

HS_DCU FLIGHT MODEL

REPORT OF FUNCTIONAL TESTS

Report of functional tests

1 Table of contents

1	Table of contents	2
2	Test Configuration	4
3	POWER ON : CONSUMPTION TESTS	7
3.1	Primary currents	7
3.2	Conclusion.....	7
4	Frame generation Tests	8
4.1	Procedure.....	8
4.2	ANALYSIS	8
4.3	Test of the DCU frames parity	10
4.4	Conclusion.....	13
5	Offsets	14
6	HouseKeepings	26
6.1	Housekeeping acquisition	26
6.2	Conclusion.....	31
7	BIAS generation tests	32
7.1	BIAS setting	32
7.2	ANALYSIS	33
7.2.1	Bias frequency photometer.....	34
7.2.2	Bias frequency spectrometer	37
7.2.3	Bias amplitudes	39
7.2.4	JFET amplitudes Vss.....	42
7.2.5	JFET On successives (Vdd)	44
7.2.6	Photo Heaters and Spectro Heaters	47
7.3	Conclusion.....	50
8	BIAS test in stand alone mode : Monitoring of BIAS	51
9	Demodulation Tests	52
9.1	Procedure.....	52
9.2	Data analysis	53
9.3	Batch edition	53
9.4	Conclusion.....	57
10	Gain Tests	58
10.1	Procedure.....	58
10.2	Data analysis	59

Report of functional tests

10.2.1	Photometer	59
10.2.2	Spectrometer.....	62
10.3	Conclusion.....	64
11	Cross Talk	65
11.1	Procedure.....	65
11.1.1	Photometer	65
11.2	Data analysis	68
11.3	Conclusion.....	71
12	Noise.....	72
12.1	Conclusion.....	76

Report of functional tests

2 Test Configuration

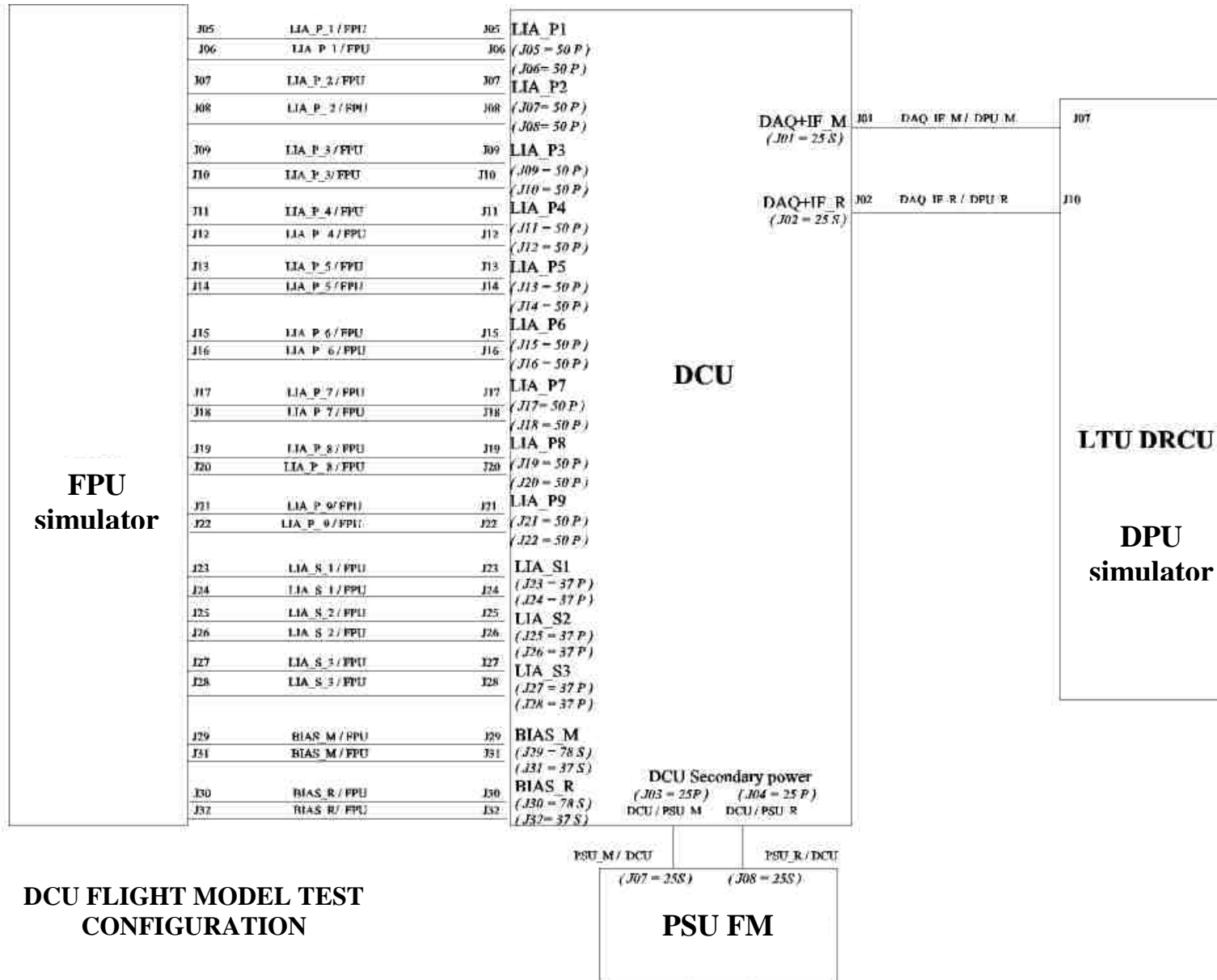
We use the LTU in its latest software configuration, the fully assembled DCU and FCU, the FPU and the PSU Flight Model (PSU FM).

Before to connect any harness, we place savers on all connectors

Connect all harnesses as described below :

- Between DCU and FPU
- Between DCU and LTU
- Between FCU and LTU
- Between FCU and FPU
- Between DCU and PSU FM
- Between FCU and PSU FM

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DCU FLIGHT MODEL TEST CONFIGURATION

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FPU simulator

FCU



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3 POWER ON : CONSUMPTION TESTS

3.1 Primary currents

We report thereafter the consumption on the primary voltage (28 V)

Conso 28 V	Main	redundant	Expected
Power ON	400 mA	400 mA	400 mA
MCU ON	810 mA	810 mA	810 mA
MCU ON and booted	870 mA	870 mA	870 mA
LIAP ON	2100 mA	2100 mA	2100 mA
LIAS ON	1230 mA	1230 mA	1230 mA
LIAP ON and MCU OFF	1610 mA	1610 mA	1600 mA
LIAS ON and MCU OFF	750 mA	740 mA	7540 mA

3.2 Conclusion

Consumption TEST	OK	NON OK
Test responsible	Comments : TEST SUCCESSFULL	
Henri TRIOU		
Technical specialist		
Quality		

These measurements are within the specified values, we can go through the functional tests procedure.

