 km	0,076 km	

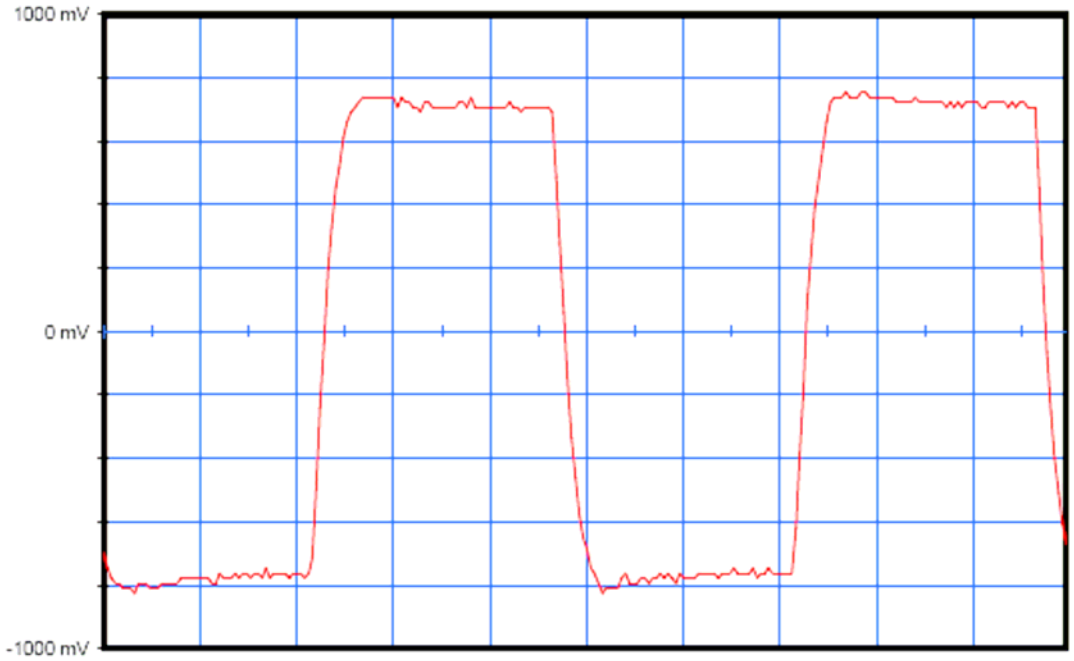
Electrical and other parameters

CW preamble	ms 158,4 <	< 161,6	160,37
Total transmission time	ms 514,8 <	<525,2	519,62
Modulation frequency	Hz 396<	< 404	401,48
Phase deviation : total	rd	<=2,40	2,16
Phase deviation : positive	rd 1,00 <	< 1,20	1,08
Phase deviation : negative	rd -1,20 <	< -1,00	-1,08
Symmetry measurement	%	<=5 %	0,40
Nominal frequency : F2	Hz		406027834,05
Short term2			1,59E-10
Short term3			6,37E-11
Slope			-6,26E-11
Residual			2,80E-10
406 MHz power output	dBm		36,8
Homing frequency	MHz		121,5017
121,5 MHz power output	dBm		18,9
Soak temperature	°C		21,1
Extra feature			No
First Burst Delay	> 47,5 sec		> 50 sec

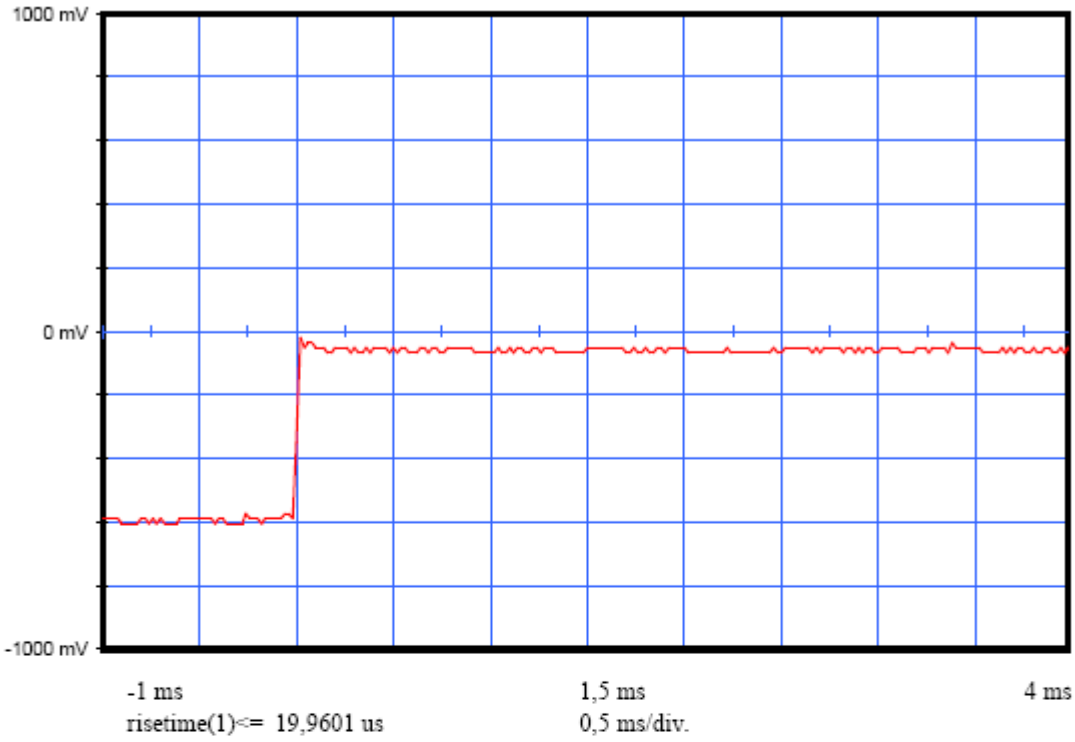


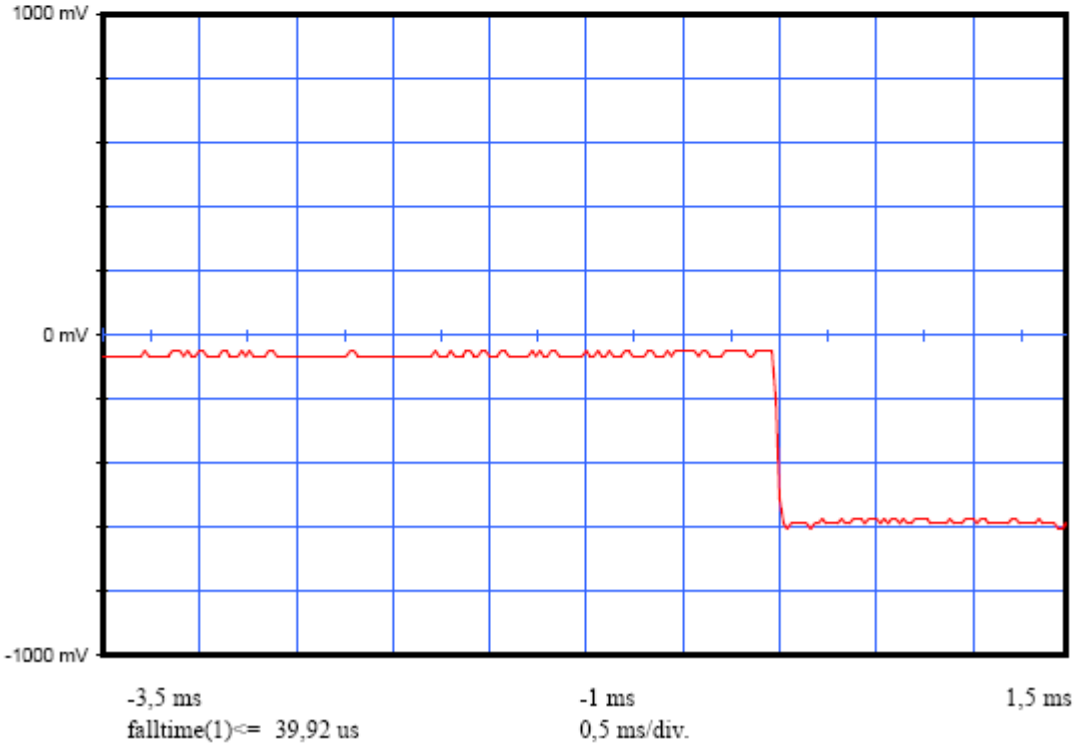


0 ms 10 ms 20 ms
Vmarker1 850 mv ==> 1,2 rd
Vmarker2 700 mv ==> 1 rd
2 ms/div.



8 ms 10,5 ms 13 ms
Duty Cycle : 0,004016064
0,5 ms/div.
falltime(1)<= 139,721 us
risetime(1)<= 149,7 us
+width(1) 1,23752 ms
-widht(1) 1,2475 ms


1000 mV
0 mV
-1000 mV
-1 ms
1,5 ms
4 ms
risetime(1)<= 19,9601 us
0,5 ms/div.


1000 mV
0 mV
-1000 mV
-3,5 ms
-1 ms
1,5 ms
falltime(1)<= 39,92 us
0,5 ms/div.

Certification Test at 55°C Date of test : 12-oct-2007

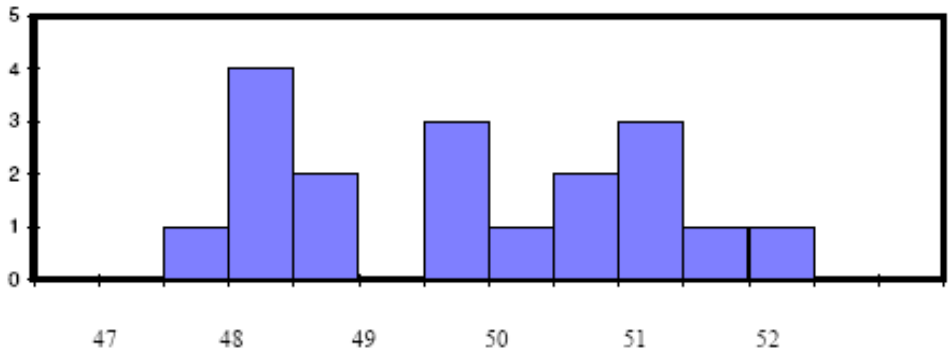
Manufacturer : MARTEC / KANNAD
Beacon Type : XS3-GPS
Number : UT1

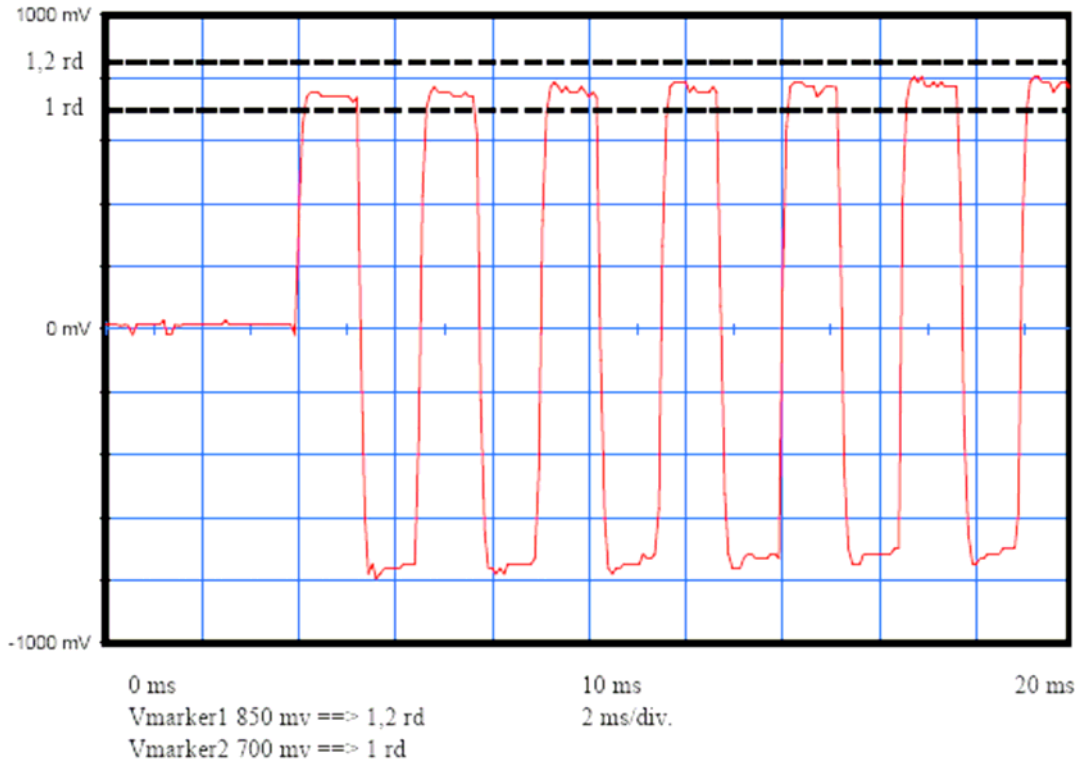
Message

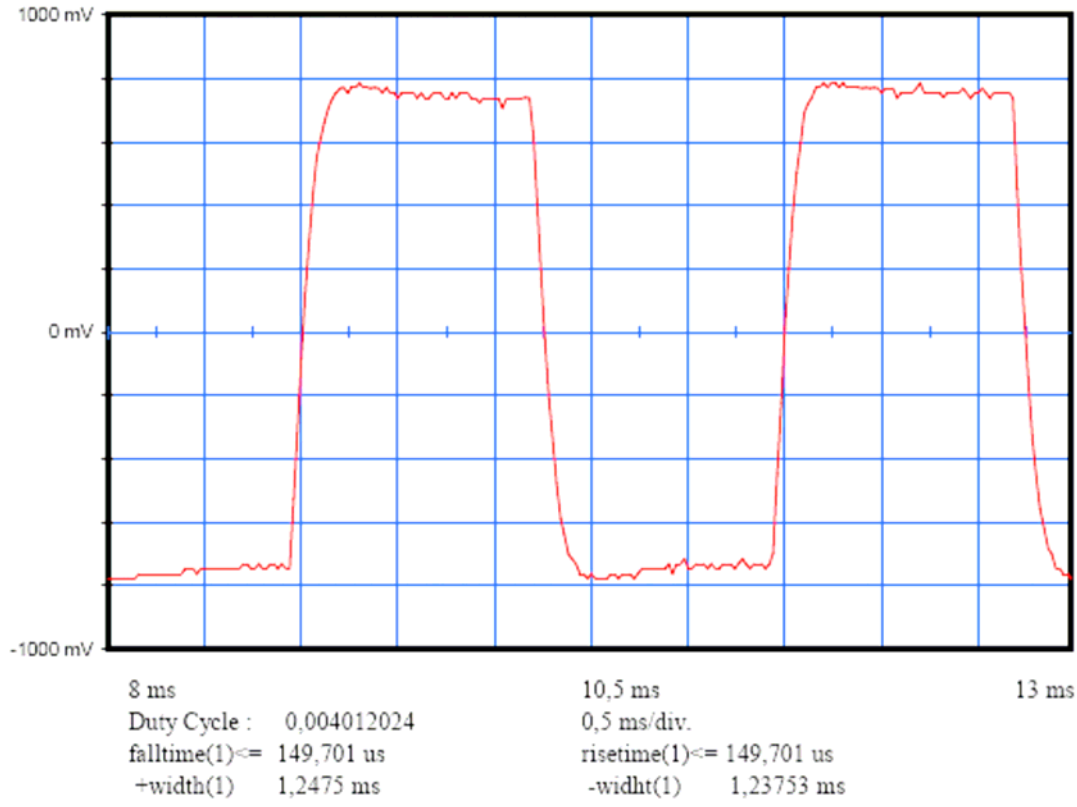
Message received		FFFE2F8E3E2293E02B8036AFFAF78E014CDA	
Format Flag	25	1	
Protocol flag	26	0	
Ident./Position code	27-85	0	
Country Code/Country	27-36	227 / FRANCE	
Protocol Code : U/Std-Nat	37-39/37-40	1110	
Protocol Code Used	37-39/37-40	Test-Standard Location	
Identification Data	40-85/41-64/41-58		
Identification Used		0	
Calculated BCH1	25-85	1ABFEB	
Encoded BCH1	86-106	1ABFEB	
Homing	112	1	
Em.cod/nat.use/supp.data	107-112	110111	
Encod pos data	111	1	Internal
Fixed Data "1"	108	1	OK
Calculated BCH2	107-132	CDA	
Encoded BCH2	133-144	CDA	
Latitude position		North 43° 33' 32"	
Longitude position		East 1° 28' 44"	
Delta position	< 0,5 km	0,076 km	

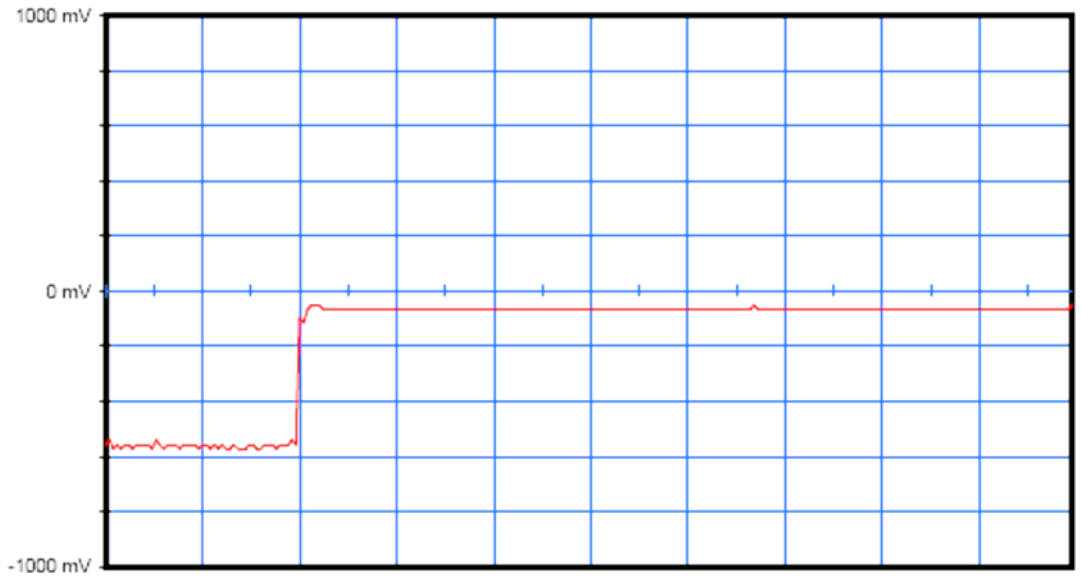
Electrical and other parameters

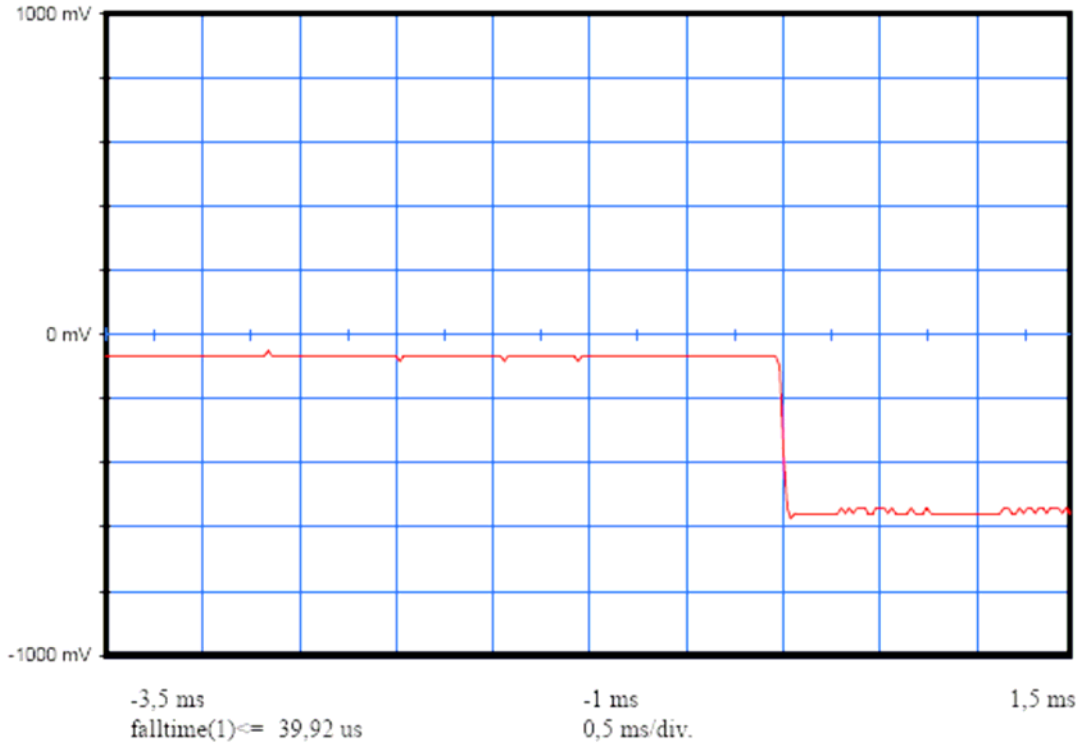
CW preamble	ms 158,4 <	< 161,6	160,33
Total transmission time	ms 514,8 <	<525,2	519,16
Modulation frequency	Hz 396<	< 404	401,86
Phase deviation : total	rd	<=2,40	2,15
Phase deviation : positive	rd 1,00 <	< 1,20	1,09
Phase deviation : negative	rd -1,20 <	< -1,00	-1,06
Symmetry measurement	%	<=5 %	0,40
Nominal frequency : F2	Hz		406027804,93
Short term2			8,86E-11
Short term3			8,98E-11
Slope			-1,43E-10
Residual			1,20E-09
406 MHz power output	dBm		35,6
Homing frequency	MHz		121,5008
121,5 MHz power output	dBm		18,5
Soak temperature	°C		55,2
Extra feature			No
First Burst Delay	> 47,5 sec		> 50 sec