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4 Frame generation Tests

4.1 Procedure

- ⇒ FPU simulator switched ON but not used
- ⇒ Batch executed by LTU : *DAQ-IF-TESTS Main Redundant.txt*
 - ⇒ 2 x 5 TM file generated by LTU (DPU) (Main and Redundant)
 - ⇒ Rename the files with the following extensions :

Main Side

Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_Frame_Test_Main.tm
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_Frame_Number_Main.tm
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_Photo_frequency_Main.tm
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_spectro_frequency_Main.tm
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_Time_reset_Main.tm

Redundant side

Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_Frame_Test_Redundant.tm
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_Frame_Number_Redundant.tm
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_Photo_frequency_Redundant.tm
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_spectro_frequency_Main.tm
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss)_Time_reset_Redundant.tm

4.2 ANALYSIS

Check consistency with specification : Labview Software (button frame_length, frame_id, frame count, sampling rate photo, sampling rate_spectro)

Open last renamed TM files (with extension ref. [Frame_Test.tm](#) to [Time_reset.tm](#))

Frame ID and Frame length :

⇒ Check green light

	As run Main	As run Redundant
Green light OK	OK	OK
Frame ID and Frame length	OK	OK

Report of functional tests

Frame counter :

⇒ Open last renamed TM file (ref. [_Frame_Number](#))

⇒ Enter 338 in "number of frames" box (340 is theoretical value)

Check for "frame count green light led"

Stop frame count analysis

	As run Main	As run Redundant
Green light OK	OK	OK
Frame counter	OK	OK

Sampling frequencies :

Open last renamed TM file (ref. [_photo_frequency](#))

⇒ delta t max = 0,007 s (Criterion)

⇒ Check the "green light" (sampling rate photometer)

⇒ Stop photosampling rate analysis

	As run Main	As run Redundant
Green lights OK	OK	OK
Delta tmax < 0,00001 s	OK	OK
No error in parity Photometer sampling rate		

Open last renamed TM file (ref. [_spectro_frequency](#))

⇒ delta t max = 0,007 s (Criterion)

⇒ Check the "green light" (sampling rate spectrometer)

⇒ Stop spectro sampling rate analysis

	As run Main	As run Redundant
Green lights OK	OK	OK
Delta tmax < 0,00002 s	OK	OK

Report of functional tests

No error in parity spectrometer sampling rate		
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Time Stamp Reset :

- ⇒ Open last renamed TM file (ref. _Time_Reset)
 - ⇒ Enter manually the frequency : 50.86 Hz in "frequency box"
 - ⇒ Check the "green light" and no error in "block time vs block number" box
- Stop block time analysis

	As run Main	As run Redundant
Green light OK	OK	OK
block time vs block number	OK	OK

4.3 Test of the DCU frames parity

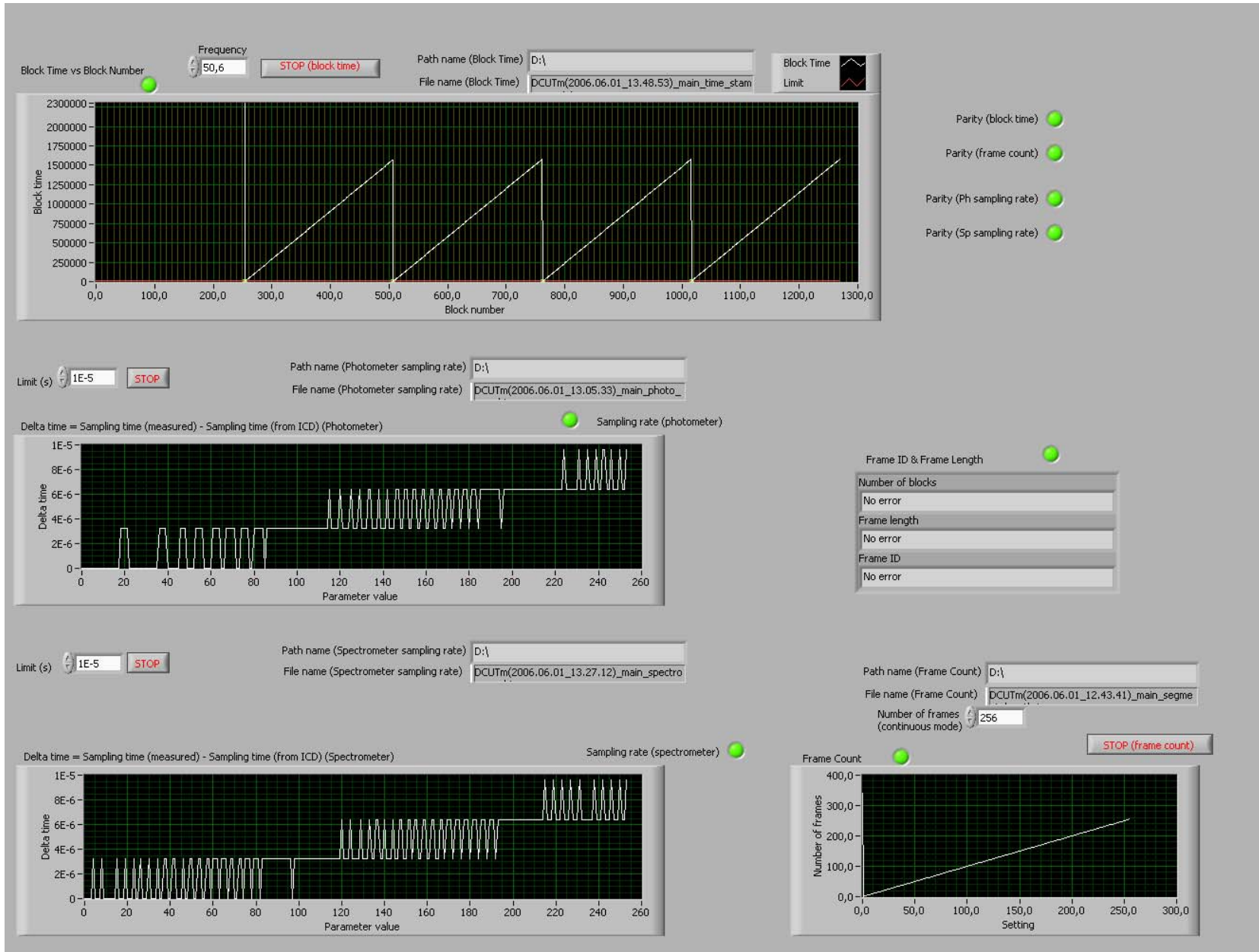
- ⇒ Check the 4 "green lights" associated with parity
- ⇒ Enter manually the frequency : 50.86 Hz
 - ⇒ Check two "green lights" :
 - for the time value at time reset (Block time vs Block number)
 - for the parity block time

	As run Main	As run Redundant
4 Green lights OK	OK	OK

Cut and paste here after hardcopies of labview (Main and Redundant)

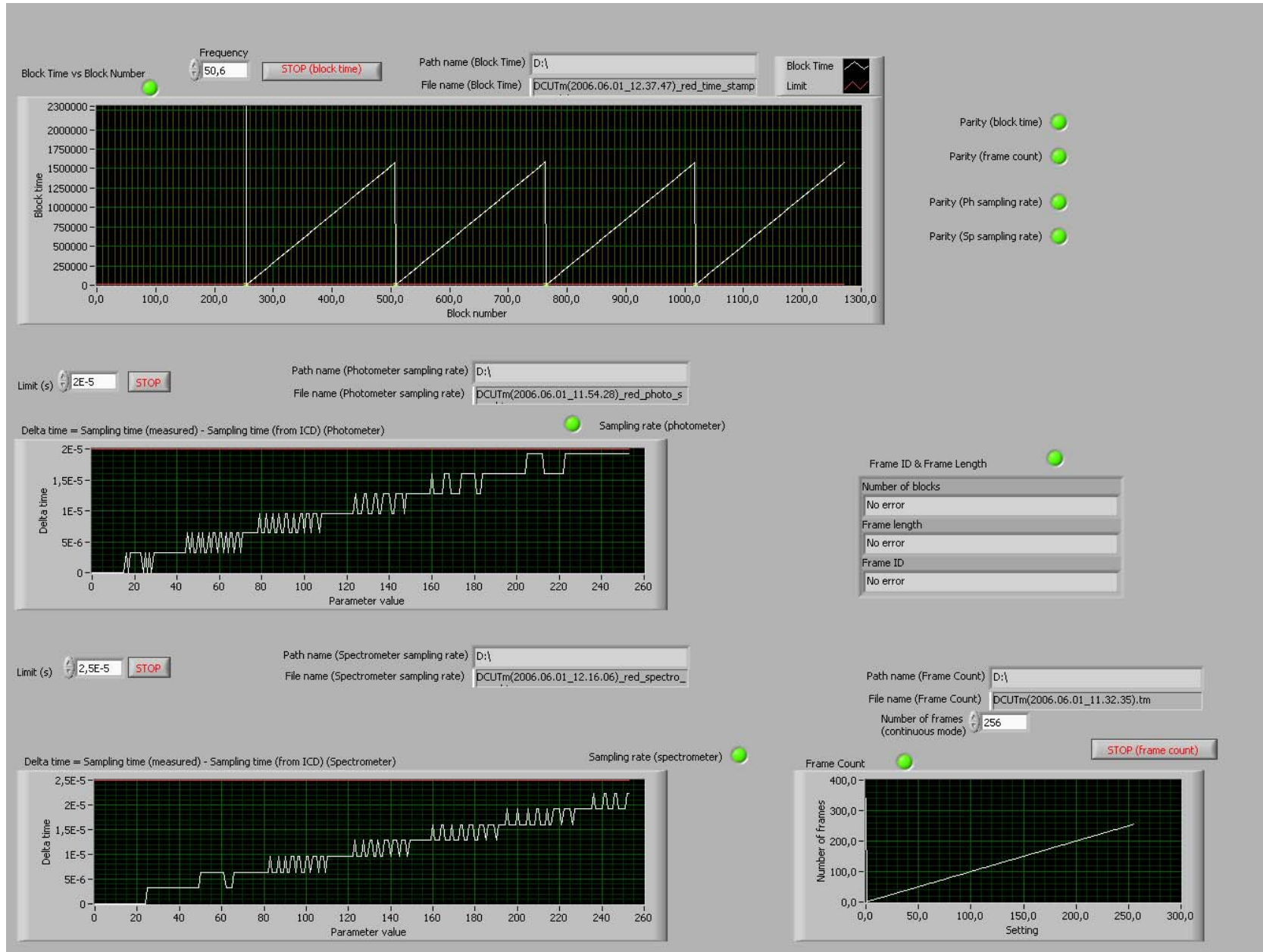
Report of functional tests

Main side



Report of functional tests

Redundant side



Report of functional tests

4.4 Conclusion

Frame generation TEST	OK	NON OK
Test responsible	Comments :	
Henri TRIOU	TEST SUCCESSFULL	
Technical specialist		
Quality		

Report of functional tests

5 Offets

In this test, we use a simulator input file that consist in sinus signal with the same pic pic level of 0,2 mV on all channels but at different magnitude levels (id est with different offsets) within the specified range. The purpose is then to check that the automatic offset function allows reading the signal within its specified magnitude range.

We perform signal acquisition using the FPU simulator script : Script_Spire_ScieNiveaux.spt
Simulator freq = 0.32 (0,08 Hz)

We obtain the following telemetry files

Main

TM files of 09h23 and 09h25

Redundant

TM files of 09h27 and 09h29

We thereafter represent the signal as read from TM files. The value of the offset has been added to the signal so as to differentiate the channels and to re create the signal.

On LIAS boards, the same signal is sent on a group of 3 channels. The value of the offset computed by DCU appears on the line above.

Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006



Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006

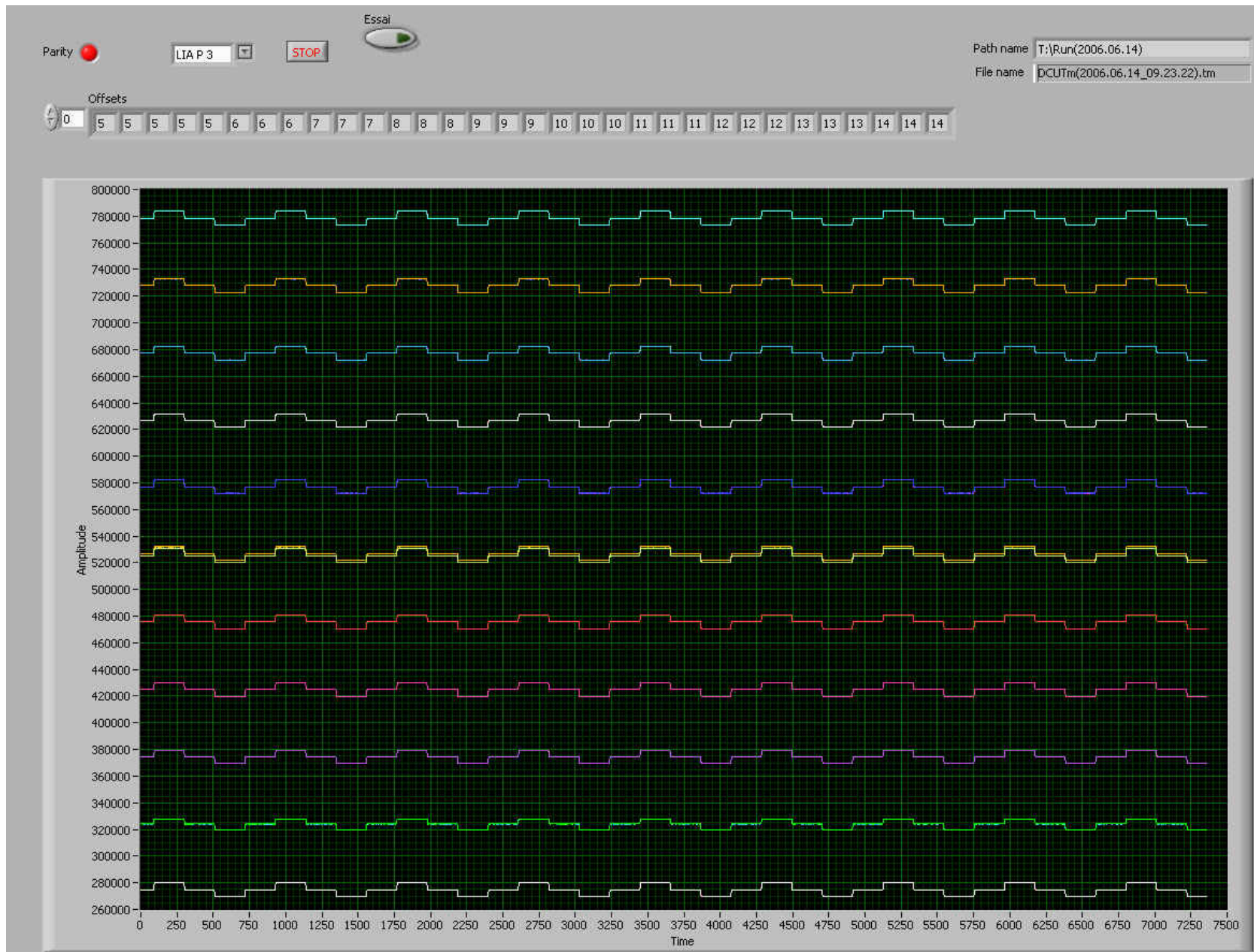


Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006

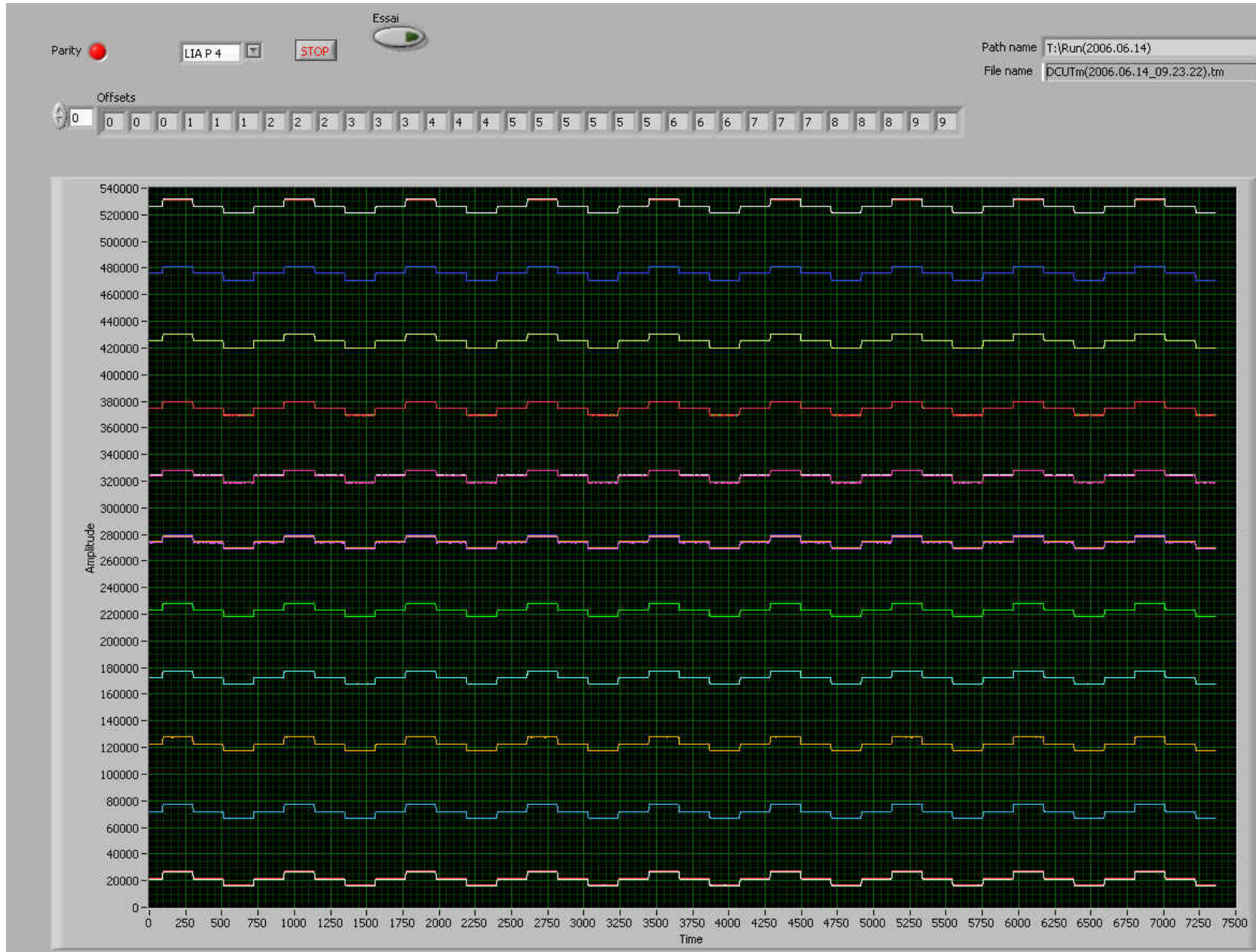


Report of functional tests

SAP-SPIRE- HT-0425-06 **V1.0**

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Report of functional tests

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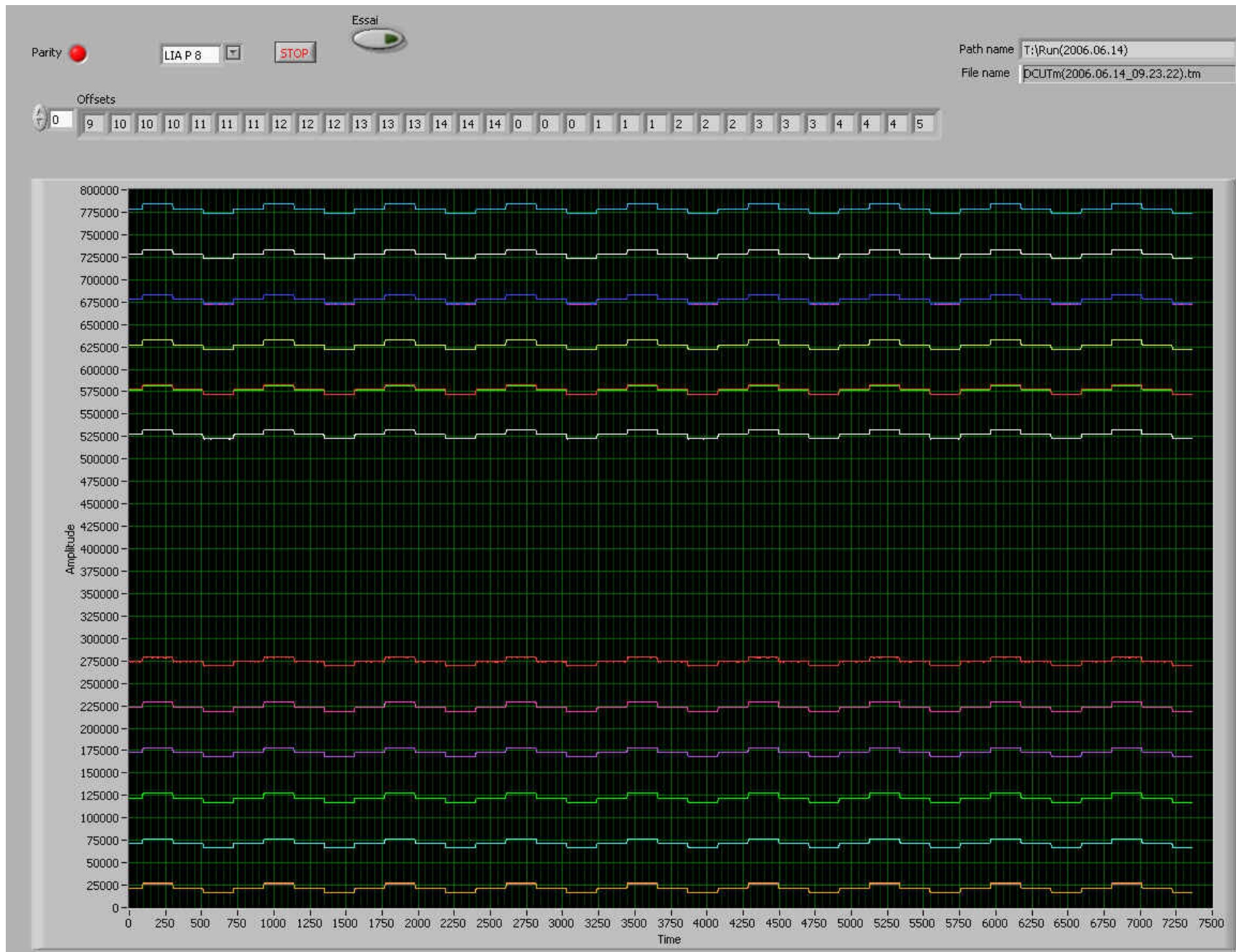


Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006

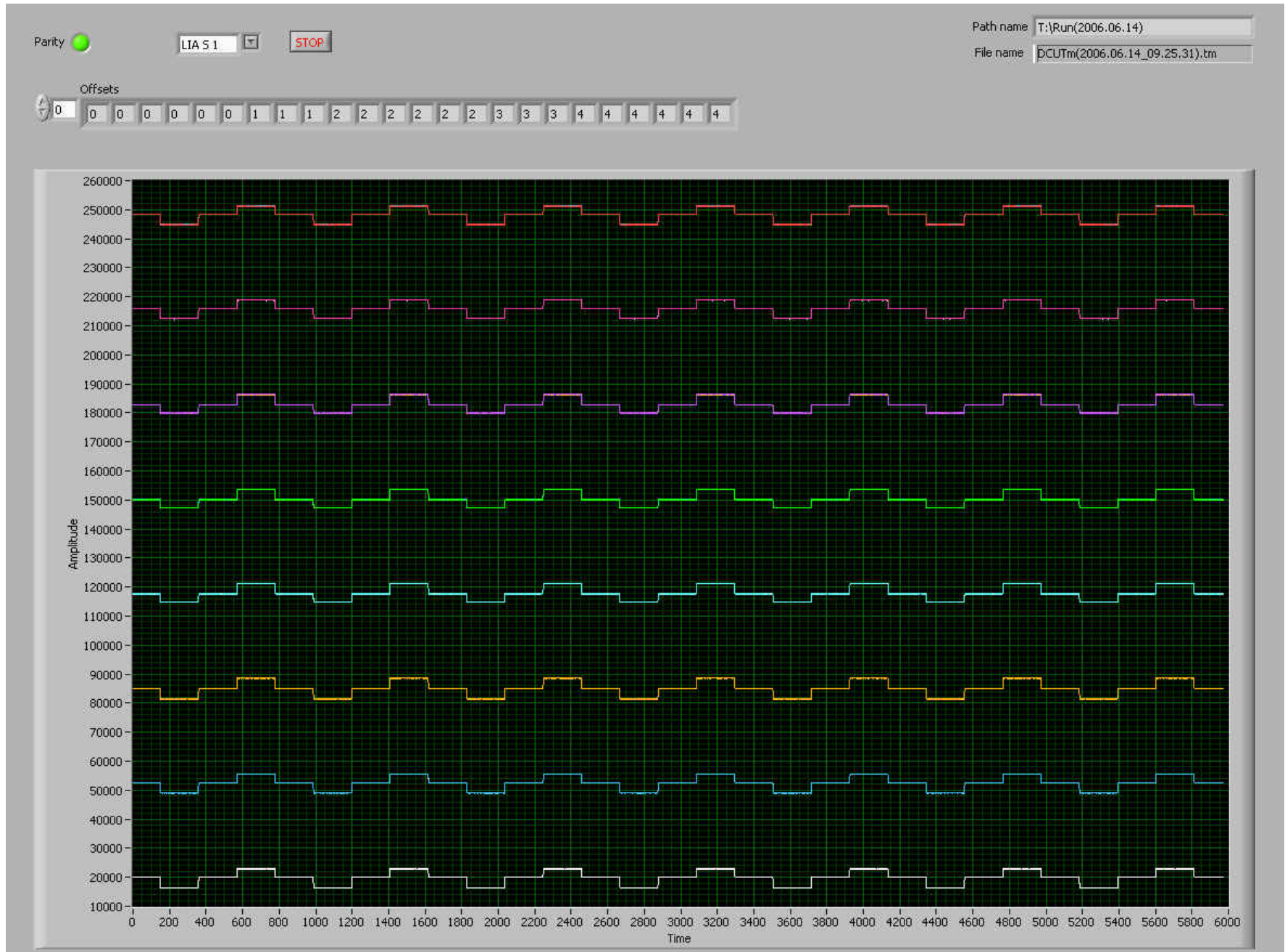


Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006

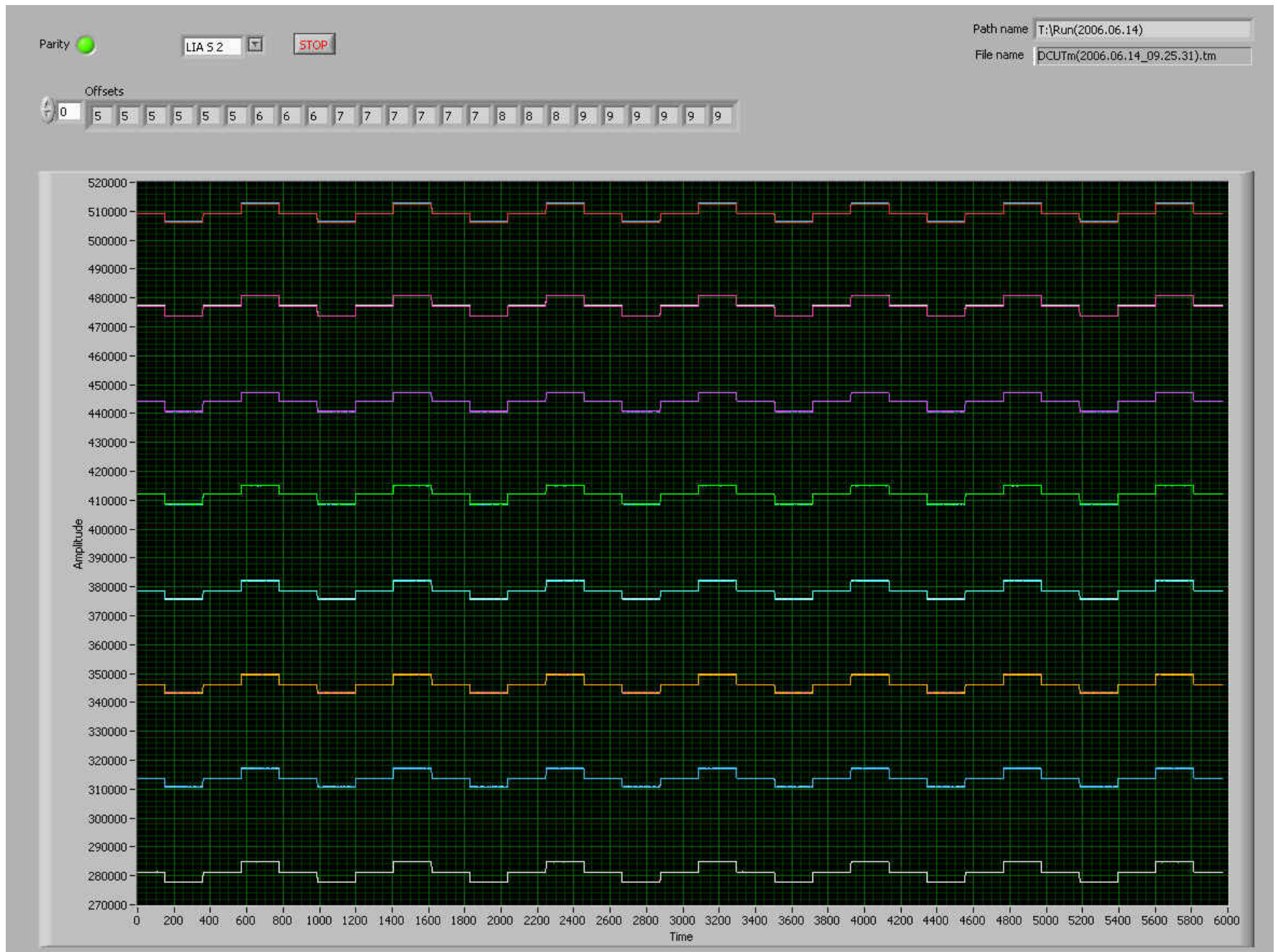


Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006

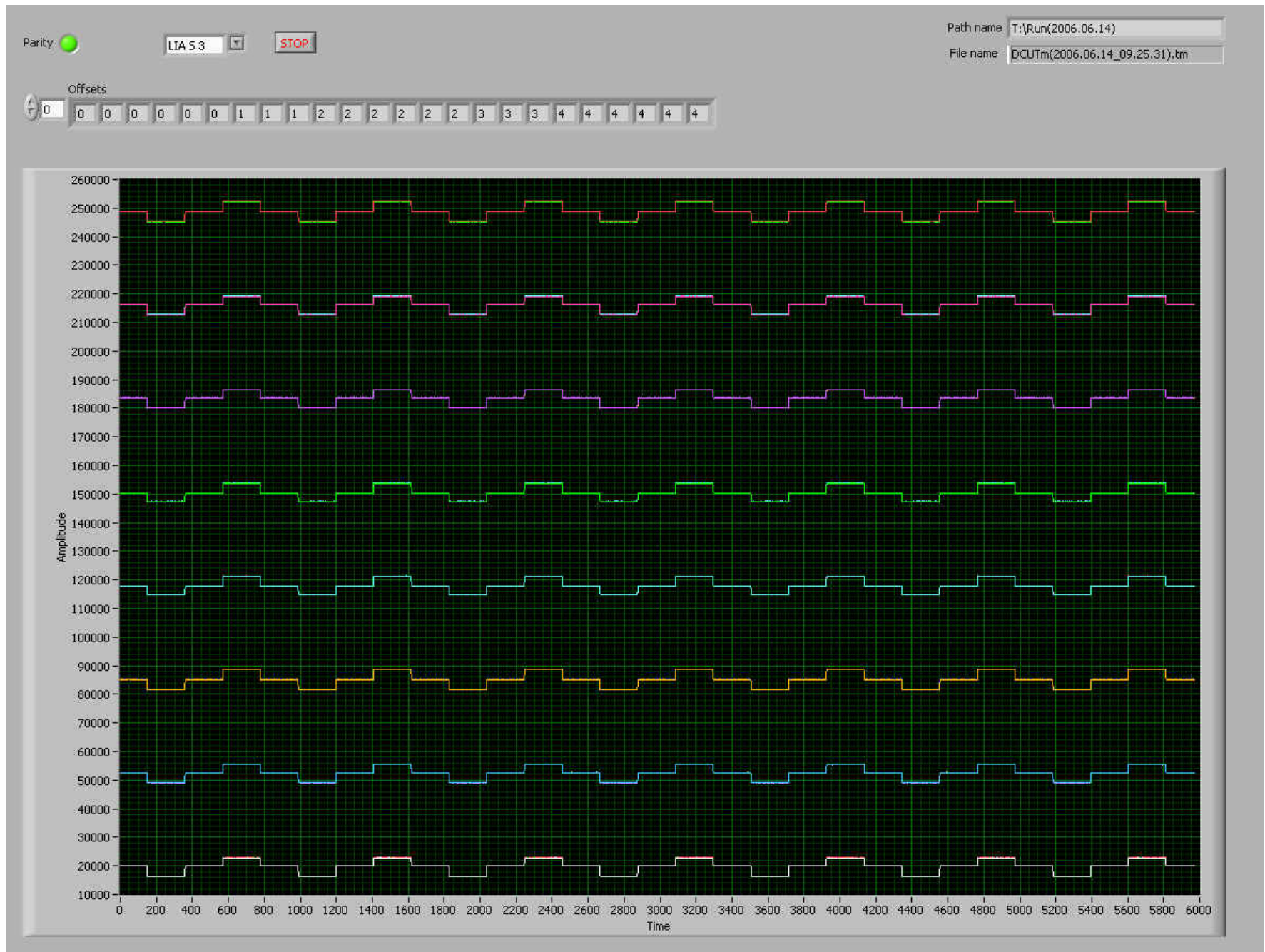


Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006



Report of functional tests

SAP-SPIRE- HT-0425-06 **V1.0**

Issue : 1.0

Date : 13/06/2006

Offsets	OK	NON OK
Test responsible Henri TRIOU Technical specialist Quality	Comments : TEST SUCCESSFULL	

Report of functional tests

6 HouseKeepings

6.1 Housekeeping acquisition

We start the DCU Monitoring Mode from LTU using the batch *DRCU Monitoring.txt*
We observe the results over a sufficient time (1 minute)

When LIAP LIAS are both OFF

	As run
Check LIAP & LIAS OFF	OK

When LIAP ON.

Include in as run the hardcopy off LTU monitoring screen (replace typical view provided here after)

Report of functional tests

Main side :

MONITORING

DCU

Nom Parametre	Description	Valeur C...	Min	Max	Unite
BIAS_TEMP	BIAS board Temp	22.46	-31.01	70.01	°C
LIA_S1_TEMP	LIAS board 1 Temp	21.25	-31.01	70.01	°C
LIA_S2_TEMP	LIAS board 2 Temp	20.86	-31.01	70.01	°C
LIA_S3_TEMP	LIAS board 3 Temp	20.38	-31.01	70.01	°C
LIA_P9_TEMP	LIAP board 9 Temp	21.63	-31.01	70.01	°C
LIA_P8_TEMP	LIAP board 8 Temp	22.11	-31.01	70.01	°C
LIA_P7_TEMP	LIAP board 7 Temp	21.83	-31.01	70.01	°C
LIA_P6_TEMP	LIAP board 6 Temp	22.00	-31.01	70.01	°C
LIA_P5_TEMP	LIAP board 5 Temp	21.94	-31.01	70.01	°C
LIA_P4_TEMP	LIAP board 4 Temp	22.15	-31.01	70.01	°C
LIA_P3_TEMP	LIAP board 3 Temp	21.82	-31.01	70.01	°C
LIA_P2_TEMP	LIAP board 2 Temp	21.91	-31.01	70.01	°C
LIA_P1_TEMP	LIAP board 1 Temp	22.09	-31.01	70.01	°C
DAQ_IF_TEMP	DAQ_IF board Temp	24.49	-31.01	70.01	°C
BDAQ_P5	BIAS/DAQ_IF +5V(before post regu...	5.11	4.90	5.26	V
BDAQ_P9	BIAS/DAQ_IF +9V(before post regu...	8.97	8.50	9.10	V