1000 mV
1,2 rd
1 rd
0 mV
-1000 mV
0 ms
10 ms
20 ms
Vmarker1 850 mv ==> 1,2 rd
2 ms/div.
Vmarker2 700 mv ==> 1 rd

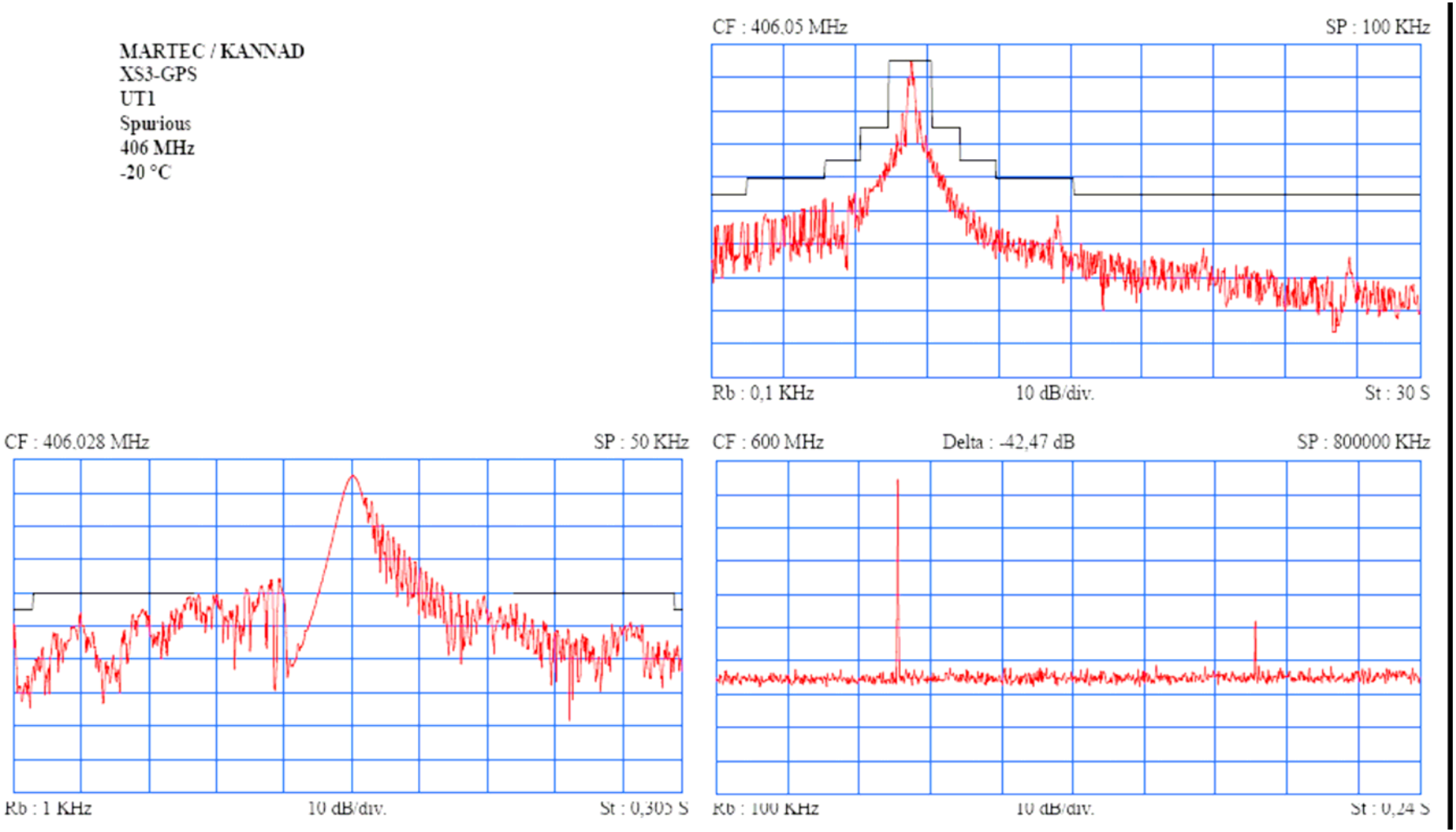

1000 mV
0 mV
-1000 mV
8 ms
10,5 ms
13 ms
Duty Cycle : 0,004012024
0,5 ms/div.
falltime(1)<= 149,701 us
risetime(1)<= 149,701 us
+width(1) 1,2475 ms
-widht(1) 1,23753 ms


1000 mV
0 mV
-1000 mV
-1 ms
1,5 ms
4 ms
risetime(1)<= 9,98017 us
0,5 ms/div.

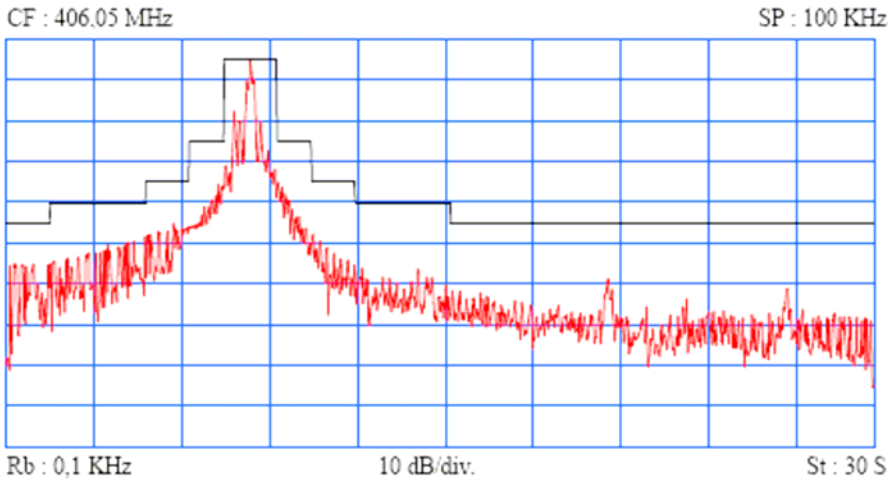

1000 mV
0 mV
-1000 mV
-3,5 ms
-1 ms
1,5 ms
falltime(1)<= 39,92 us
0,5 ms/div.

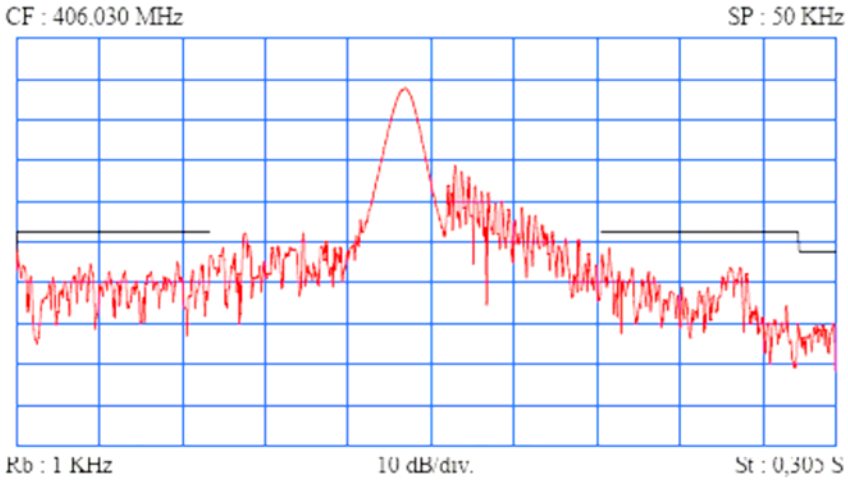
SPURIOUS EMISSIONS RESULTS
MARTEC / KANNAD
XS3-GPS
N° UT1
at -20° C, 22° C and 55° C

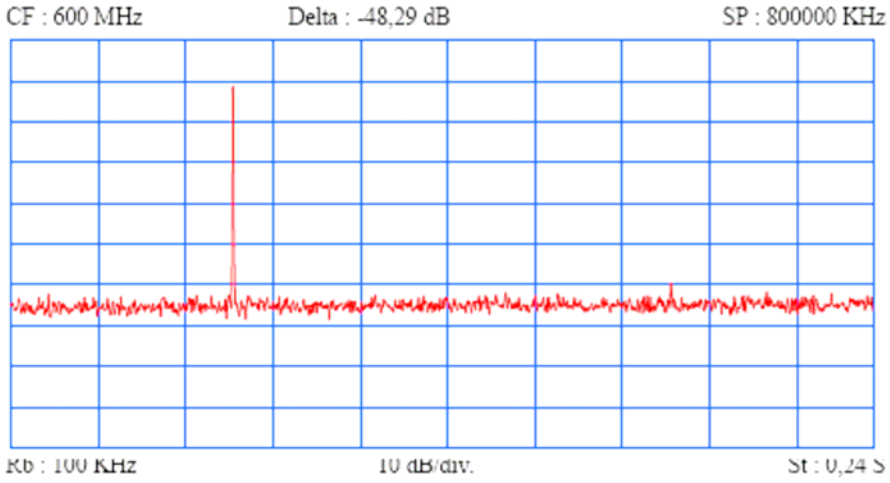
MARTEC / KANNAD
XS3-GPS
UT1
Spurious
406 MHz
-20 °C



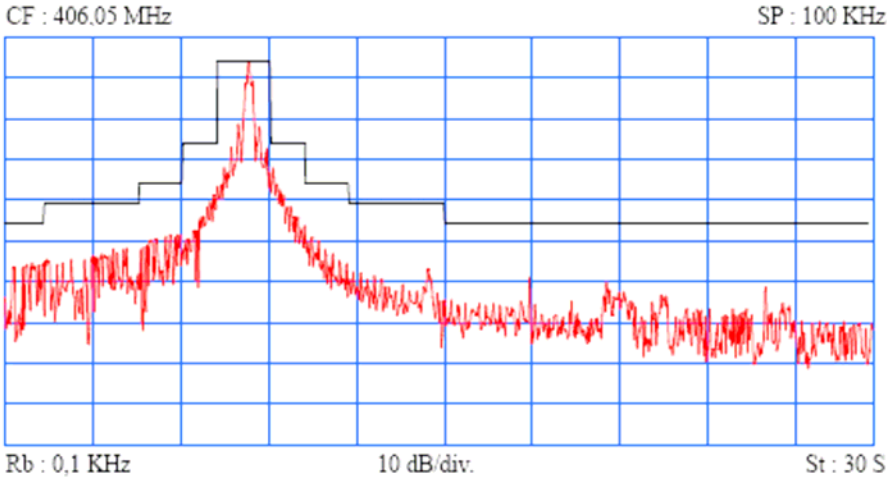
MARTEC / KANNAD
XS3-GPS
UT1
Spurious
406 MHz
22 °C

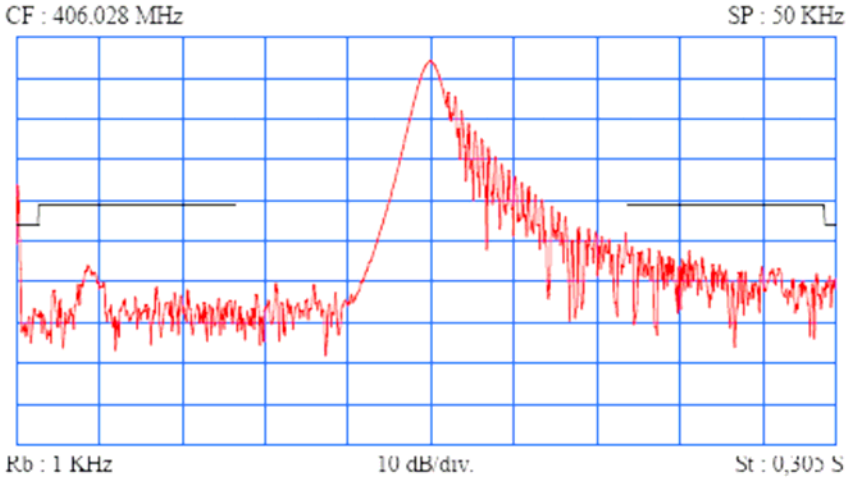


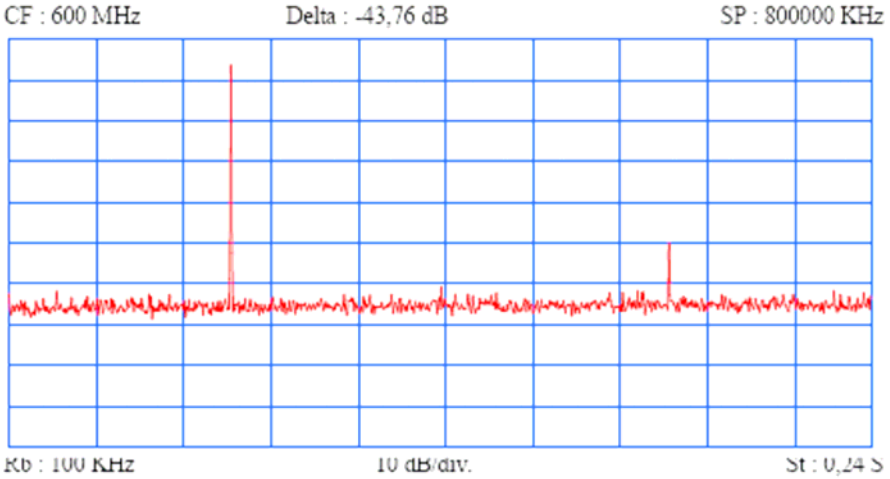




MARTEC / KANNAD
XS3-GPS
UT1
Spurious
406 MHz
55 °C







406 MHz VSWR 3:1 TEST RESULTS ON
MARTEC / KANNAD
XS3-GPS
N° UT1
at -20° C, 22° C and 55° C

Certification Test VSWR at -20°C Date of test : 17-oct-07

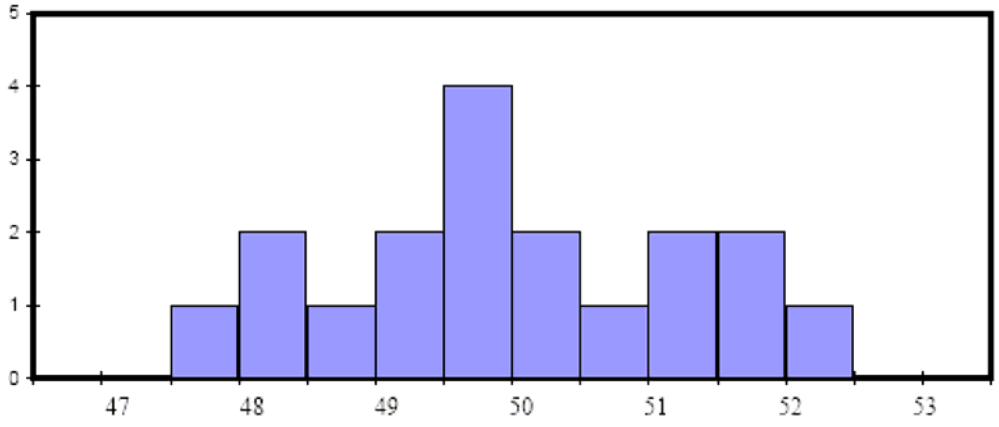
Manufacturer : MARTEC / KANNAD
Beacon Type : XS3-GPS
Number : UT1

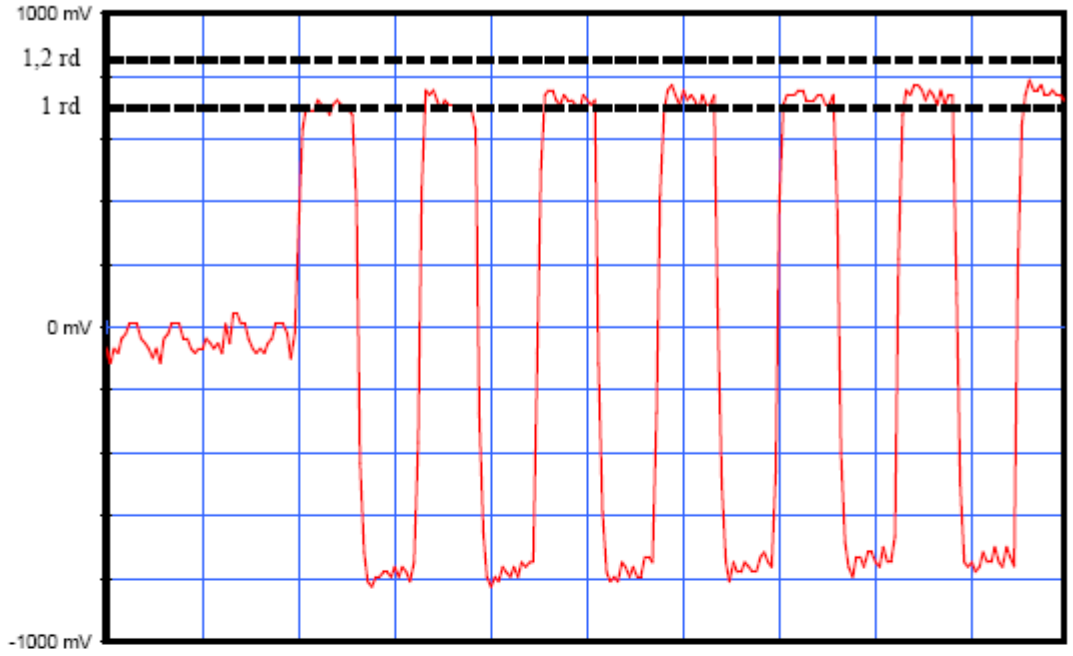
Message

Message received		FFFE2F8E3E2293E02B8036AFFAF78E4154C9
Format Flag	25	1
Protocol flag	26	0
Ident./Position code	27-85	0
Country Code/Country	27-36	227 / FRANCE
Protocol Code : U/Std-Nat	37-39/37-40	1110
Protocol Code Used	37-39/37-40	Test-Standard Location
Identification Data	40-85/41-64/41-58	
Identification Used		0
Calculated BCH1	25-85	1ABFEB
Encoded BCH1	86-106	1ABFEB
Homing	112	1
Em.cod/nat.use/supp.data	107-112	110111
Encod pos data	111	1 Internal
Fixed Data "1"	108	1
Calculated BCH2	107-132	4C9
Encoded BCH2	147-144	4C9
Latitude position		North 43° 33' 36"
Longitude position		East 1° 28' 40"
Delta position	< 0,5 km	0,076 km