BDAQ_N9	BIAS/DAQ_IF -9V(before post regul...	-9.04	-9.10	-8.50	V
LIAP_P5	LIAP +5V(before post regulator)	5.16	4.90	5.27	V
LIAP_P9	LIAP +9V(before post regulator)	11.51	11.20	11.60	V
LIAP_N9	LIAP -9V(before post regulator)	-11.53	-11.60	-11.20	V
LIAS_P5	LIAS +5V(before post regulator)	0.09	4.90	5.26	V
LIAS_P9	LIAS +9V(before post regulator)	0.01	11.20	11.60	V
LIAS_N9	LIAS -9V(before post regulator)	0.01	-11.60	-11.20	V
PWR_STATUS	LIA1 to LIA12 12 +5V/+9V/-9V status	0000	0.00	0.00	hexa
T/C_1	16 bits ADC (Offset=0) 1	2207			Decimal
T/C_2	16 bits ADC (Offset=0) 2	4351			Decimal
T/C_3	16 bits ADC (Offset=0) 3	255			Decimal

SCU

Status

Nom Parametre	Description	Valeur Lue H...	Valeur Nomin...
ScuStatus	SCU Status	0000	

Temperatures

Nom Parametre	Description	Valeur Conver...	Unite
Csu Temp	CCHK_IF Board temperature	21.00	°C
Tsu Temp	Temp Board temperature	21.00	°C
Psu Temp1	PSU temperature 1	25.00	°C
Psu Temp2	PSU temperature 2	26.00	°C

Reference/Voltage

Nom Parametre	Description	Valeur Conver...	Valeur Lue H...	Min	Max
ScuCHTp05	+5V DC powe...	5.25	697A	4.77	5.28
ScuCHTp09	+9V DC powe...	9.09	6881	8.89	9.07
ScuCHTn09	-9V DC power...	-9.08	9759	-9.07	-8.88
ScuCHT25	+2.5V DC inte...	2.52	408E	2.47	2.55
ScuCHTref	Internal voltag...	1.23	3F13	1.21	1.25
ScuCHTgnd	Internal Groun...	0.00	0005	-0.04	0.04
ScuHTTref	Internal voltag...	1.23	3F3A	1.21	1.25
ScuHTTgnd	Internal Groun...	-0.00	FFFB	-0.04	0.04

MCU

Nom Par...	Description	Valeur Decimale	Valeur Convertie	Min	Max	Unite
5V	+5V power supply vol...		4.85	5.25		V
P14V	+14V power supply vo...		14.20	14.60		V
M14V	-14V power supply vol...		-14.60	-14.20		V
P15V	+15V power supply vo...		15.20	15.60		V
M15V	-15V power supply vol...		-15.60	-15.20		V
MACTemp	MAC temperature probe		-5.75	30.00		°C
SMECTemp	SMEC temperature pr...		-5.75	30.00		°C
BSMTemp	BSM temperature probe		-5.75	30.00		°C
ErrorCode	errors, warnings occur...		0.00	0.00		

Report of functional tests

Redundant side :

MONITORING

DCU

Nom Parametre	Description	Valeur C...	Min	Max	Unite
BIAS_TEMP	BIAS board Temp	21.47	-31.01	70.01	°C
LIA_S1_TEMP	LIAS board 1 Temp	21.04	-31.01	70.01	°C
LIA_S2_TEMP	LIAS board 2 Temp	20.92	-31.01	70.01	°C
LIA_S3_TEMP	LIAS board 3 Temp	20.72	-31.01	70.01	°C
LIA_P9_TEMP	LIAP board 9 Temp	21.77	-31.01	70.01	°C
LIA_P8_TEMP	LIAP board 8 Temp	21.66	-31.01	70.01	°C
LIA_P7_TEMP	LIAP board 7 Temp	21.66	-31.01	70.01	°C
LIA_P6_TEMP	LIAP board 6 Temp	22.05	-31.01	70.01	°C
LIA_P5_TEMP	LIAP board 5 Temp	21.80	-31.01	70.01	°C
LIA_P4_TEMP	LIAP board 4 Temp	21.98	-31.01	70.01	°C
LIA_P3_TEMP	LIAP board 3 Temp	21.89	-31.01	70.01	°C
LIA_P2_TEMP	LIAP board 2 Temp	22.18	-31.01	70.01	°C
LIA_P1_TEMP	LIAP board 1 Temp	21.65	-31.01	70.01	°C
DAQ_IF_TEMP	DAQ_IF board Temp	21.22	-31.01	70.01	°C
BDAQ_P5	BIAS/DAQ_IF +5V(before post regu...	5.09	4.90	5.26	V
BDAQ_P9	BIAS/DAQ_IF +9V(before post regu...	8.99	8.50	9.10	V
BDAQ_N9	BIAS/DAQ_IF -9V(before post regul...	-9.06	-9.10	-8.50	V
LIAP_P5	LIAP +5V(before post regulator)	5.17	4.90	5.27	V
LIAP_P9	LIAP +9V(before post regulator)	11.52	11.20	11.60	V
LIAP_N9	LIAP -9V(before post regulator)	-11.53	-11.60	-11.20	V
LIAS_P5	LIAS +5V(before post regulator)	0.00	4.90	5.26	V
LIAS_P9	LIAS +9V(before post regulator)	0.00	11.20	11.60	V
LIAS_N9	LIAS -9V(before post regulator)	0.00	-11.60	-11.20	V
PWR_STATUS	LIA1 to LIA12 12 +5V/+9V/-9V status	0000	0.00	0.00	hexa
T/C_1	16 bits ADC (Offset=0) 1	2173			Decimal
T/C_2	16 bits ADC (Offset=0) 2	255			Decimal
T/C_3	16 bits ADC (Offset=0) 3	250			Decimal

SCU

Status

Nom Parametre	Description	Valeur Lue H...	Valeur Nomin...
ScuStatus	SCU Status	0000	

Temperatures

Nom Parametre	Description	Valeur Conver...	Unite
Csu Temp	CCHK_IF Board temperature	21.00	°C
Tsu Temp	Temp Board temperature	22.00	°C
Psu Temp1	PSU temperature 1	23.00	°C
Psu Temp2	PSU temperature 2	24.00	°C

Reference/Voltage

Nom Parametre	Description	Valeur Conver...	Valeur Lue H...	Min	Max
ScuCHTp05	+5V DC powe...	5.24	6944	4.77	5.28
ScuCHTp09	+9V DC powe...	9.09	6889	8.89	9.07
ScuCHTn09	-9V DC power...	-9.11	971A	-9.07	-8.88
ScuCHT25	+2.5V DC inte...	2.52	4092	2.47	2.55
ScuCHTref	Internal voltag...	1.23	3F19	1.21	1.25
ScuCHTgnd	Internal Groun...	0.00	0009	-0.04	0.04
ScuTHTref	Internal voltag...	1.24	3F4B	1.21	1.25
ScuTHTgnd	Internal Groun...	-0.00	FFFF	-0.04	0.04

MCU

Nom Par...	Description	Valeur Decimale	Valeur Convertie	Min	Max	Unite
5V	+5V power supply volt...		4.85	5.25		V
P14V	+14V power supply vo...		14.20	14.60		V
M14V	-14V power supply vol...		-14.60	-14.20		V
P15V	+15V power supply vo...		15.20	15.60		V
M15V	-15V power supply vol...		-15.60	-15.20		V
MACTemp	MAC temperature probe		-5.75	30.00		°C
SMECTemp	SMEC temperature pr...		-5.75	30.00		°C
BSMTemp	BSM temperature probe		-5.75	30.00		°C
ErrorCode	errors, warnings occur...		0.00	0.00		

Report of functional tests

When LIAP OFF and LIAS ON.

Include in as run the hardcopy off LTU monitoring screen (replace typical view provided here after)

Main side :

MONITORING

DCU

Nom Parametre	Description	Valeur C...	Min	Max	Unite
BIAS_TEMP	BIAS board Temp	22.60	-31.01	70.01	°C
LIA_S1_TEMP	LIAS board 1 Temp	21.41	-31.01	70.01	°C
LIA_S2_TEMP	LIAS board 2 Temp	20.95	-31.01	70.01	°C
LIA_S3_TEMP	LIAS board 3 Temp	20.49	-31.01	70.01	°C
LIA_P9_TEMP	LIAP board 9 Temp	21.82	-31.01	70.01	°C
LIA_P8_TEMP	LIAP board 8 Temp	22.35	-31.01	70.01	°C
LIA_P7_TEMP	LIAP board 7 Temp	22.08	-31.01	70.01	°C
LIA_P6_TEMP	LIAP board 6 Temp	22.29	-31.01	70.01	°C
LIA_P5_TEMP	LIAP board 5 Temp	22.18	-31.01	70.01	°C
LIA_P4_TEMP	LIAP board 4 Temp	22.46	-31.01	70.01	°C
LIA_P3_TEMP	LIAP board 3 Temp	22.12	-31.01	70.01	°C
LIA_P2_TEMP	LIAP board 2 Temp	22.14	-31.01	70.01	°C
LIA_P1_TEMP	LIAP board 1 Temp	22.27	-31.01	70.01	°C
DAQ_IF_TEMP	DAQ_IF board Temp	24.62	-31.01	70.01	°C
BDAQ_P5	BIAS/DAQ_IF +5V(before post regu...	5.11	4.90	5.26	V
BDAQ_P9	BIAS/DAQ_IF +9V(before post regu...	8.97	8.50	9.10	V
BDAQ_N9	BIAS/DAQ_IF -9V(before post regul...	-9.05	-9.10	-8.50	V
LIAP_P5	LIAP +5V(before post regulator)	0.23	4.90	5.27	V
LIAP_P9	LIAP +9V(before post regulator)	0.01	11.20	11.60	V
LIAP_N9	LIAP -9V(before post regulator)	0.01	-11.60	-11.20	V
LIAS_P5	LIAS +5V(before post regulator)	5.21	4.90	5.26	V
LIAS_P9	LIAS +9V(before post regulator)	11.55	11.20	11.60	V
LIAS_N9	LIAS -9V(before post regulator)	-11.55	-11.60	-11.20	V
PwR_STATUS	LIA1 to LIA12 12 +5V/+9V/-9V status	0000	0.00	0.00	hexa
T/C_1	16 bits ADC (Offset=0) 1	2207			Decimal
T/C_2	16 bits ADC (Offset=0) 2	4351			Decimal
T/C_3	16 bits ADC (Offset=0) 3	255			Decimal