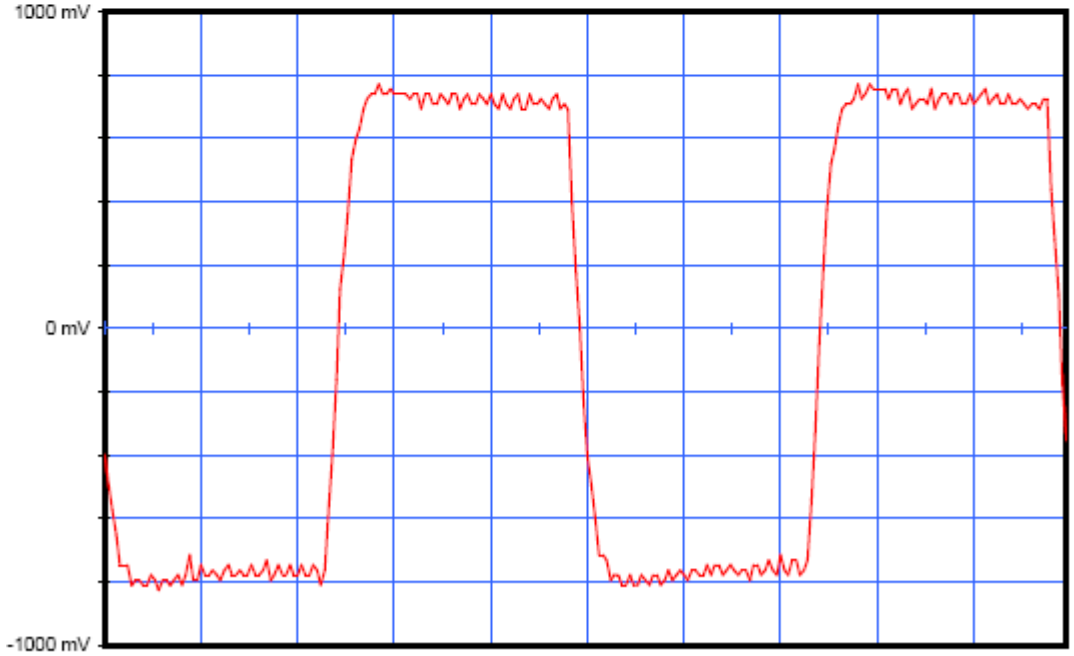
Electrical and other parameters

Rise time Modulation	ms			0,1497
Fall time Modulation	ms			0,1497
Phase deviation :positive	rd	1,00 <	< 1,20	1,08
Phase deviation : negative	rd	-1,20 <	< -1,00	-1,09
Symmetry measurement	%		<=5 %	0,40
Nominal frequency : F2	Hz			406027859,83





Vmarker1 850 mv ==> 1,2 rd 2 ms/div.
Vmarker2 700 mv ==> 1 rd



Duty Cycle : 0,004020072 0,5 ms/div.
falltime(1)<= 149,701 us risetime(1)<= 149,7 us
+width(1) 1,24751 ms -widht(1) 1,23752 ms

Certification Test VSWR at 22°C Date of test : 17 oct 2007

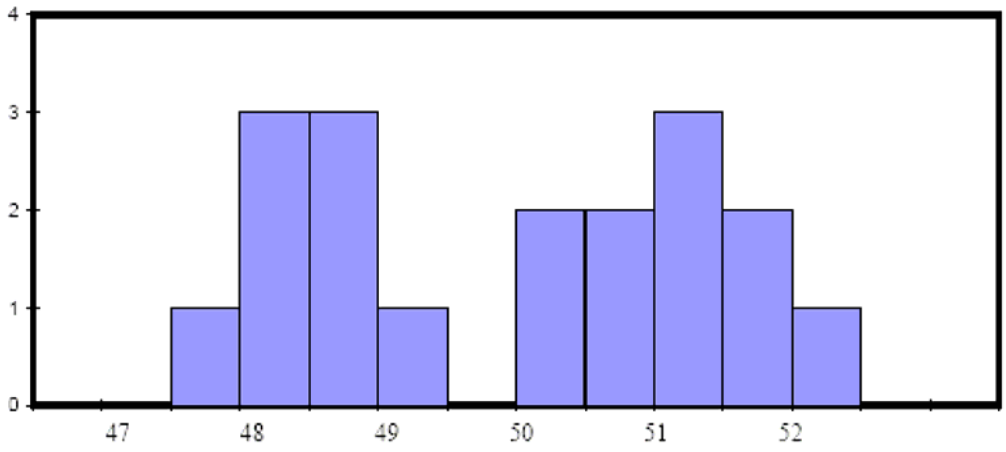
Manufacturer : MARTEC / KANNAD
Beacon Type : XS3-GPS
Number : UT1

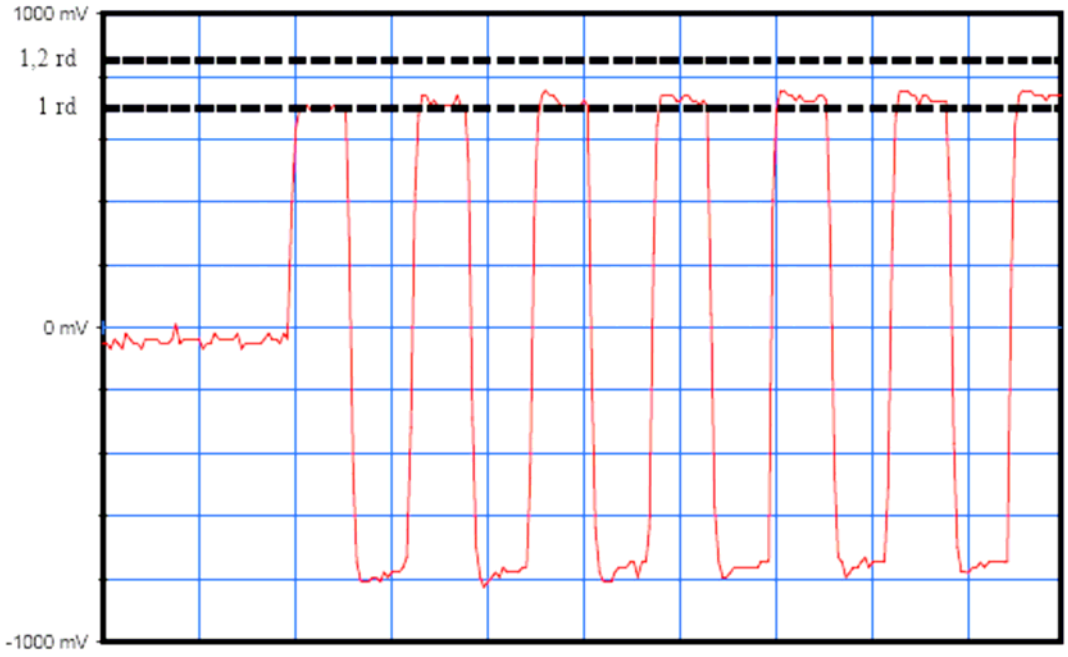
Message

Message received		FFFE2F8E3E2293E02B8036AFFAF78E014CDA
Format Flag	25	1
Protocol flag	26	0
Ident./Position code	27-85	0
Country Code/Country	27-36	227 / FRANCE
Protocol Code : U/Std-Nat	37-39/37-40	1110
Protocol Code Used	37-39/37-40	Test-Standard Location
Identification Data	40-85/41-64/41-5	
Identification Used		0
Calculated BCH1	25-85	1ABFEB
Encoded BCH1	86-106	1ABFEB
Homing	112	1
Em.cod/nat.use/supp.data	107-112	110111
Encod pos data	111	1 Internal
Fixed Data "1"	108	1
Calculated BCH2	107-132	CDA
Encoded BCH2	147-144	CDA
Latitude position		North 43° 33' 32"
Longitude position		East 1° 28' 44"
Delta position	< 0,5 km	0,076 km

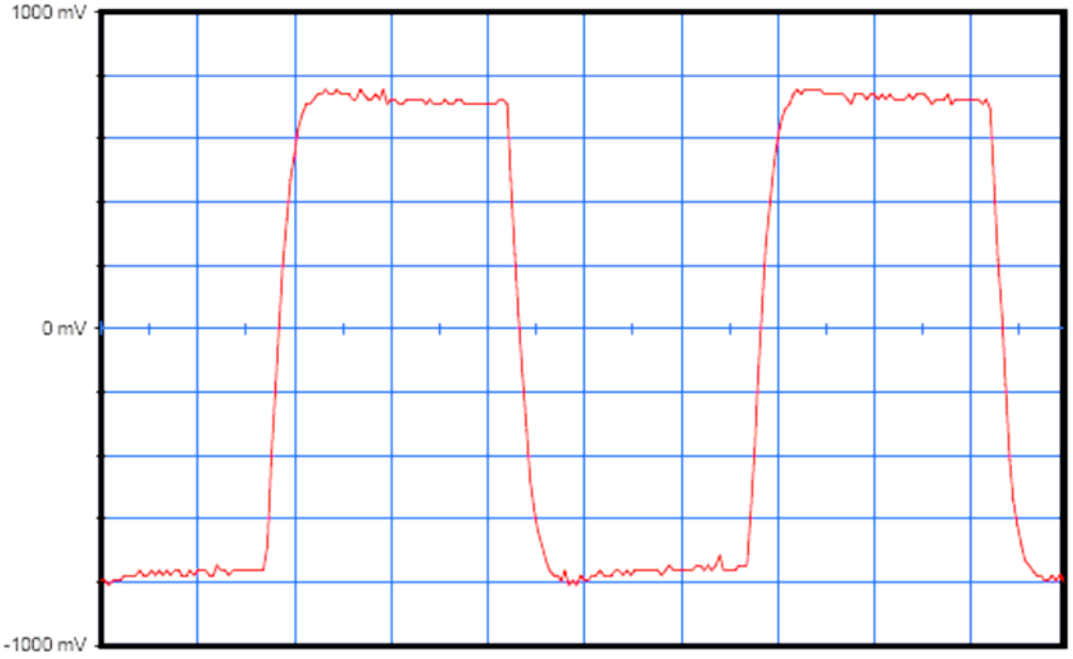
Electrical and other parameters

Rise time Modulation	ms			0,1497
Fall time Modulation	ms			0,1497
Phase deviation :positive	rd	1,00 <	< 1,20	1,09
Phase deviation : negative	rd	-1,20 <	< -1,00	-1,07
Symmetry measurement	%		<=5 %	0,40
Nominal frequency : F2	Hz			406027831,40





Vmarker1 850 mv ==> 1,2 rd 2 ms/div.
Vmarker2 700 mv ==> 1 rd



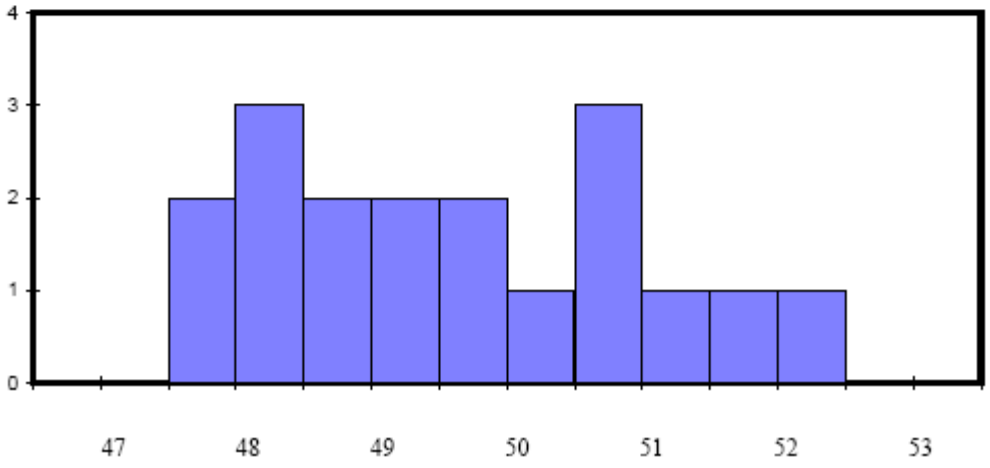
Duty Cycle : 0,004012024 0,5 ms/div.
falltime(1)<= 149,701 us risetime(1)<= 149,701 us
+width(1) 1,2475 ms -widht(1) 1,23753 ms

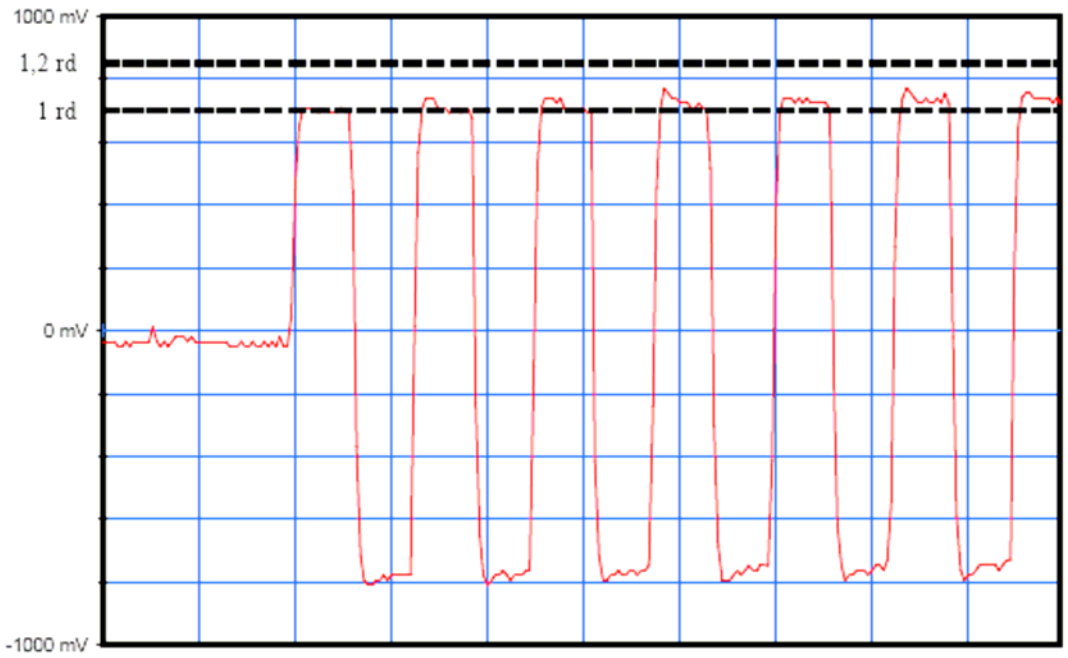
Message

Message received		FFFE2F8E3E2293E02B8036AFFAF78E4154C9
Format Flag	25	1
Protocol flag	26	0
Ident./Position code	27-85	0
Country Code/Country	27-36	227 / FRANCE
Protocol Code : U/Std-Nat	37-39/37-40	1110
Protocol Code Used	37-39/37-40	Test-Standard Location
Identification Data	40-85/41-64/41-58	
Identification Used		0
Calculated BCH1	25-85	1ABFEB
Encoded BCH1	86-106	1ABFEB
Homing	112	1
Em.cod/nat.use/supp.data	107-112	110111
Encod pos data	111	1 Internal
Fixed Data "1"	108	1
Calculated BCH2	107-132	4C9
Encoded BCH2	147-144	4C9
Latitude position		North 43° 33' 36"
Longitude position		East 1° 28' 40"
Delta position	< 0,5 km	0,076 km

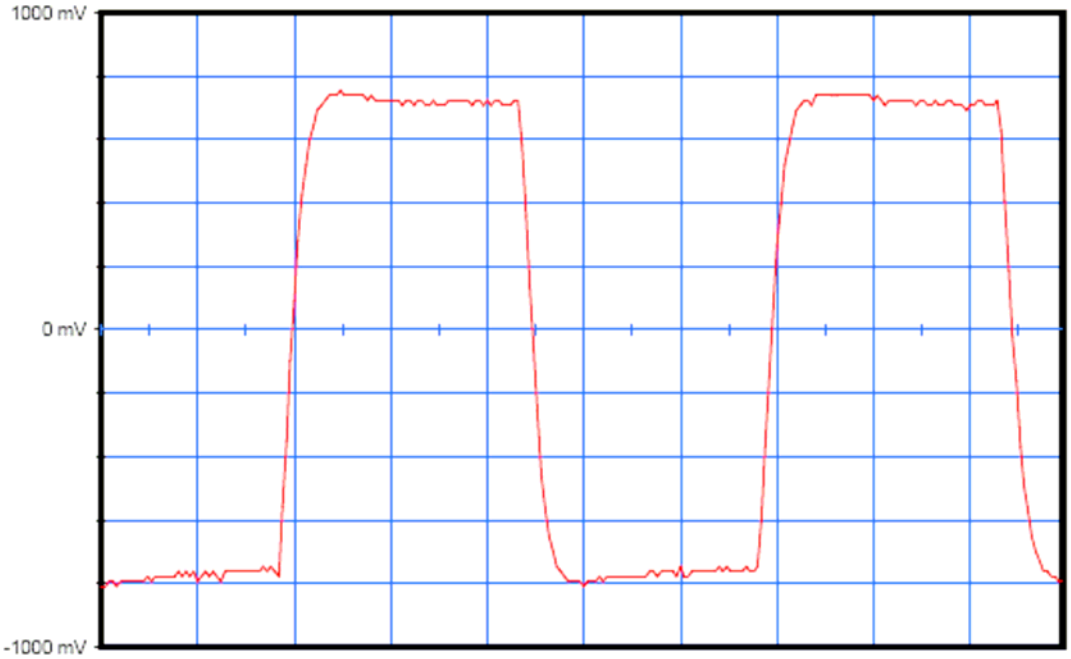
Electrical and other parameters

Rise time Modulation	ms			0,1497
Fall time Modulation	ms			0,1397
Phase deviation :positive	rd	1,00 <	< 1,20	1,08
Phase deviation : negative	rd	-1,20 <	< -1,00	-1,07
Symmetry measurement	%		<=5 %	0,81
Nominal frequency : F2	Hz			406027811,34





Vmarker1 850 mv ==> 1,2 rd 2 ms/div.
Vmarker2 700 mv ==> 1 rd



Duty Cycle : 0,008060443 0,5 ms/div.
falltime(1)<= 139,721 us risetime(1)<= 149,701 us
+width(1) 1,2475 ms -widht(1) 1,22755 ms

SELF-TEST MODE CONTROL ON
MARTEC / KANNAD
XS3-GPS
N° UT1
at 22° C

Message at -20°C

Manufacturer	MARTEC / KANNAD
Beacon model	XS3-GPS
Serial number	UT1
Date of test	13-sept-07
Temperature	-18,6
Message received	FFFED08E3E2293E07FDFFDF6D23783E0F66C
Frame synchro. pattern	011010000
15 Hex ID	1C7C4527C0FFBFF

Total transmission time	ms	514.8<	< 525.2	519,63

Message at 22°C

Manufacturer	MARTEC / KANNAD
Beacon model	XS3-GPS
Serial number	UT1
Date of test	26-sept-07
Temperature	22,9
Message received	FFFED08E3E2293E07FDFFDF6D23783E0F66C
Frame synchro. pattern	011010000
15 Hex ID	1C7C4527C0FFBFF

Total transmission time	ms	514.8<	<525.2	519,40

Message at 55 °C

Manufacturer	MARTEC / KANNAD
Beacon model	XS3-GPS
Serial number	UT1
Date of test	12-sept-07
Temperature	55,1
Message received	FFFED08E3E2293E07FDFFDF6D23783E0F66C
Frame synchro. pattern	011010000
15 Hex ID	1C7C4527C0FFBFF

Total transmission time	ms	514.8<	<525.2	519,16

Self Test message decode

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 227	27-36	0011100011
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	001000101001001111100000
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	10111110110110100 1000
BCH 1 Calculated:	N/A	10111110110110100 1000
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: 121.5 MHz homer	112	1
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	011001101100
BCH 2 Calculated:	N/A	011001101100
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	1C7C4527C0FFBFF

THERMAL SHOCK TEST RESULT
ON
MARTEC / KANNAD
XS3-GPS
N° UT1
23°C to -10°C

Temperature Soak : 23°C
Temperature Measure : -10°C

Warm Up	Δ Frequency (Hz)	Temp. (°C)	P406 (dBm)	P121.5 (dBm)
1	49845,93	20,8	36,2	0,0
2	49844,24	-10,4	36,2	18,1
3	49843,88	-11,5	36,2	18,1
4	49845,05	-10,9	36,2	18,1
5	49847,20	-10,6	36,2	18,2
6	49849,89	-10,5	36,2	18,2
7	49852,82	-10,6	36,2	18,2
8	49855,80	-10,7	36,2	18,3
9	49858,52	-10,5	36,2	18,3
10	49861,18	-10,6	36,2	18,3
11	49863,42	-10,7	36,2	18,3
12	49865,30	-10,7	36,2	18,4
13	49866,88	-10,7	36,3	18,4
14	49868,27	-10,7	36,3	18,4
15	49869,43	-10,6	36,3	18,4
16	49870,22	-10,6	36,3	18,4
17	49870,93	-10,6	36,3	18,5
18	49871,52	-10,6	36,3	18,5

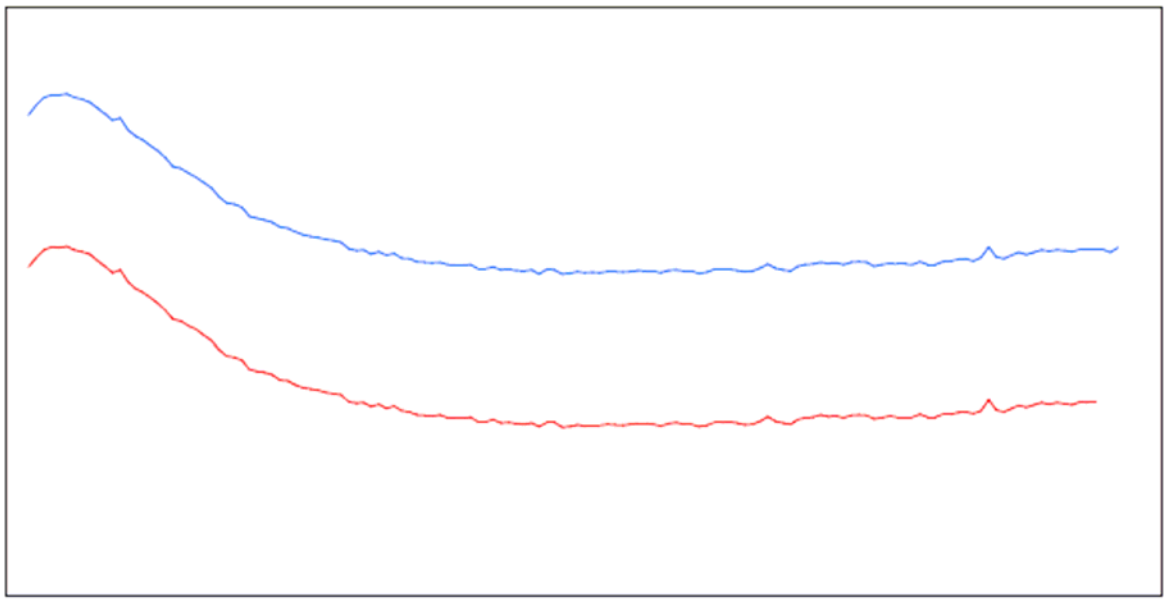
No	Temp.	Slope	Sigma	P406	Short term	P121.5
1	-10,6	5,6E-9	4,9E-9	36,2	7,6E-11	18,5
18	-10,8	-2,3E-10	6,3E-10	36,3	6,4E-11	18,6
31	-10,7	-4,1E-10	1,2E-10	36,3	7,8E-11	18,7
61	-10,8	-8,7E-11	9,7E-11	34,4	6,3E-11	18,7
91	-10,7	6,0E-12	6,5E-11	36,4	5,6E-11	18,7
121	-10,8	-1,1E-12	8,2E-11	36,4	8,1E-11	18,7

Samples of beacon message during the Thermal Shock Test :

Hex message	Message decode
FFFE2F8E3E2293E02B8036AFFAF78E014CDA	See operating Life test results
FFFE2F8E3E2293E02B8036AFFAF78E0159E3	""
FFFE2F8E3E2293E02B8036AFFAF78E4141F0	""

Frequency variation

406027879



406027865

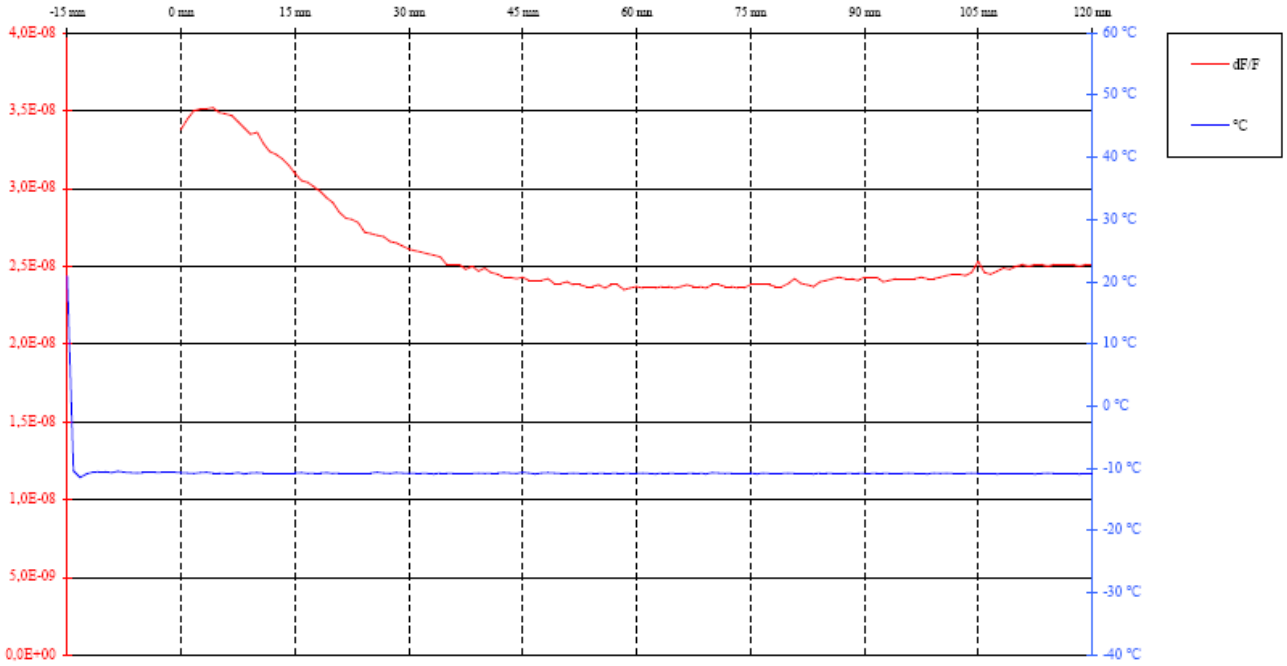
Initial tracing — Smoothed tracing

THERMAL SHOCK TEST / 30 °C change (23 °C to -10 ° C)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 11/10/2007
Time : 14:29:21

FREQUENCY VARIATION

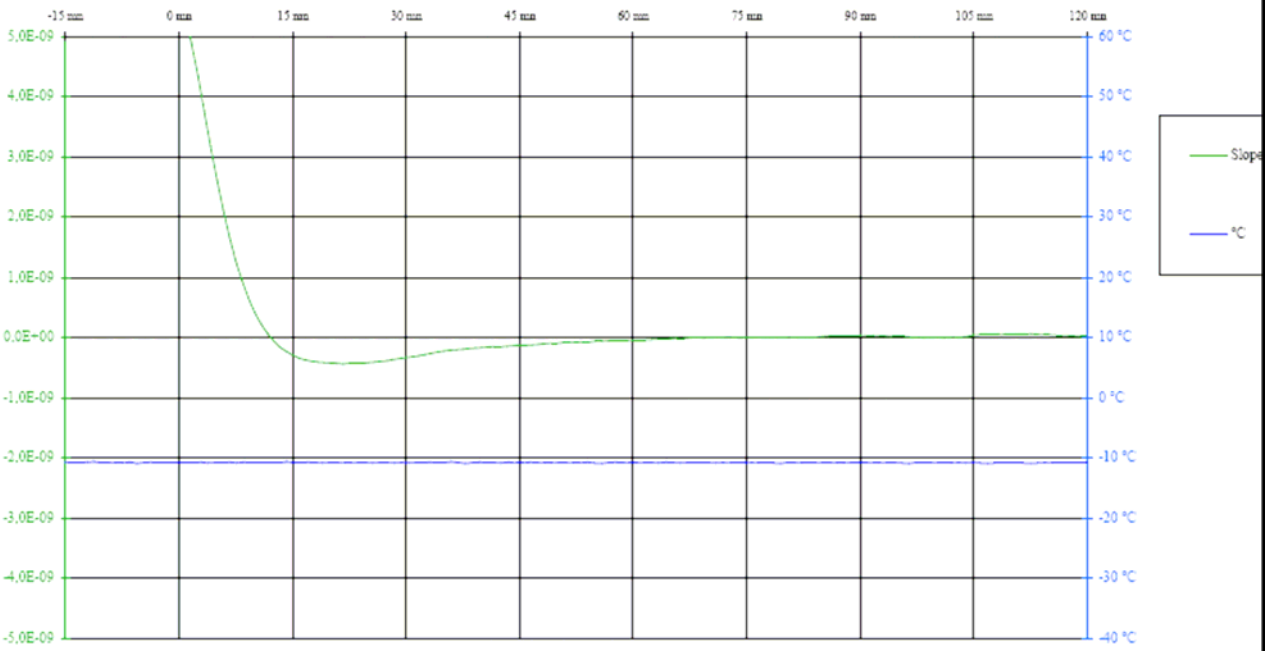


THERMAL SHOCK TEST / 30 °C change (23 °C to -10 ° C)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 11/10/2007
Time : 14:29:21

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

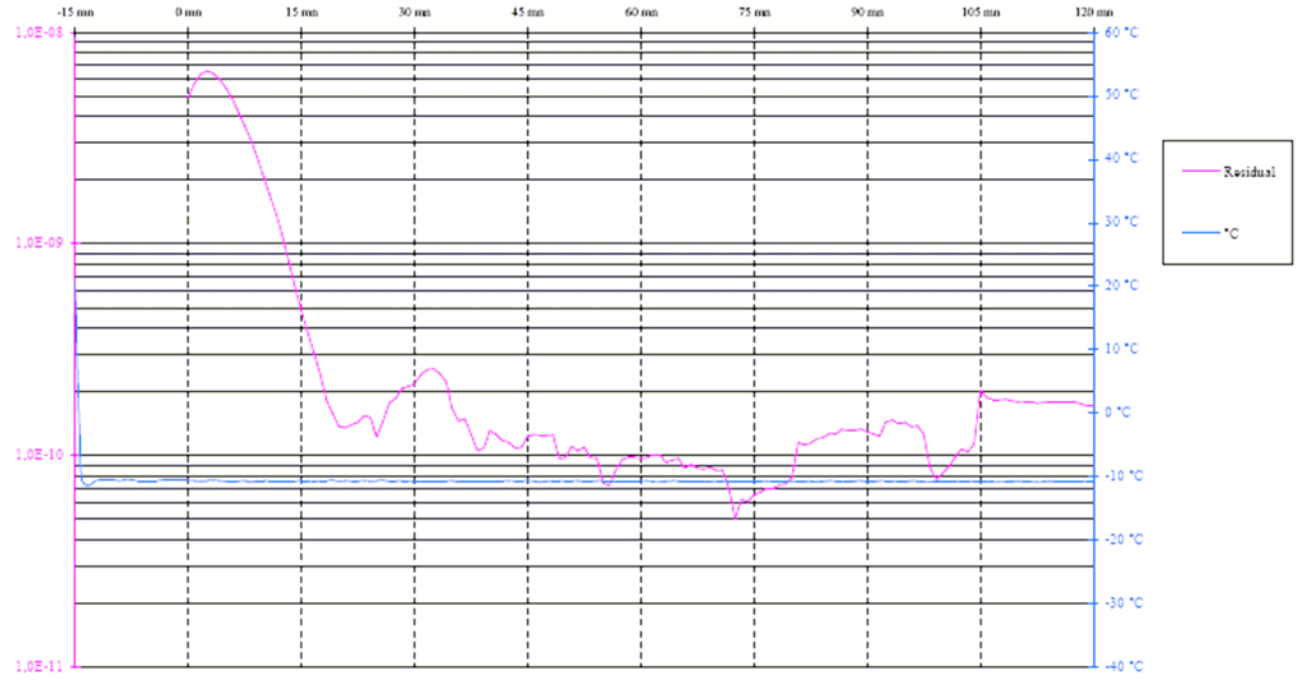


THERMAL SHOCK TEST / 30 °C change (23 °C to -10 ° C)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 11/10/2007
Time : 14:29:21

MEDIUM TERM STABILITY : RESIDUAL (≤ 3,0E-9)

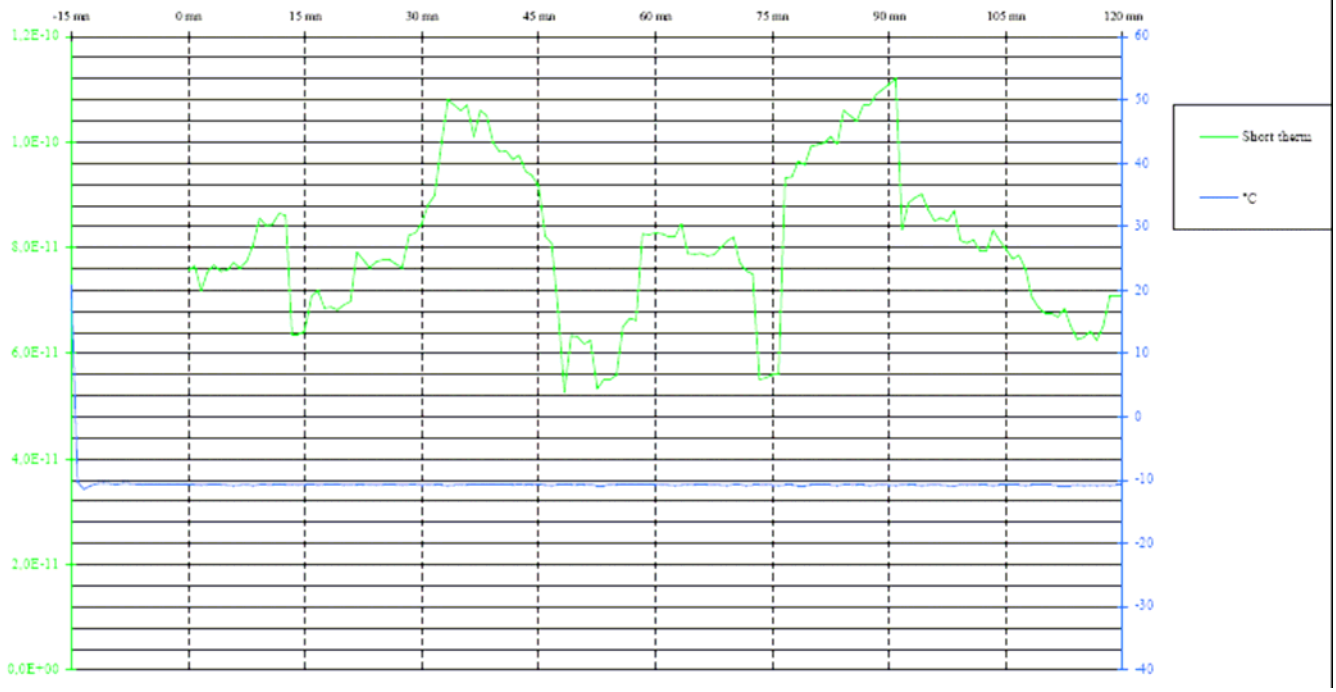


THERMAL SHOCK TEST / 30 °C change (23 °C to -10 ° C)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 11/10/2007
Time : 14:29:21

SHORT TERM STABILITY /100 mS (≤ 2,0E-9)

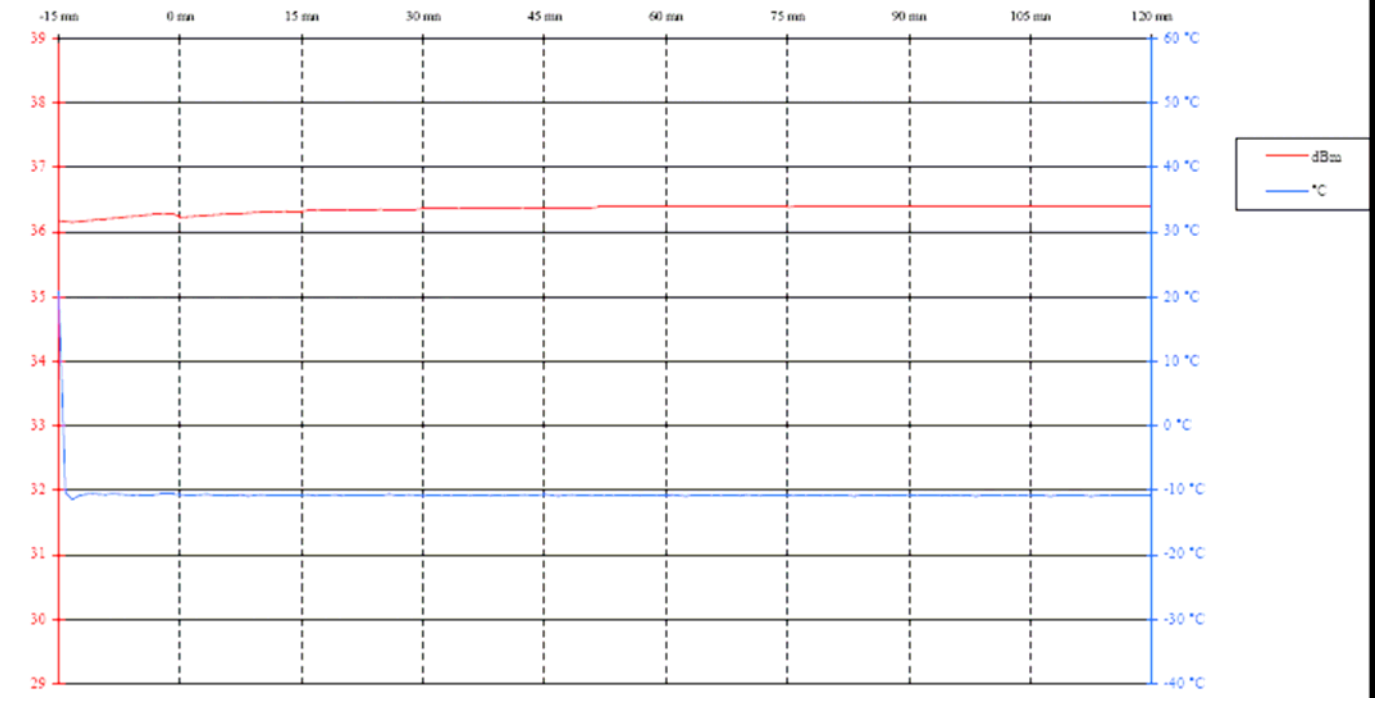


THERMAL SHOCK TEST / 30 °C change (23 °C to -10 ° C)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 11/10/2007
Time : 14:29:21

OUTPUT POWER (35 to 39 dBm)



OPERATING LIFE TEST RESULTS
ON
MARTEC / KANNAD
XS3-GPS
N° UT1
-20 °C

Note : Prior to the Operating Life Test and following manufacturer note : "Batteries Discharge Calculation " (Appendix A) the battery pack capacity has been reduced by test laboratory during **3,74 hours**

The operating lifetime obtained is 28 hours with 36 dBm output power

Warm Up	Δ Frequency (Hz)	Temp. (°C)	P406 (dBm)	P121.5 (dBm)
1	49879,08	-20,7	36,5	0,0
2	49875,21	-20,8	36,5	0,0
3	49872,47	-20,6	36,5	19,1
4	49870,15	-20,6	36,5	19,1
5	49869,23	-20,5	36,5	19,1
6	49868,97	-20,8	36,5	19,1
7	49868,84	-20,5	36,5	19,1
8	49868,73	-20,7	36,5	19,1
9	49868,72	-20,7	36,5	19,1
10	49868,52	-20,7	36,5	19,1
11	49868,46	-20,6	36,5	19,1
12	49868,40	-20,7	36,5	19,1
13	49868,31	-20,7	36,5	19,1
14	49868,31	-20,7	36,5	19,1
15	49868,27	-20,7	36,5	19,1
16	49868,18	-20,5	36,5	19,1
17	49868,30	-20,6	36,5	19,1
18	49868,18	-20,7	36,5	19,1

No	Temp.	Slope	Sigma	P406	Short term	P121.5
1	-20,8	-7,0E-10	3,1E-09	36,5	1,7E-10	19,1
18	-20,7	-5,4E-11	1,9E-10	36,5	8,3E-11	19,1
31	-20,6	-1,1E-11	1,5E-10	36,5	7,3E-11	19,1
61	-20,6	2,2E-11	9,2E-11	36,5	7,3E-11	19,1
91	-20,7	-1,2E-11	1,1E-10	36,5	9,5E-11	19,1
121	-20,7	1,4E-11	1,1E-10	36,5	8,5E-11	19,1
151	-20,7	2,2E-11	8,2E-11	36,5	6,8E-11	19,1
181	-20,7	1,6E-11	9,0E-11	36,5	7,3E-11	19,1
211	-20,7	6,6E-12	2,0E-10	36,5	7,3E-11	19,1
241	-20,6	1,1E-11	1,3E-10	36,5	9,2E-11	19,1
271	-20,6	1,8E-11	1,6E-10	36,5	7,9E-11	19,1
301	-20,7	2,1E-11	1,2E-10	36,5	6,2E-11	19,1
331	-20,7	5,1E-11	1,7E-10	36,5	9,2E-11	19,1
361	-20,8	3,6E-12	1,6E-10	36,5	7,8E-11	19,1
391	-20,7	1,0E-11	2,4E-10	36,5	6,0E-11	19,1
421	-20,8	2,3E-11	1,9E-10	36,5	7,9E-11	19,1
451	-20,7	1,0E-11	1,3E-10	36,5	9,2E-11	19,1
481	-20,6	6,4E-14	1,7E-10	36,5	8,7E-11	19,1
511	-20,6	-7,3E-13	8,0E-11	36,5	6,4E-11	19,1
541	-20,7	-1,3E-11	1,5E-10	36,5	6,9E-11	19,1
571	-20,6	-1,1E-11	1,1E-10	36,5	1,1E-10	19,1
601	-20,8	1,2E-11	1,1E-10	36,5	8,3E-11	19,1
631	-20,6	2,0E-12	8,2E-11	36,5	8,8E-11	19,1
661	-20,8	4,9E-12	1,1E-10	36,5	5,9E-11	19,1
691	-20,8	7,4E-12	2,1E-10	36,5	7,9E-11	19,1
721	-20,7	3,8E-12	6,9E-11	36,5	7,6E-11	19,1
751	-20,7	4,1E-12	1,7E-10	36,5	9,2E-11	19,1
781	-20,7	-1,1E-11	2,2E-10	36,5	8,0E-11	19,1
811	-20,7	-1,7E-12	1,6E-10	36,5	6,2E-11	19,1
841	-20,7	1,4E-11	1,8E-10	36,5	7,1E-11	19,1

No	Temp.	Slope	Sigma	P406	Short term	P121.5	
871	-20,7	2,5E-11	1,9E-10	36,5	6,6E-11	19,1	
901	-20,6	-1,0E-11	8,6E-11	36,5	8,3E-11	19,1	
931	-20,7	7,3E-12	1,9E-10	36,5	7,6E-11	19,1	
961	-20,6	4,5E-12	2,2E-10	36,5	6,8E-11	19,1	
991	-20,6	2,1E-12	1,1E-10	36,5	8,1E-11	19,1	
1021	-20,7	-1,5E-12	9,4E-11	36,5	8,4E-11	19,1	
1051	-20,8	-6,7E-13	7,4E-11	36,5	6,4E-11	19,1	
1081	-20,7	-3,3E-12	1,0E-10	36,5	1,1E-10	19,1	
1111	-20,6	-5,6E-12	8,3E-11	36,5	7,1E-11	19,1	
1141	-20,7	8,6E-12	8,8E-11	36,5	7,2E-11	19,1	
1171	-20,7	-2,2E-11	1,2E-10	36,5	6,5E-11	19,1	
1201	-20,7	-2,2E-11	1,2E-10	36,5	7,3E-11	19,1	
1231	-20,7	-2,5E-12	9,0E-11	36,5	8,7E-11	19,1	
1261	-20,6	7,5E-12	1,1E-10	36,5	7,7E-11	19,1	
1291	-20,6	-5,8E-12	1,9E-10	36,5	8,2E-11	19,1	
1321	-20,6	1,4E-11	1,6E-10	36,5	7,7E-11	19,1	
1351	-20,6	-7,5E-12	9,7E-11	36,5	7,7E-11	19,1	
1381	-20,7	-5,6E-12	1,2E-10	36,5	7,5E-11	19,1	
1411	-20,7	1,3E-11	2,3E-10	36,5	9,8E-11	19,1	
1441	-20,7	1,7E-11	2,2E-10	36,5	7,6E-11	19,1	
1471	-20,7	5,0E-12	1,4E-10	36,5	1,1E-10	19,1	
1501	-20,6	1,1E-11	1,7E-10	36,5	9,3E-11	19,1	
1531	-20,6	1,4E-11	5,6E-11	36,5	8,4E-11	19,1	
1561	-20,8	3,3E-12	1,1E-10	36,5	8,0E-11	19,1	
1591	-20,7	4,0E-12	7,6E-11	36,5	1,1E-10	19,1	
1621	-20,6	2,9E-12	1,0E-10	36,5	8,6E-11	19,1	
1651	-20,8	1,4E-12	1,8E-10	36,5	9,0E-11	19,1	
1681	-20,7	-1,2E-11	6,1E-11	36,5	1,3E-10	19,1	
1711	-20,6	1,4E-11	1,5E-10	36,5	2,4E-10	19,1	
1741	-20,6	1,3E-12	2,0E-10	36,5	2,8E-10	19,1	24 h
1771	-20,7	1,5E-11	2,9E-10	36,5	3,3E-10	19,1	
1801	-20,6	-1,4E-11	2,2E-10	36,5	2,0E-10	19,1	
1831	-20,6	6,9E-13	2,1E-10	36,5	1,4E-10	19,1	
1861	-20,7	1,4E-11	2,0E-10	36,5	1,2E-10	19,1	
1891	-20,8	4,3E-12	1,8E-10	36,5	1,2E-10	19,1	
1921	-20,6	5,4E-12	1,4E-10	36,5	1,2E-10	19,1	
1951	-20,6	1,1E-11	8,7E-11	36,5	7,2E-11	19,1	
1981	-20,7	1,9E-11	1,5E-10	36,5	6,4E-10	19,1	
2011	-20,7	-1,9E-11	2,3E-10	36,5	1,7E-9	19,1	
2026	-20,7	-9,1E-10	2,8E-09	36,5	1,3E-9	19,1	28 h
2041	-20,6	1,1E-8	2,1E-08	35,9	6,2E-9	19,1	
2071	-20,6	2,7E-10	1,3E-09	34,5	3,0E-9	19,1	
2101	-20,7	3,4E-10	1,1E-09	34,0	2,7E-9	19,1	
2131	-20,6	1,1E-10	1,3E-09	33,4	1,9E-9	18,8	
2161	-20,7	1,5E-10	2,6E-10	32,9	1,5E-9	18,2	
2191	-20,7	-5,2E-10	4,1E-09	27,9	2,1E-9	12,2	

2221						

Sample beacon message during the Operating Lifetime Test :

FFFE2F8E3E2293E02B8036AFFAF78E4141F0

ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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: 16	**129-132**	**0100**
BCH 2 Encoded:	**133-144**	**000111110000**
BCH 2 Calculated:	**N/A**	**000111110000**
Composite Latitude: 43.559999999999995 Degrees North	**N/A**	**Composite Longitude: 1.478888888888889 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

FFFE2F8E3E2293E02B8036AFFAF78E014CDA

ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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**	**110011011010**
BCH 2 Calculated:	**N/A**	**110011011010**
Composite Latitude: 43.55888888888889 Degrees North	**N/A**	**Composite Longitude: 1.478888888888889 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

FFFE2F8E3E2293E02B8036AFFAF78E0159E3

ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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: 20	**129-132**	**0101**
BCH 2 Encoded:	**133-144**	**100111100011**
BCH 2 Calculated:	**N/A**	**100111100011**
Composite Latitude: 43.55888888888889 Degrees North	**N/A**	**Composite Longitude: 1.4777777777777778 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

FFFE2F8E3E2293E02B8036AFFAF78E412A5F

ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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: 8	**129-132**	**0010**
BCH 2 Encoded:	**133-144**	**101001011111**
BCH 2 Calculated:	**N/A**	**101001011111**
Composite Latitude: 43.559999999999995 Degrees North	**N/A**	**Composite Longitude: 1.4811111111111112 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

FFFE2F8E3E2293E02B8036AFFAF78E4154C9

ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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**	**010011001001**
BCH 2 Calculated:	**N/A**	**010011001001**
Composite Latitude: 43.559999999999995 Degrees North	**N/A**	**Composite Longitude: 1.4777777777777778 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

FFFE2F8E3E2293E02B8036AFFAF78E4141F0

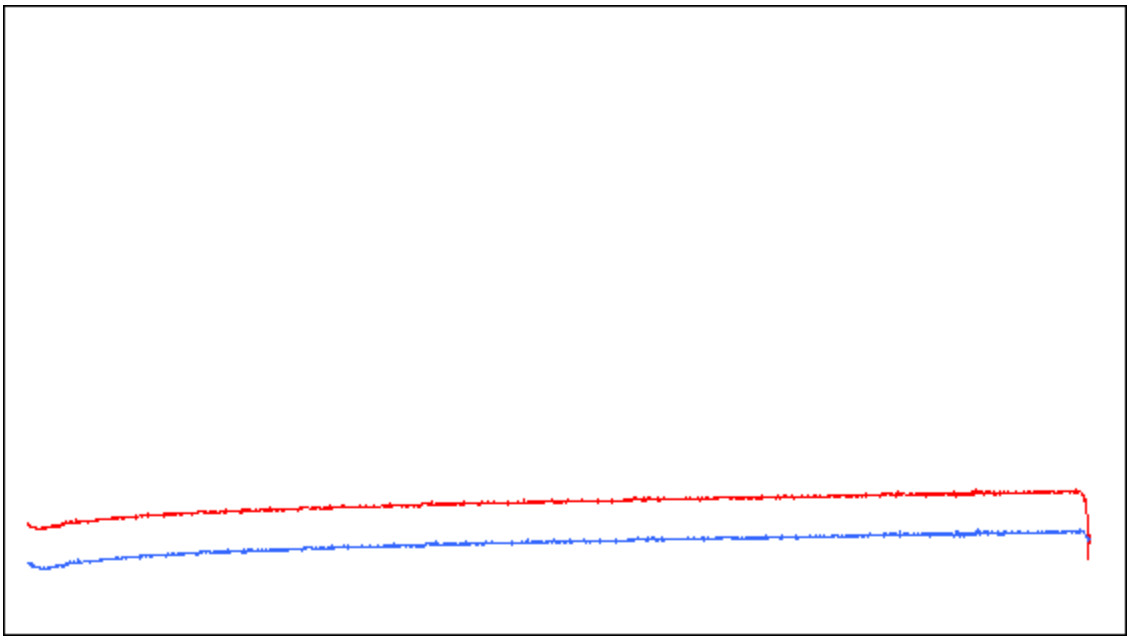
ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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: 16	**129-132**	**0100**
BCH 2 Encoded:	**133-144**	**000111110000**
BCH 2 Calculated:	**N/A**	**000111110000**
Composite Latitude: 43.559999999999995 Degrees North	**N/A**	**Composite Longitude: 1.478888888888889 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

FFFE2F8E3E2293E02B8036AFFAF78E416B82

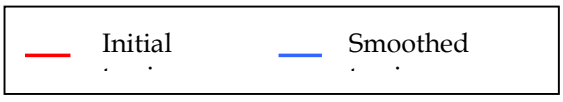
ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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: 24	**129-132**	**0110**
BCH 2 Encoded:	**133-144**	**101110000010**
BCH 2 Calculated:	**N/A**	**101110000010**
Composite Latitude: 43.559999999999995 Degrees North	**N/A**	**Composite Longitude: 1.4766666666666668 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

Frequency variation

406027,921 kHz



406027,864 kHz

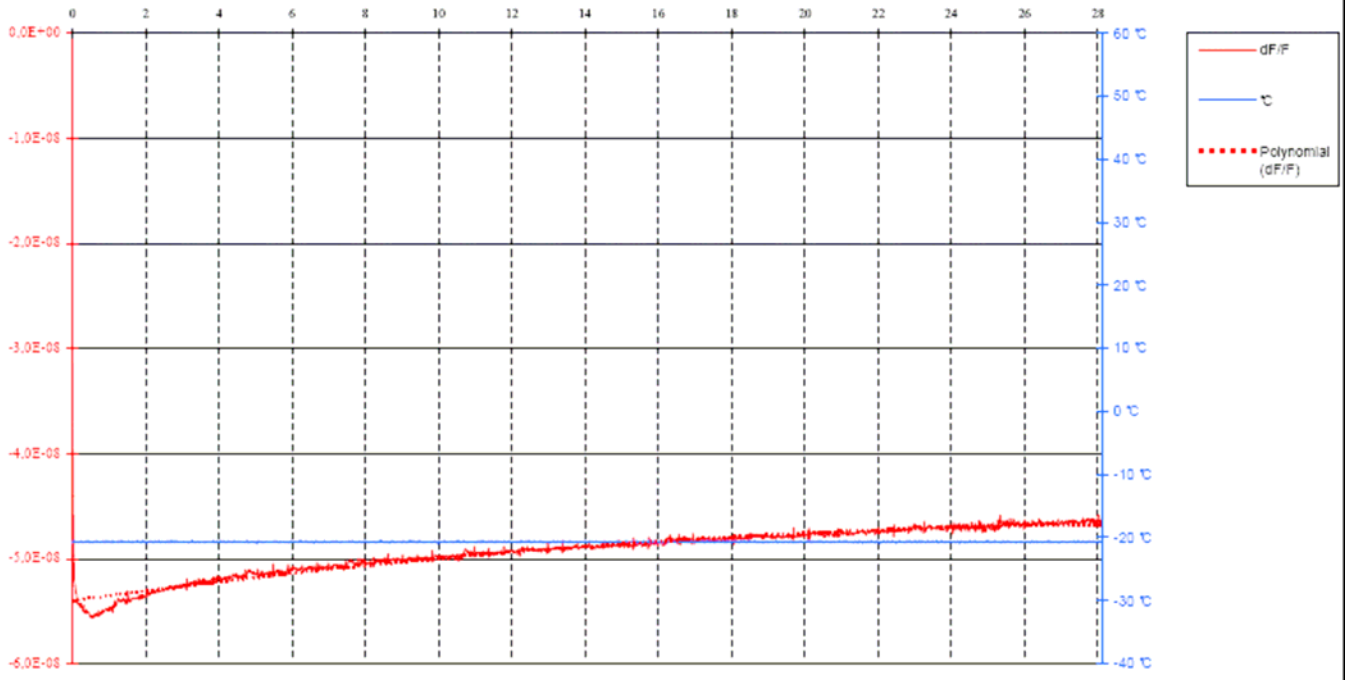


LIFE TEST AT -20 °C

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 2 Nov 2007
Time : 10:42:22

FREQUENCY VARIATION

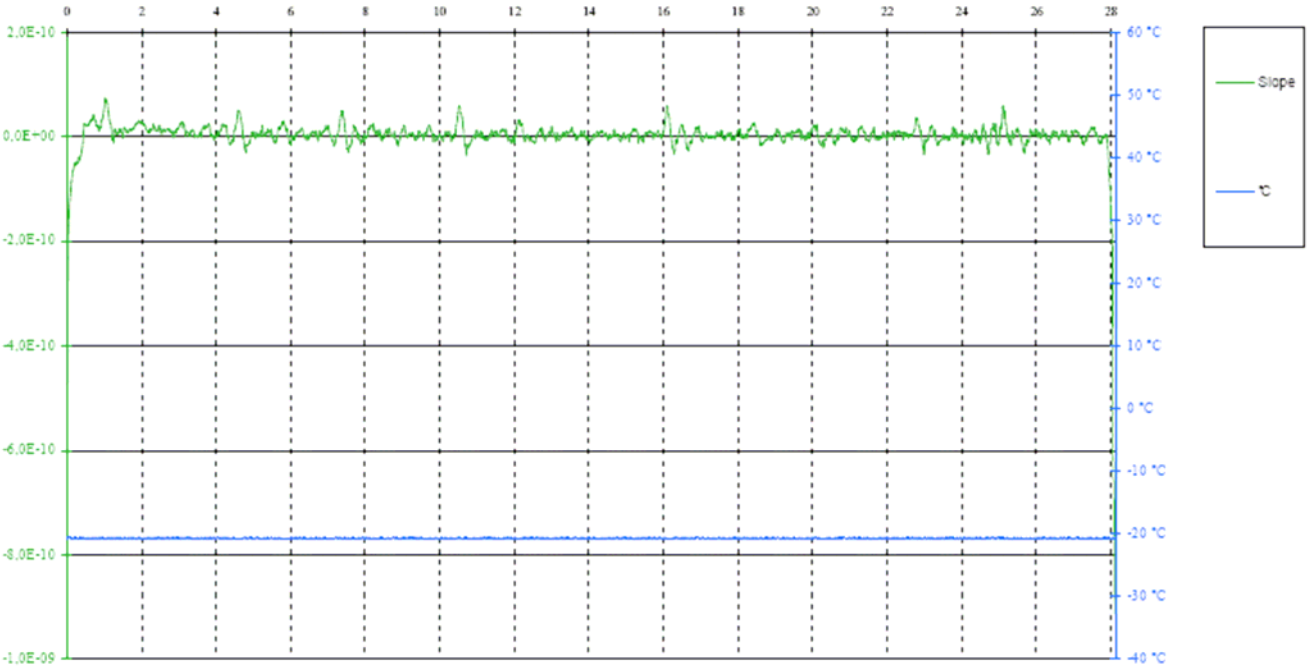


LIFE TEST AT -20 °C

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 2 Nov 2007
Time : 10:42:22

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

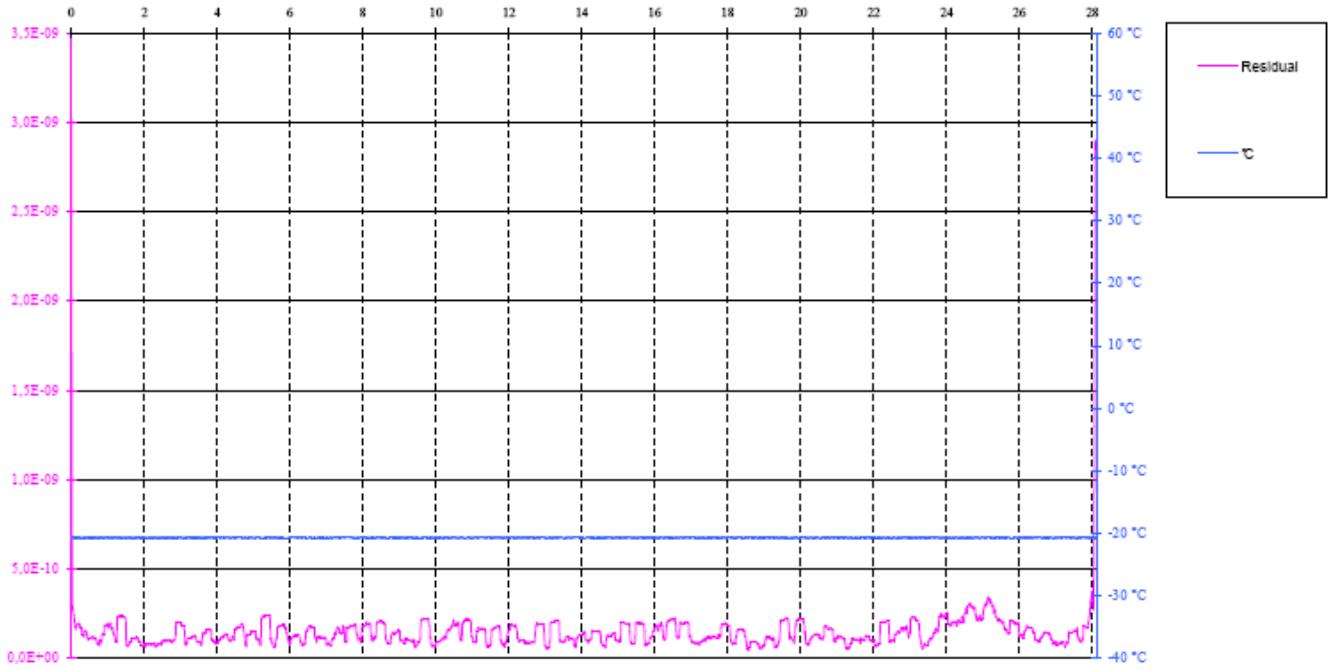


LIFE TEST AT -20 °C

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 2 Nov 2007
Time : 10:42:22

MEDIUM TERM STABILITY : RESIDUAL (≦ 3,0E-9)

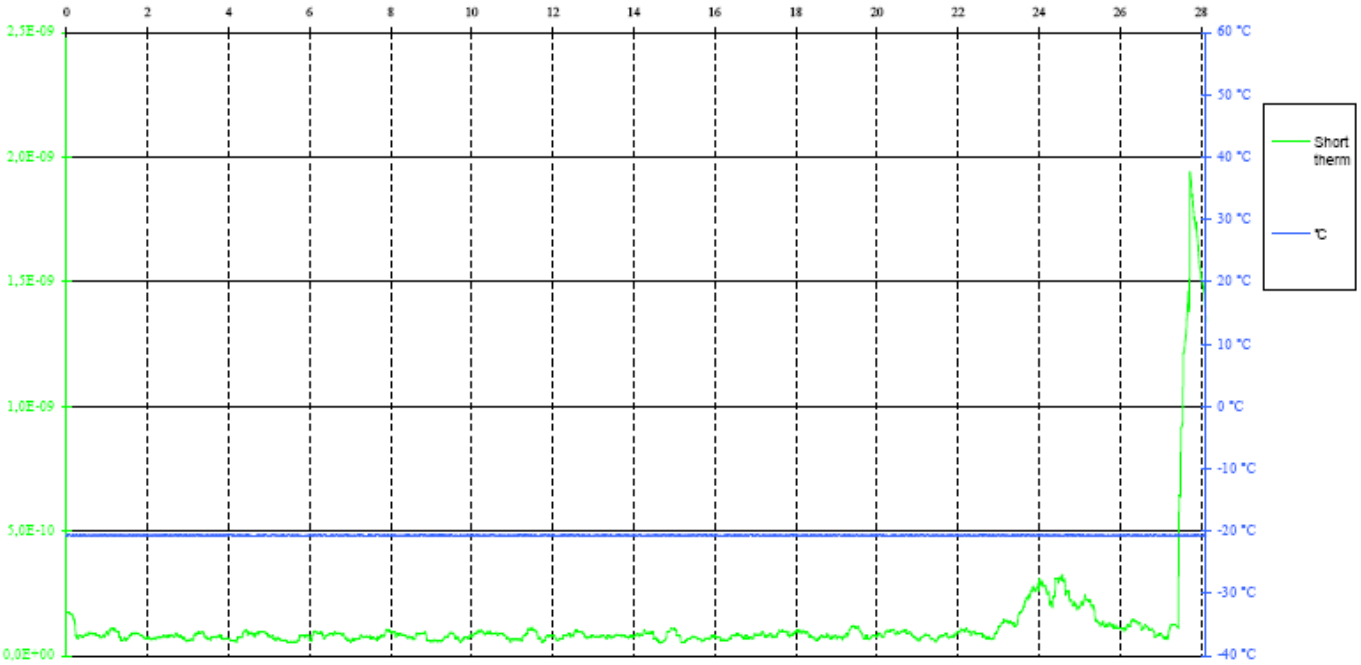


LIFE TEST AT -20 °C

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 2 Nov 2007
Time : 10:42:22

SHORT TERM STABILITY /100 mS (≦ 2,0E-9)

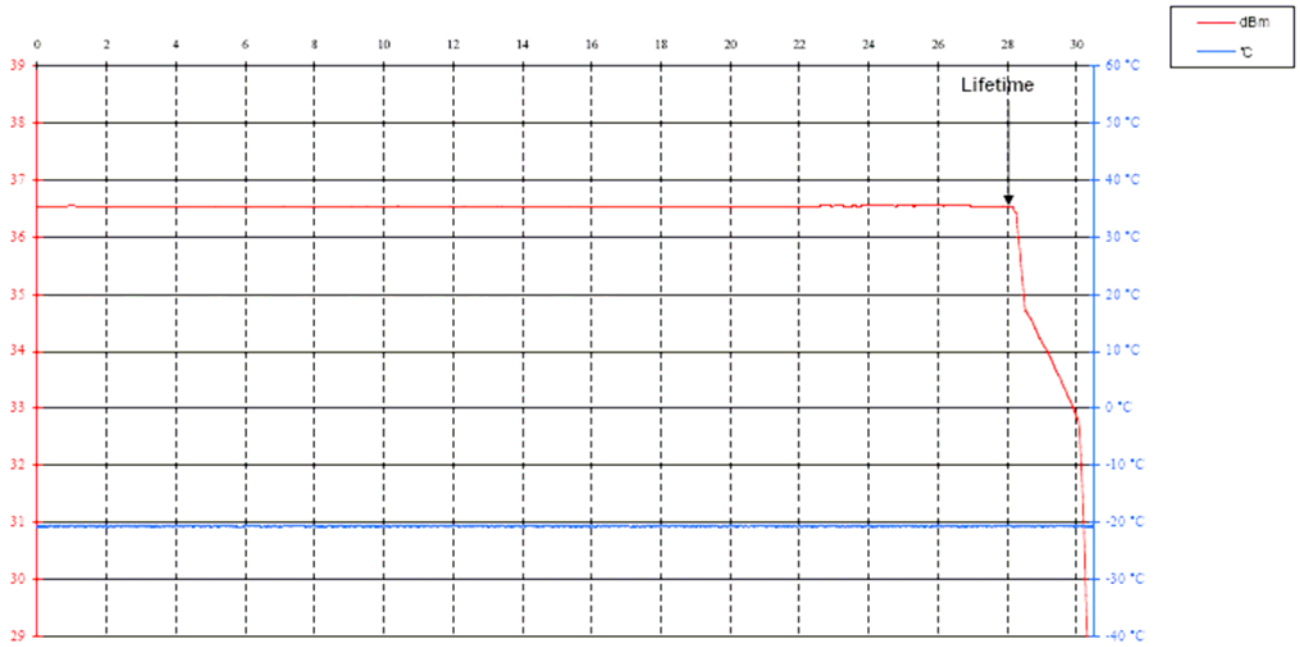


LIFE TEST AT -20 °C

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Numero : UT1

Date : 2 Nov 2007
Time : 10:42:22

OUTPUT POWER (35 to 39 dBm)

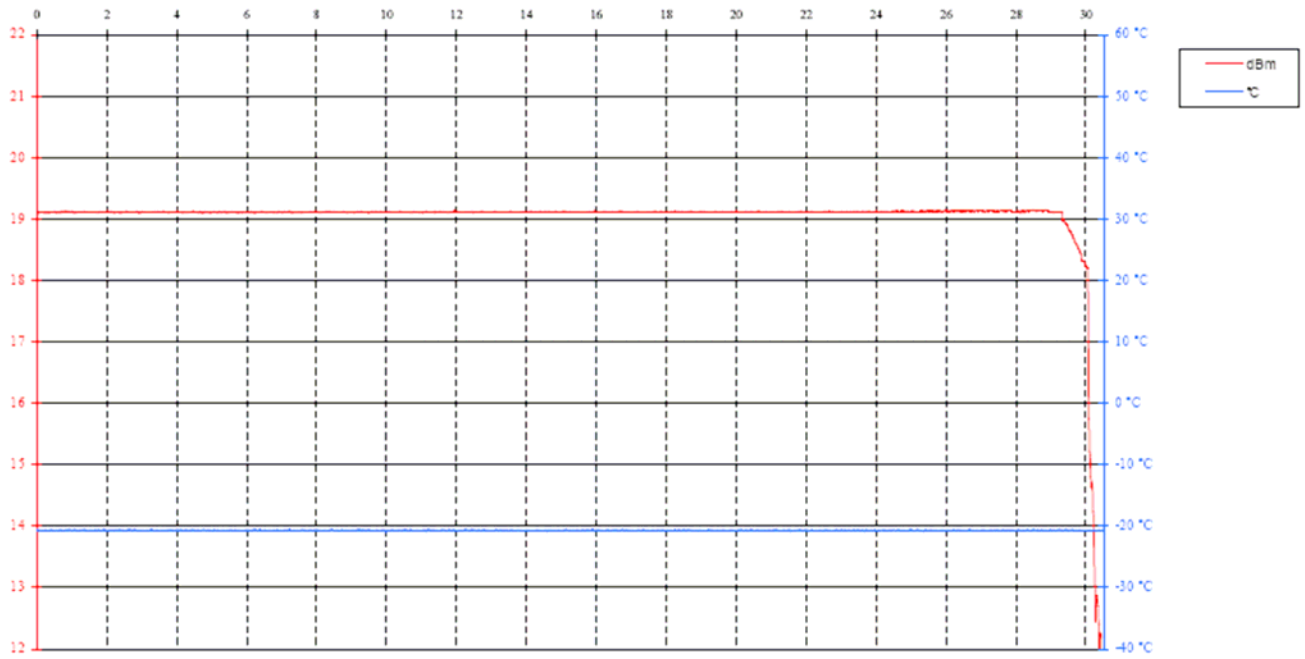


LIFE TEST AT -20 °C

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Numero : UT1

Date : 2 Nov 2007
Time : 10:42:22

121,5 MHJz OUTPUT POWER (14 to 20 dBm)



TEMPERATURE GRADIENT TEST RESULT ON
MARTEC / KANNAD
XS3-GPS
N° UT1
from -20° C to 55° C

Warm Up	Δ Frequency (Hz)	Temp. (°C)	P406 (dBm)	P121.5 (dBm)
1	49881,84	-21,0	36,6	0,0
2	49872,82	-20,9	36,6	0,0
3	49871,86	-21,1	36,6	18,9
4	49871,55	-21,0	36,6	18,9
5	49871,52	-21,1	36,6	18,9
6	49871,37	-21,1	36,6	18,9
7	49871,36	-21,0	36,6	18,9
8	49871,29	-21,0	36,6	18,9
9	49871,23	-21,0	36,6	18,9
10	49871,17	-21,1	36,6	18,9
11	49871,19	-21,1	36,6	18,9
12	49871,16	-21,0	36,6	18,9
13	49871,11	-21,1	36,6	18,9
14	49871,03	-21,1	36,6	18,9
15	49871,02	-21,0	36,6	18,9
16	49870,98	-21,0	36,6	18,9
17	49870,99	-21,1	36,6	18,9
18	49870,97	-21,1	36,6	18,9

No	Temp.	Slope	Sigma	P406	Short term	P121.5
1	-21,1	-2,0E-10	6,4E-10	36,6	8,5E-11	18,9
18	-21,0	-2,5E-11	1,2E-10	36,6	7,6E-11	18,9
31	-21,1	-2,0E-11	9,6E-11	36,6	7,8E-11	18,9
61	-21,1	4,3E-12	7,7E-11	36,6	8,1E-11	18,9
91	-21,1	4,3E-12	9,0E-11	36,6	8,0E-11	18,9
121	-21,0	-4,0E-12	7,9E-11	36,6	7,4E-11	18,9
151	-19,0	5,4E-11	9,2E-11	36,6	6,5E-11	18,9
181	-17,0	1,3E-10	1,1E-10	36,5	9,0E-11	18,9
211	-15,0	1,6E-10	1,2E-10	36,5	9,2E-11	18,9
241	-12,9	1,4E-10	2,7E-10	36,5	2,8E-10	18,9
271	-10,9	1,5E-10	2,1E-10	36,5	1,5E-10	18,8
301	-8,9	1,9E-10	1,5E-10	36,5	7,6E-11	18,8
331	-6,8	1,4E-10	1,1E-10	36,5	7,6E-11	18,8
361	-4,8	1,4E-10	1,1E-10	36,5	9,0E-11	18,7
391	-2,8	1,3E-10	3,0E-10	36,4	8,0E-11	18,7
421	-0,7	5,4E-11	3,2E-10	36,4	7,9E-11	18,7
451	1,3	-3,2E-11	1,9E-10	36,4	8,0E-11	18,6
481	3,2	-8,9E-11	1,4E-10	36,4	8,9E-11	18,6
511	5,2	-1,6E-10	8,9E-11	36,4	7,1E-11	18,6
541	7,4	-2,5E-10	8,6E-11	36,4	6,8E-11	18,5
571	9,4	-3,4E-10	7,5E-11	36,4	6,4E-11	18,5
601	11,5	-4,4E-10	7,9E-11	36,3	6,3E-11	18,4
631	13,6	-5,3E-10	9,9E-11	36,3	7,5E-11	18,4
661	15,7	-6,2E-10	9,1E-11	36,3	7,2E-11	18,3
691	17,7	-7,1E-10	8,9E-11	36,3	6,0E-11	18,3
721	19,7	-7,4E-10	1,3E-10	36,3	8,0E-11	18,2
751	21,7	-8,1E-10	1,4E-10	36,3	7,3E-11	18,2
781	23,8	-9,4E-10	5,3E-10	36,2	7,3E-11	18,1
811	25,8	-8,6E-10	3,9E-10	36,2	7,2E-11	18,0
841	27,9	-8,2E-10	1,1E-10	36,2	8,9E-11	17,9

No	Temp.	Slope	Sigma	P406	Short term	P121.5
871	30,1	-8,3E-10	7,7E-11	36,2	7,7E-11	17,9
901	32,3	-8,2E-10	1,7E-10	36,2	7,8E-11	17,8
931	34,5	-7,8E-10	2,0E-10	36,1	9,0E-11	17,7
961	36,7	-6,6E-10	1,4E-10	36,1	6,9E-11	17,6
991	38,8	-5,2E-10	1,8E-10	36,1	7,2E-11	17,5
1021	41,2	-3,1E-10	1,6E-10	36,1	6,5E-11	17,4
1051	43,6	-1,4E-10	2,9E-10	36,0	8,7E-11	17,3
1081	45,5	1,0E-10	1,4E-10	36,0	5,8E-11	17,2
1111	47,7	3,3E-10	1,3E-10	36,0	5,5E-11	17,1
1141	49,8	5,6E-10	1,5E-10	36,0	5,9E-11	17,0
1171	51,9	8,5E-10	1,6E-10	35,9	7,8E-11	16,8
1201	54,0	1,1E-9	1,8E-10	35,9	7,8E-11	16,7
1231	54,8	9,5E-10	3,4E-10	35,9	6,1E-11	16,6
1261	54,8	2,6E-10	1,5E-10	35,9	7,0E-11	16,5
1291	54,8	7,4E-11	2,1E-10	35,9	6,7E-11	16,5
1321	54,8	1,3E-10	4,0E-10	35,9	1,0E-10	16,5

Beacon message during the Frequency Stability Test with Temperature Gradient :

Hex message	Message decode
FFFE2F8E3E2293E02B8036AFFAF78E014CDA	See operating Life test results
FFFE2F8E3E2293E02B8036AFFAF78E0166A8	See following page
FFFE2F8E3E2293E02B8036AFFAF78E413F66	""
FFFE2F8E3E2293E02B8036AFFAF78E4141F0	See operating Life test results
FFFE2F8E3E2293E02B8036AFFAF78E4154C9	See operating Life test results

FFFE2F8E3E2293E02B8036AFFAF78E0166A8

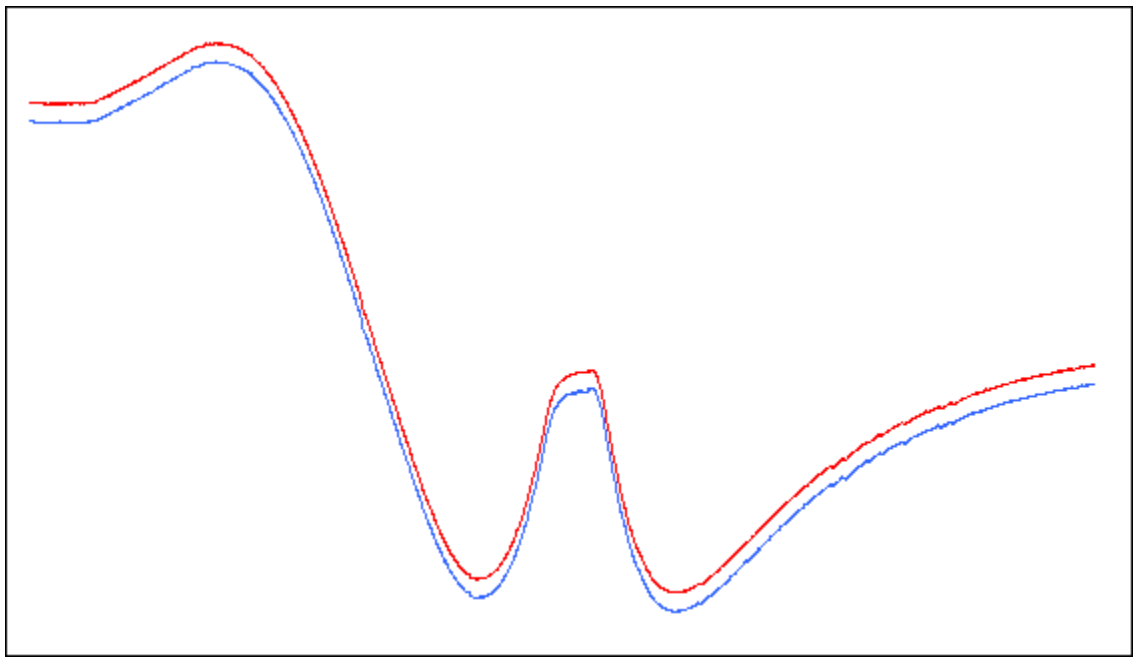
ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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: 24	**129-132**	**0110**
BCH 2 Encoded:	**133-144**	**011010101000**
BCH 2 Calculated:	**N/A**	**011010101000**
Composite Latitude: 43.55888888888889 Degrees North	**N/A**	**Composite Longitude: 1.4766666666666668 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

FFFE2F8E3E2293E02B8036AFFAF78E413F66

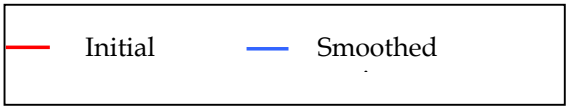
ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
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: 12	**129-132**	**0011**
BCH 2 Encoded:	**133-144**	**111101100110**
BCH 2 Calculated:	**N/A**	**111101100110**
Composite Latitude: 43.559999999999995 Degrees North	**N/A**	**Composite Longitude: 1.48 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

Frequency variation

406027890 Hz



406027764 Hz

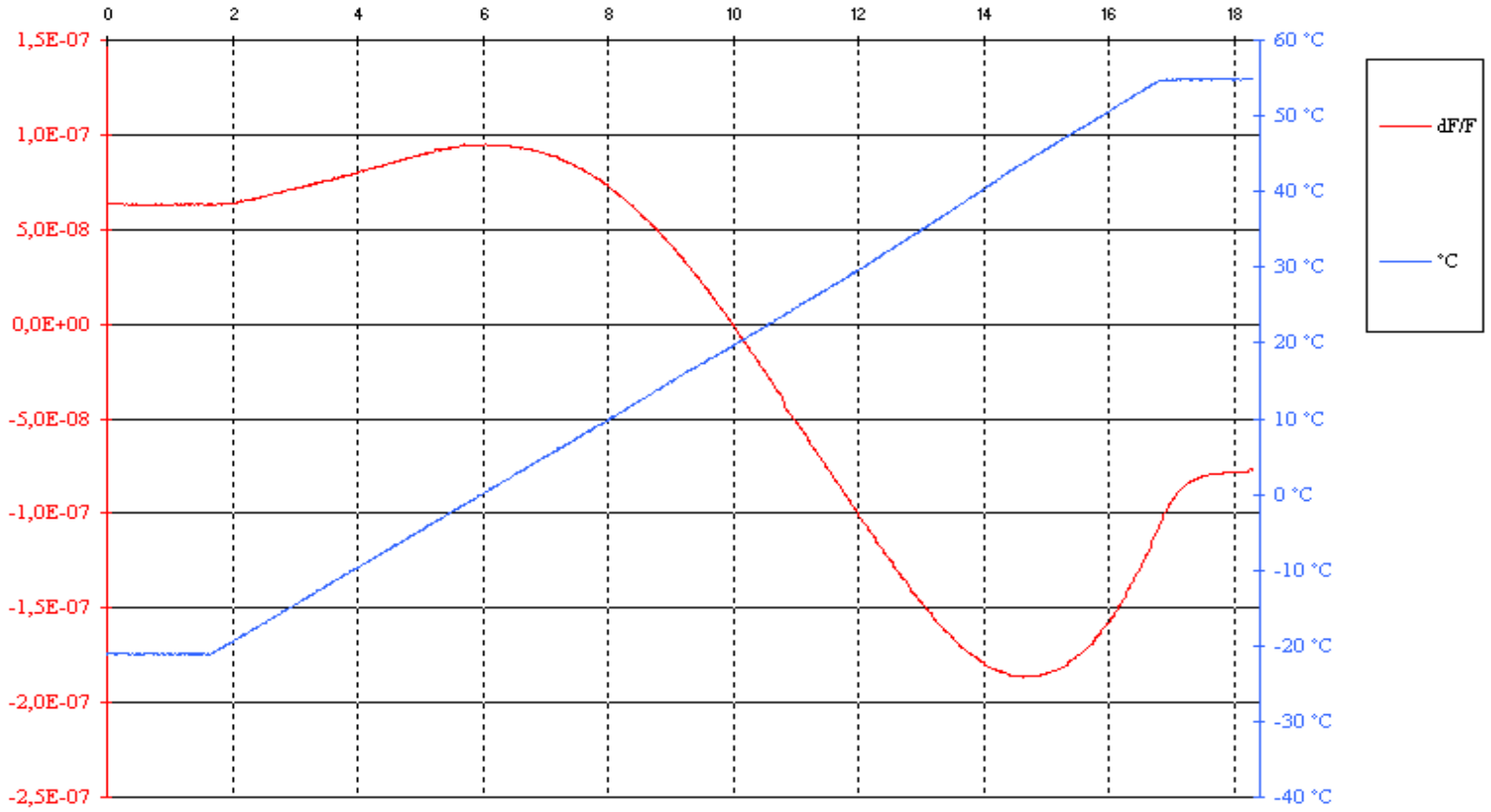


TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 12/10/2007
Time : 18:21:01

FREQUENCY VARIATION



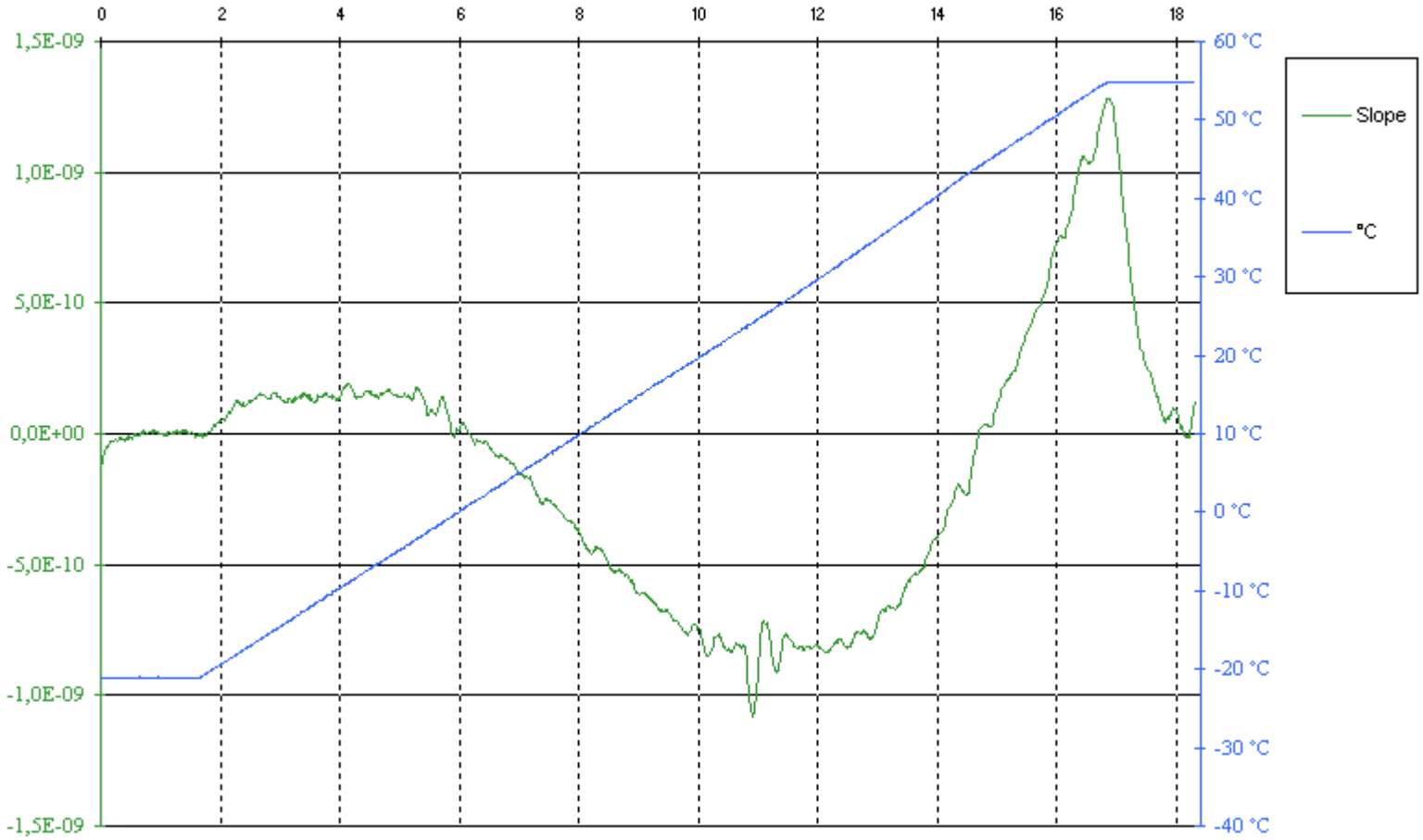
TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

	Equipment in test	INTESPACE Reference
	PLB : Kannad XS3-GPS	E7555-RTCM

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number :

Date : 12/10/2007
Time : 18:21:01

MEDIUM TERM STABILITY : MEAN SLOPE /mn A to B, C+15 to D, and E+15 to F (-1,0E-9 to 1,0E-9)
MEAN SLOPE /mn B to C+15, and D to E+15 (-2,0E-9 to 2,0E-9)

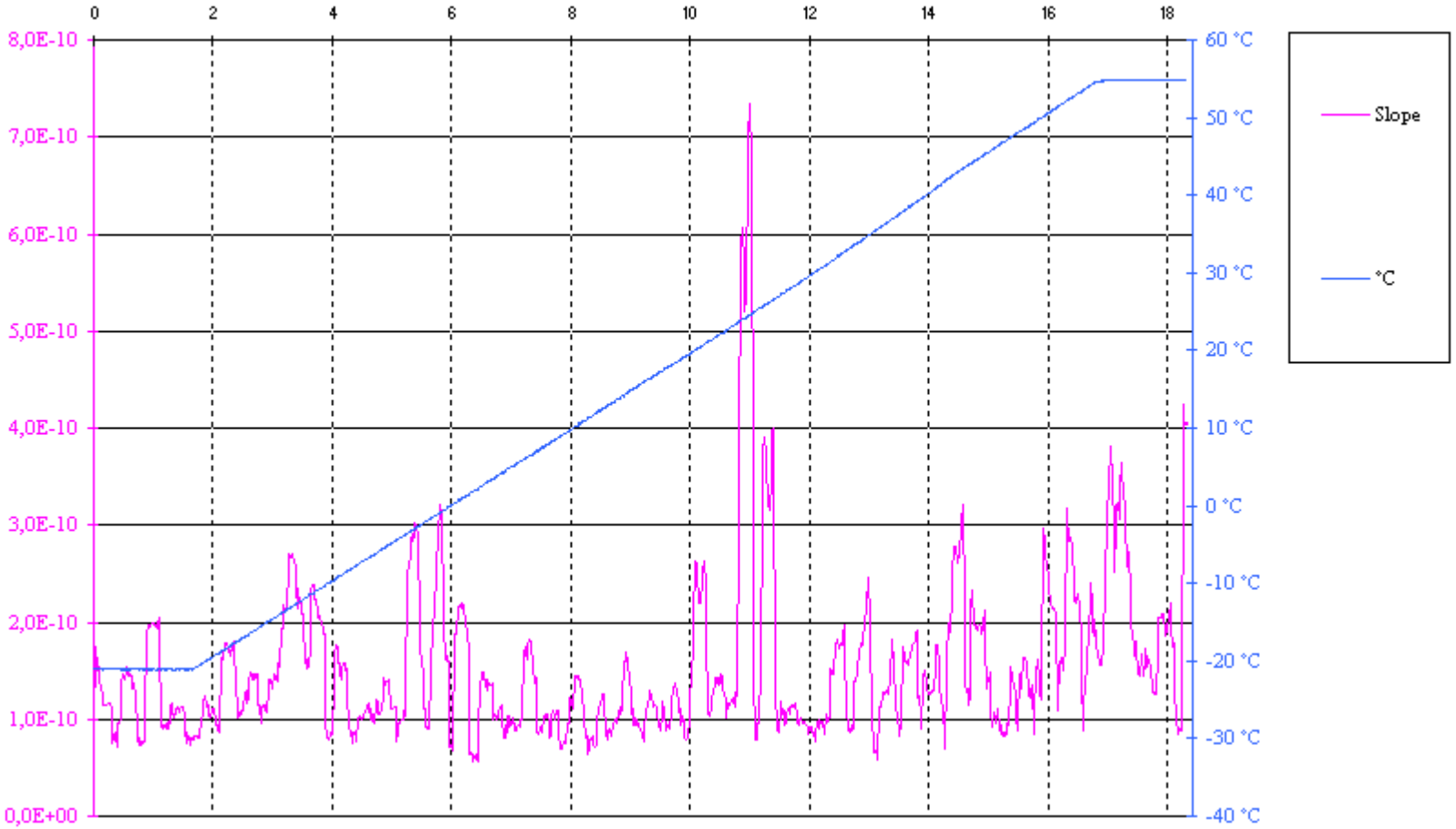


TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 12/10/2007
Time : 18:21:01

MEDIUM TERM STABILITY : RESIDUAL (≤ 3,0E-9)

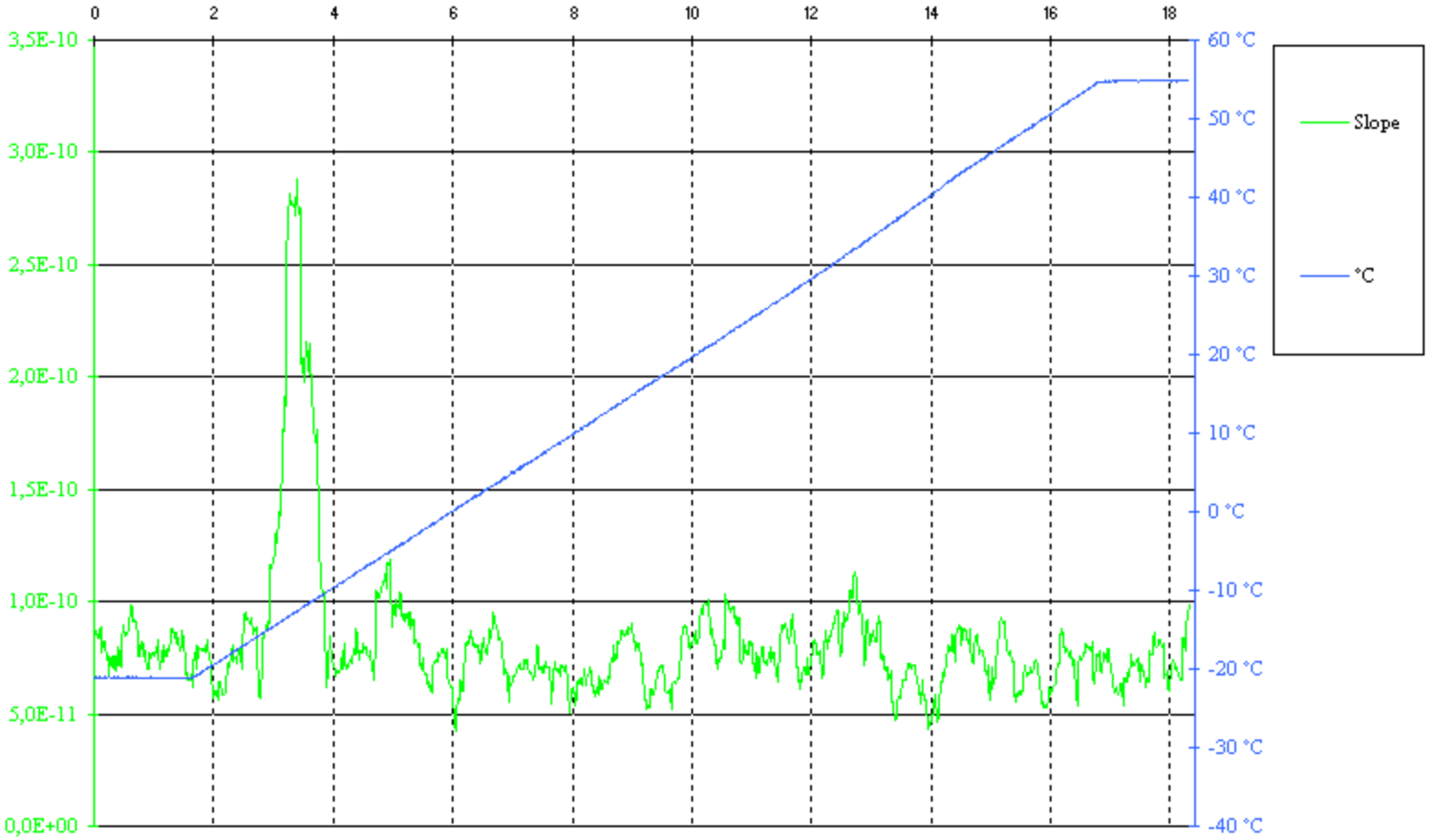


TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 12/10/2007
Time : 18:21:01

SHORT TERM STABILITY /100 mS (≤ 2,0E-9)

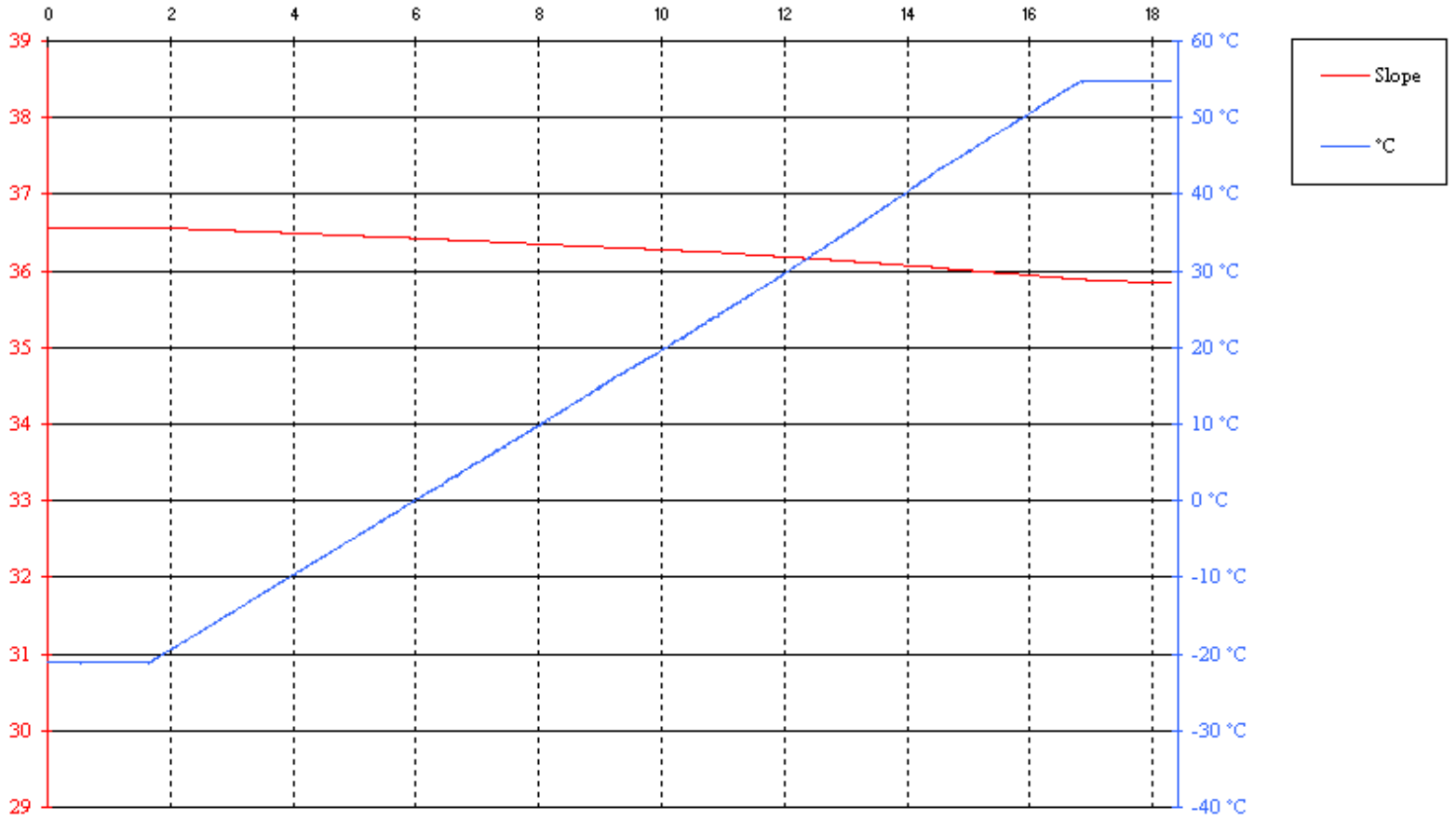


TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 12/10/2007
Time : 18:21:01

OUTPUT POWER (35 to 39 dBm)



TEMPERATURE GRADIENT TEST RESULT ON
MARTEC / KANNAD
XS3-GPS
N° UT1
from 55° C to -20° C

Warm Up	Δ Frequency (Hz)	Temp. (°C)	P406 (dBm)	P121.5 (dBm)
1	49788,32	54,7	35,8	16,2
2	49789,05	54,7	35,8	16,2
3	49789,66	54,8	35,8	16,2
4	49790,25	54,8	35,8	16,2
5	49797,35	54,8	35,8	16,1
6	49797,73	54,8	35,8	16,1
7	49798,17	54,8	35,8	16,1
8	49798,50	54,8	35,8	16,1
9	49798,86	54,9	35,8	16,1
10	49799,22	55,0	35,8	16,1
11	49799,58	54,9	35,8	16,1
12	49799,88	54,9	35,8	16,1
13	49800,31	54,8	35,8	16,1
14	49800,50	54,9	35,8	16,1
15	49800,70	54,9	35,8	16,1
16	49801,01	55,0	35,8	16,1
17	49801,33	55,0	35,8	16,1
18	49801,62	55,0	35,8	16,1

No	Temp.	Slope	Sigma	P406	Short term	P121.5
1	55,0	1,0E-9	4,1E-10	35,8	6,0E-11	16,1
18	55,1	8,9E-10	2,7E-10	35,8	6,7E-11	16,0
31	55,1	6,4E-10	2,6E-10	35,7	7,5E-11	16,0
61	55,1	3,4E-10	1,9E-10	35,7	1,0E-10	16,0
91	55,0	5,2E-10	6,8E-10	35,7	7,7E-11	16,0
121	55,1	1,4E-10	3,5E-10	35,7	6,8E-11	16,0
151	53,7	-6,3E-10	4,1E-10	35,7	6,9E-11	16,0
181	51,7	-1,0E-9	4,2E-10	35,7	7,7E-11	16,1
211	49,6	-1,0E-9	2,8E-10	35,7	9,8E-11	16,3
241	47,7	-8,4E-10	1,5E-10	35,8	7,1E-11	16,4
271	45,5	-5,7E-10	1,1E-10	35,8	6,3E-11	16,5
301	43,5	-3,2E-10	1,1E-10	35,8	8,0E-11	16,6
331	41,5	-1,1E-10	8,2E-11	35,8	7,3E-11	16,7
361	39,5	-7,4E-12	3,3E-10	35,8	7,9E-11	16,8
391	37,3	2,7E-10	1,4E-10	35,9	9,2E-11	16,9
421	35,3	4,4E-10	9,7E-11	35,9	6,3E-11	17,0
451	33,2	5,8E-10	9,9E-11	35,9	9,2E-11	17,1
481	31,1	7,3E-10	1,6E-10	35,9	6,5E-11	17,2
511	29,1	7,7E-10	1,6E-10	36,0	9,2E-11	17,4
541	26,9	8,2E-10	1,4E-10	36,0	6,8E-11	17,4
571	24,9	8,5E-10	2,2E-10	36,0	8,8E-11	17,4
601	22,8	8,4E-10	1,4E-10	36,0	7,7E-11	17,5
631	20,7	8,2E-10	1,0E-10	36,1	5,1E-11	17,6
661	18,7	7,4E-10	2,9E-10	36,1	7,1E-11	17,7
691	16,7	7,5E-10	1,3E-10	36,1	7,4E-11	17,7
721	14,5	5,8E-10	6,3E-10	36,1	8,8E-11	17,8
751	12,4	6,2E-10	2,3E-10	36,2	8,0E-11	17,8
781	10,2	5,9E-10	1,6E-10	36,2	8,9E-11	17,9
811	8,2	4,7E-10	9,3E-11	36,2	6,3E-11	17,9
841	6,1	3,8E-10	9,3E-11	36,2	6,8E-11	18,0

No	Temp.	Slope	Sigma	P406	Short term	P121.5
871	4,0	2,7E-10	7,1E-11	36,2	8,0E-11	18,0
901	2,0	1,9E-10	1,0E-10	36,2	7,9E-11	18,1
931	-0,1	8,5E-11	7,9E-11	36,3	4,2E-11	18,1
961	-2,2	-1,4E-11	6,3E-11	36,3	6,5E-11	18,2
991	-4,3	-8,3E-11	2,0E-10	36,3	7,3E-11	18,2
1021	-6,4	-1,1E-10	1,0E-10	36,3	8,6E-11	18,2
1051	-8,4	-1,4E-10	1,3E-10	36,3	1,0E-10	18,3
1081	-10,5	-1,7E-10	1,5E-10	36,3	1,2E-10	18,3
1111	-12,6	-1,6E-10	2,2E-10	36,4	6,9E-11	18,3
1141	-14,8	-1,7E-10	1,3E-10	36,4	8,3E-11	18,4
1171	-16,9	-1,5E-10	2,3E-10	36,4	2,2E-10	18,4
1201	-19,0	-1,8E-10	1,8E-10	36,4	1,2E-10	18,4
1231	-20,0	-8,6E-11	2,4E-10	36,4	1,1E-10	18,4
1261	-20,1	7,9E-11	1,3E-10	36,4	6,7E-11	18,4
1291	-20,1	2,5E-11	1,4E-10	36,4	9,0E-11	18,4
1321	-20,1	2,1E-11	1,3E-10	36,4	7,1E-11	18,4
1351	-20,2	1,4E-11	1,1E-10	36,4	8,5E-11	18,4

Beacon message during the Frequency Stability Test with Temperature Gradient :

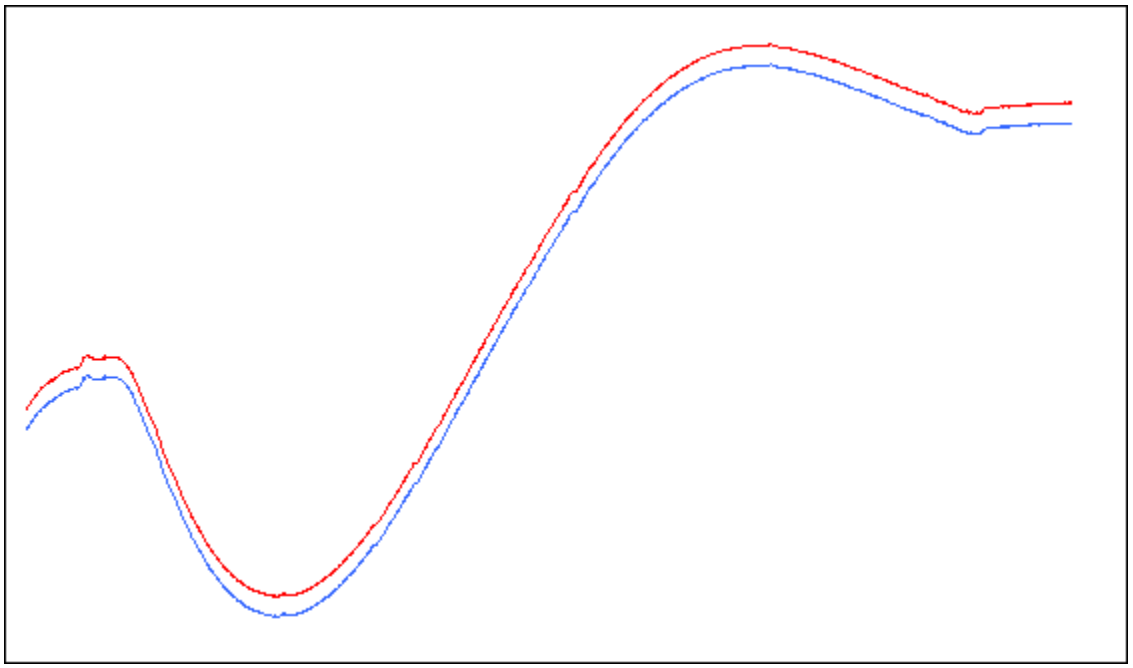
Hex message	Message decode
FFFE2F8E3E2293E02B8036AFFAF78E014CDA	See operating Life test results
FFFE2F8E3E2293E02B8036AFFAF78E0166A8	See 1st part of Fr. Stab. & Grad. Temp. Test results
FFFE2F8E3E2293E02B8036AFFAF78E4141F0	See operating Life test results
FFFE2F8E3E2293E02B8036AFFAF78DC178CA	See following page
FFFE2F8E3E2293E02B8036AFFAF78E0159E3	See operating Life test results

FFFE2F8E3E2293E02B8036AFFAF78DC178C
A

ITEM	BITS	VALUE
Message format: long format	**25**	**1**
Protocol: Location Protocol	**26**	**0**
Country code: 227	**27-36**	**0011100011**
Type of location protocol: Standard Location - Test	**37-40**	**1110**
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	**41-64**	**001000101001001111100000**
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**	**11010101111111101011**
BCH 1 Calculated:	**N/A**	**11010101111111101011**
Fixed bits (1101): Pass	**107-110**	**1101**
Position Data: Encoded Position Data Source From Internal Navigation Device	**111**	**1**
Aux Device: 121.5 MHz homer	**112**	**1**
Latitude Offset Sign: +	**113**	**1**
Latitude Offset Minutes: 3	**114-118**	**00011**
Latitude Offset Seconds: 28	**119-122**	**0111**
Longitude Offset Sign: -	**123**	**0**
Longitude Offset Minutes: 1	**124-128**	**00001**
Longitude Offset Seconds: 28	**129-132**	**0111**
BCH 2 Encoded:	**133-144**	**100011001010**
BCH 2 Calculated:	**N/A**	**100011001010**
Composite Latitude: 43.55777777777777 Degrees North	**N/A**	**Composite Longitude: 1.4755555555555555 Degrees East**
15 Hex ID:	**N/A**	**1C7C4527C0FFBFF**

Frequency variation

406027881 Hz



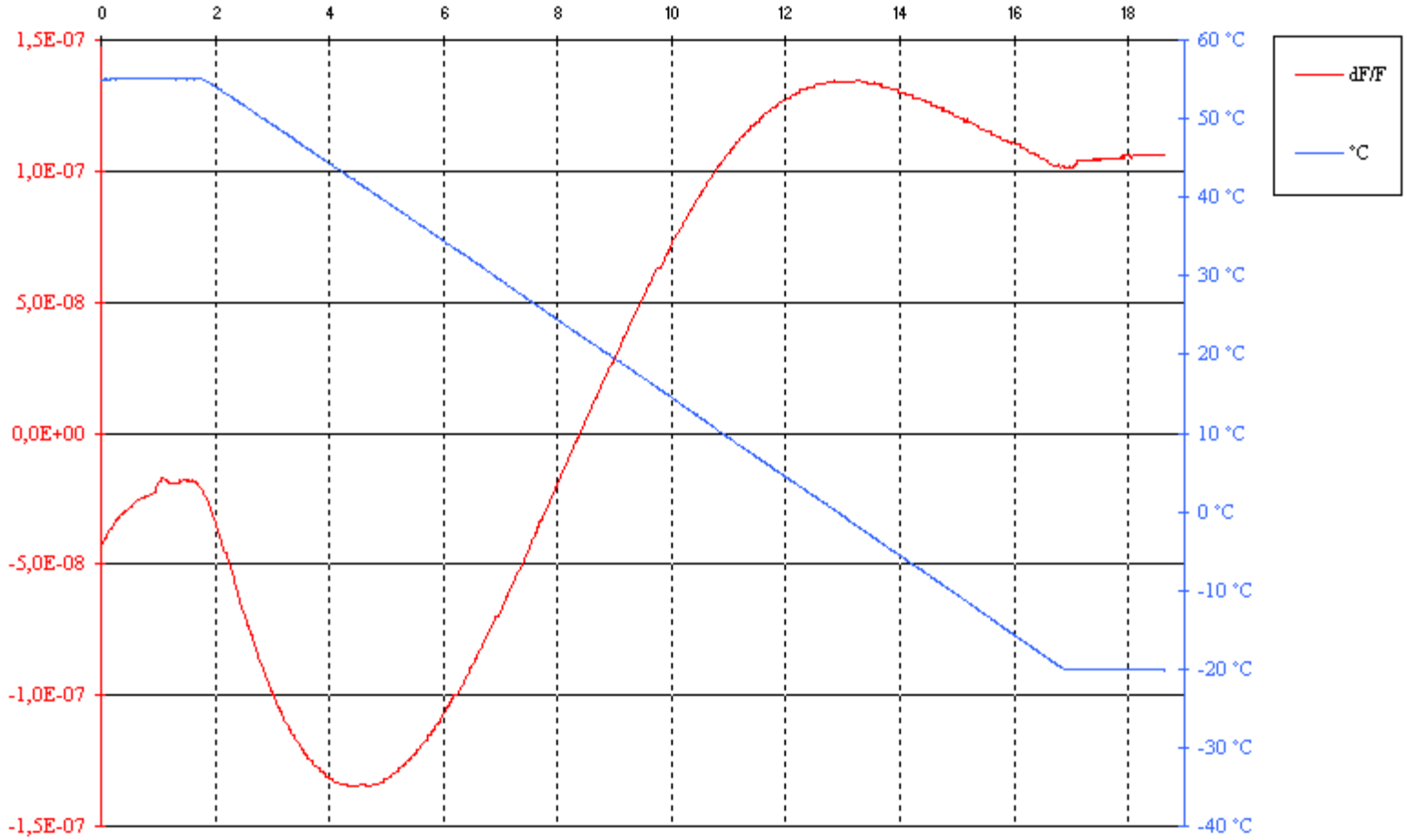
406027762 Hz

TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 16/10/2007
Time : 19:12:48

FREQUENCY VARIATION

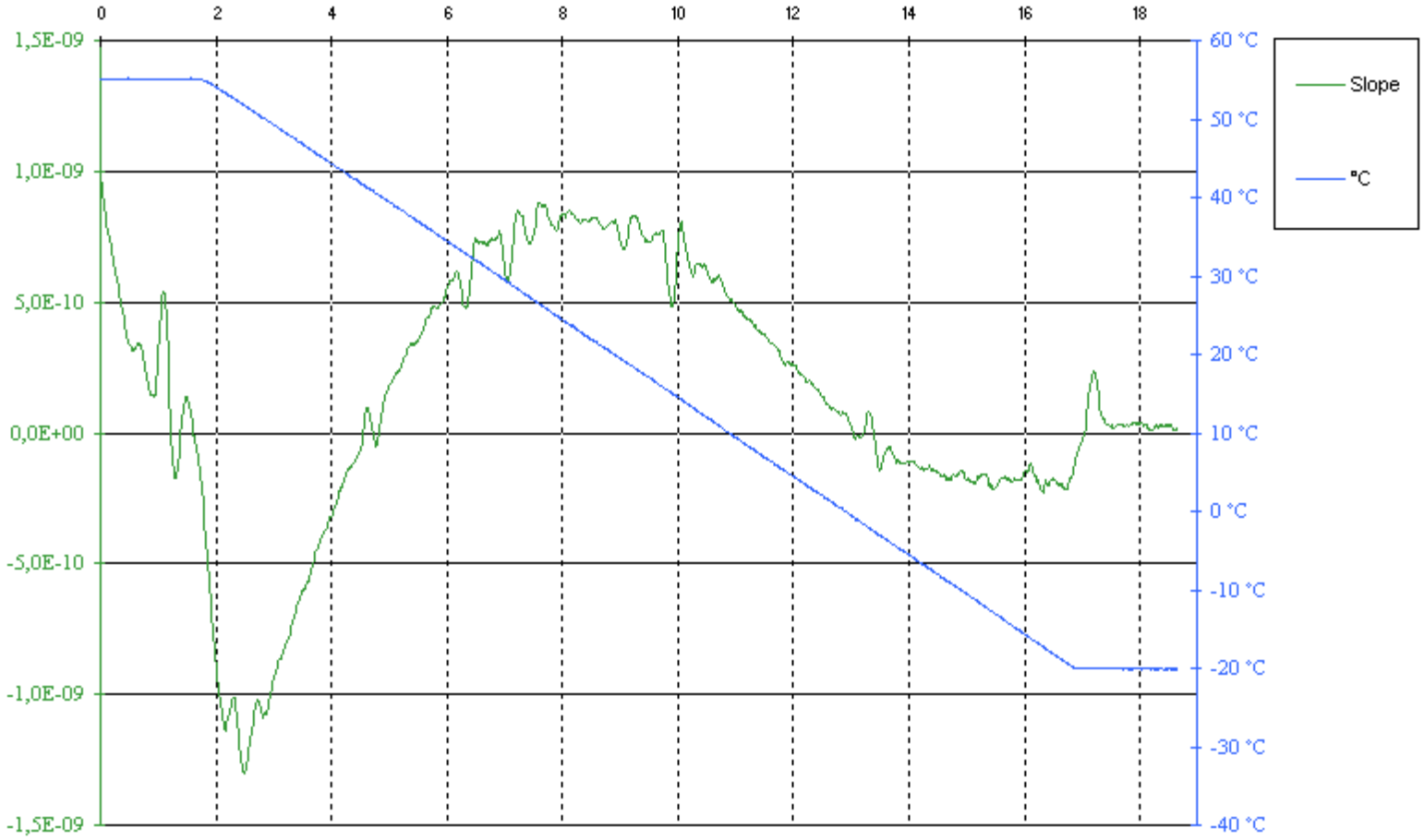


TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number :

Date : 16/10/2007
Time : 19:12:48

MEDIUM TERM STABILITY : MEAN SLOPE /mn A to B, C+15 to D, and E+15 to F (-1,0E-9 to 1,0E-9)
MEAN SLOPE /mn B to C+15, and D to E+15 (-2,0E-9 to 2,0E-9)

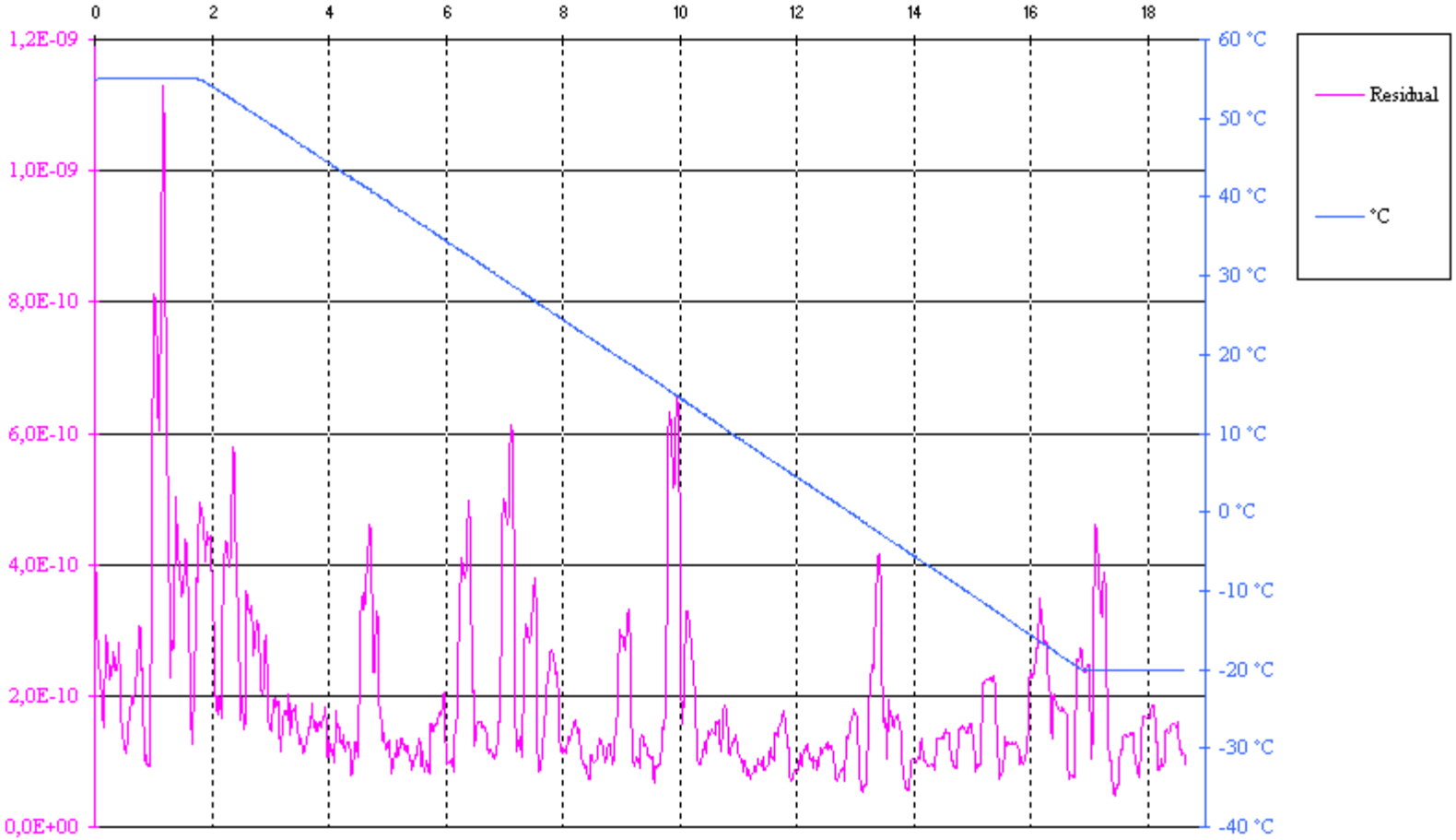


TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 16/10/2007
Time : 19:12:48

MEDIUM TERM STABILITY : RESIDUAL (≤ 3,0E-9)

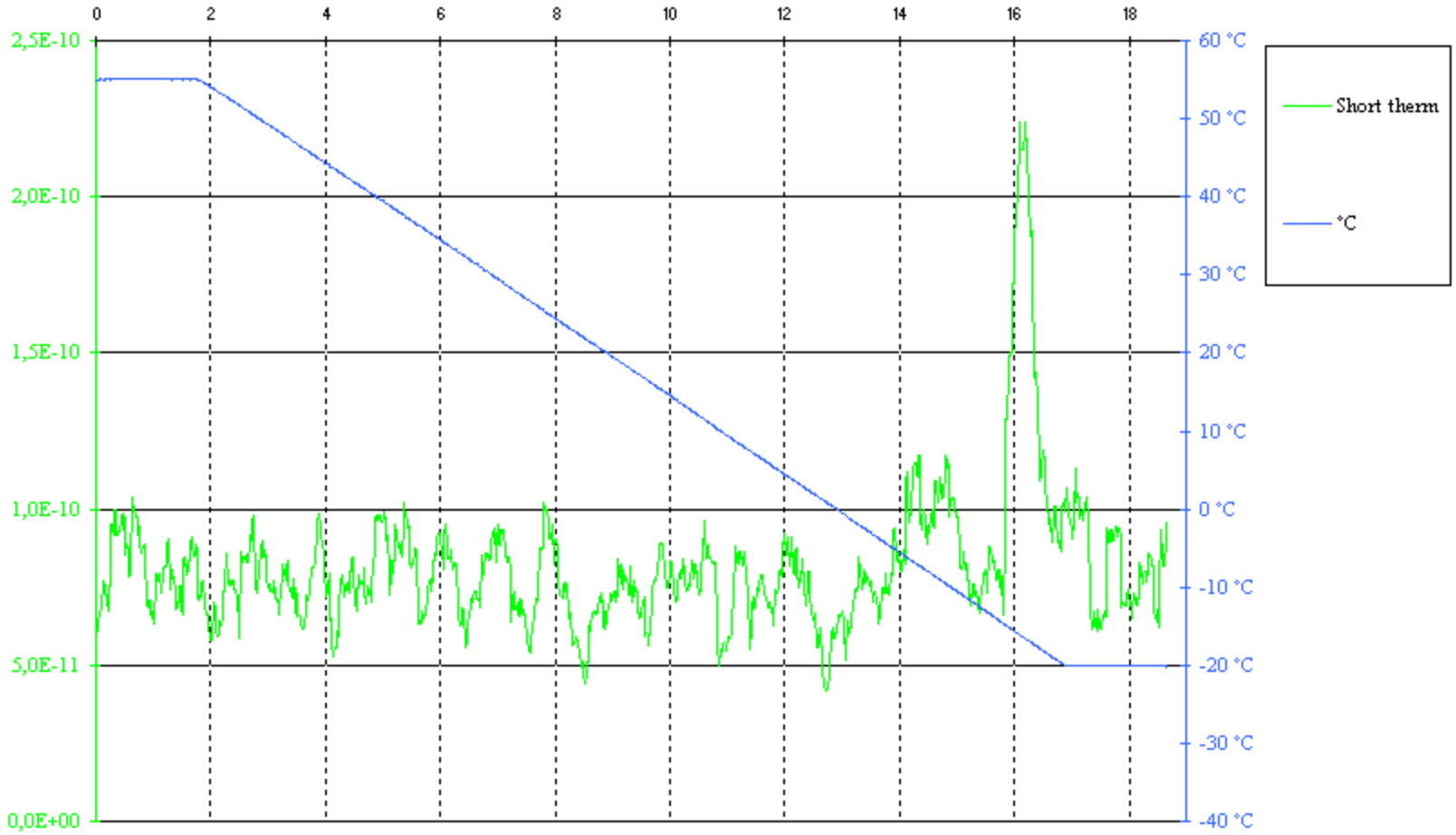


TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 16/10/2007
Time : 19:12:48

SHORT TERM STABILITY /100 mS (≤ 2,0E-9)



TEMPERATURE GRADIENT TEST RESULTS (5 °C / hour)

Manufacturer : MARTEC / KANNAD
Model : XS3-GPS
Number : UT1

Date : 16/10/2007
Time : 19:12:48

OUTPUT POWER (35 to 39 dBm)