SCU

Status

Nom Parametre	Description	Valeur Lue H...	Valeur Nomin...
ScuStatus	SCU Status	0000	

Temperatures

Nom Parametre	Description	Valeur Conver...	Unite
Csu Temp	CCHK_IF Booard temperature	21.00	°C
Tsu Temp	Temp Board temperature	21.00	°C
Psu Temp1	PSU temperature 1	25.00	°C
Psu Temp2	PSU temperature 2	26.00	°C

Reference/Voltage

Nom Parametre	Description	Valeur Conver...	Valeur Lue H...	Min	Max
ScuCHTp05	+5V DC powe...	5.25	697A	4.77	5.28
ScuCHTp09	+9V DC powe...	9.09	68B2	8.89	9.07
ScuCHTn09	-9V DC powe...	-9.08	9758	-9.07	-8.88
ScuCHT25	+2.5V DC inte...	2.52	4092	2.47	2.55
ScuCHTref	Internal voltag...	1.23	3F12	1.21	1.25
ScuCHTgnd	Internal Groun...	0.00	0005	-0.04	0.04
ScuTHTref	Internal voltag...	1.23	3F3A	1.21	1.25
ScuTHTgnd	Internal Groun...	-0.00	FFFD	-0.04	0.04

MCU

Nom Par...	Description	Valeur Decimale	Valeur Convertie	Min	Max	Unite
5V	+5V power supply volt...			4.85	5.25	V
P14V	+14V power supply vo...			14.20	14.60	V
M14V	-14V power supply vol...			-14.60	-14.20	V
P15V	+15V power supply vo...			15.20	15.60	V
M15V	-15V power supply vol...			-15.60	-15.20	V
MACTemp	MAC temperature probe			-5.75	30.00	°C
SMECTemp	SMEC temperature pr...			-5.75	30.00	°C
BSMTemp	BSM temperature probe			-5.75	30.00	°C
ErrorCode	errors, warnings occur...			0.00	0.00	

29

Report of functional tests

Redundant side :

MONITORING

DCU

Nom Parametre	Description	Valeur C...	Min	Max	Unite
BIAS_TEMP	BIAS board Temp	22.14	-31.01	70.01	°C
LIA_S1_TEMP	LIAS board 1 Temp	21.19	-31.01	70.01	°C
LIA_S2_TEMP	LIAS board 2 Temp	21.13	-31.01	70.01	°C
LIA_S3_TEMP	LIAS board 3 Temp	20.99	-31.01	70.01	°C
LIA_P9_TEMP	LIAP board 9 Temp	21.89	-31.01	70.01	°C
LIA_P8_TEMP	LIAP board 8 Temp	21.77	-31.01	70.01	°C
LIA_P7_TEMP	LIAP board 7 Temp	21.82	-31.01	70.01	°C
LIA_P6_TEMP	LIAP board 6 Temp	22.15	-31.01	70.01	°C
LIA_P5_TEMP	LIAP board 5 Temp	21.95	-31.01	70.01	°C
LIA_P4_TEMP	LIAP board 4 Temp	22.14	-31.01	70.01	°C
LIA_P3_TEMP	LIAP board 3 Temp	22.02	-31.01	70.01	°C
LIA_P2_TEMP	LIAP board 2 Temp	22.27	-31.01	70.01	°C
LIA_P1_TEMP	LIAP board 1 Temp	21.74	-31.01	70.01	°C
DAQ_IF_TEMP	DAQ_IF board Temp	23.10	-31.01	70.01	°C
BDAQ_P5	BIAS/DAQ_IF +5V(before post regu...	5.09	4.90	5.26	V
BDAQ_P9	BIAS/DAQ_IF +9V(before post regu...	8.99	8.50	9.10	V
BDAQ_N9	BIAS/DAQ_IF -9V(before post regul...	-9.06	-9.10	-8.50	V
LIAP_P5	LIAP +5V(before post regulator)	0.00	4.90	5.27	V
LIAP_P9	LIAP +9V(before post regulator)	0.00	11.20	11.60	V
LIAP_N9	LIAP -9V(before post regulator)	-0.00	-11.60	-11.20	V
LIAS_P5	LIAS +5V(before post regulator)	5.22	4.90	5.26	V
LIAS_P9	LIAS +9V(before post regulator)	11.55	11.20	11.60	V
LIAS_N9	LIAS -9V(before post regulator)	-11.56	-11.60	-11.20	V
PWR_STATUS	LIA1 to LIA12 12 +5V/+9V/-9V status	0000	0.00	0.00	hexa
T/C_1	16 bits ADC (Offset=0) 1	2173			Decimal
T/C_2	16 bits ADC (Offset=0) 2	255			Decimal
T/C_3	16 bits ADC (Offset=0) 3	250			Decimal

SCU

Status

Nom Parametre	Description	Valeur Lue H...	Valeur Nomin...
ScuStatus	SCU Status	0000	

Temperatures

Nom Parametre	Description	Valeur Conver...	Unite
Csu Temp	CCHK_IF Board temperature	22.00	°C
Tsu Temp	Temp Board temperature	22.00	°C
Psu Temp1	PSU temperature 1	25.00	°C
Psu Temp2	PSU temperature 2	26.00	°C

Reference/Voltage

Nom Parametre	Description	Valeur Conver...	Valeur Lue H...	Min	Max
ScuCHTp05	+5V DC powe...	5.24	6943	4.77	5.28
ScuCHTp09	+9V DC powe...	9.09	688A	8.89	9.07
ScuCHTn09	-9V DC power...	-9.11	9717	-9.07	-8.88
ScuCHT25	+2.5V DC inte...	2.52	4090	2.47	2.55
ScuCHTref	Internal voltag...	1.23	3F1A	1.21	1.25
ScuCHTgnd	Internal Groun...	0.00	000B	-0.04	0.04
ScuTHTref	Internal voltag...	1.24	3F4C	1.21	1.25
ScuTHTgnd	Internal Groun...	0.00	0001	-0.04	0.04

MCU

Nom Par...	Description	Valeur Decimale	Valeur Convertie	Min	Max	Unite
5V	+5V power supply volt...		4.85	5.25		V
P14V	+14V power supply vo...		14.20	14.60		V
M14V	-14V power supply vol...		-14.60	-14.20		V
P15V	+15V power supply vo...		15.20	15.60		V
M15V	-15V power supply vol...		-15.60	-15.20		V
MACTemp	MAC temperature probe		-5.75	30.00		°C
SMECTemp	SMEC temperature pr...		-5.75	30.00		°C
BSMTemp	BSM temperature probe		-5.75	30.00		°C
ErrorCode	errors, warnings occur...		0.00	0.00		

Switch LIAS OFF and stop LTU monitoring.

6.2 Conclusion

Housekeeping TEST	OK	NON OK
Test responsible Henri TRIOU Technical specialist Quality	Comments : TEST SUCCESSFULL	

Report of functional tests

7 BIAS generation tests

7.1 BIAS setting

⇒ The FPU simulator must be in slave mode and generating measurement files; one can use any simulator script file (for instance, Script_Spire_01.spt), only the outcoming measurement file matters.

⇒ The Batch executed by LTU is : BIAS-TESTS Main redundant.txt

⇒ 2 times (Main and Redundant) 7 FPU simulator measurement files (14 in total) generated that contain :

1 -> Bias frequency photometer

2 -> Bias frequency spectrometer

3 -> Bias amplitudes (PhotoBiasAmpl LW,PhotoBiasAmpl MW,PhotoBiasAmpl SW,PhotoBiasAmpl TC, SpectroBiasAmpl LW,SpectroBiasAmpl SW)

4 -> JFET amplitudes Vss

PhLWJFetVSS1 0-255

PhLWJFetVSS2 0-255

PhMWJFetVSS1 0-255

PhMWJFetVSS2 0-255

PhMWJFetVSS3 0-255

PhMWJFetVSS4 0-255

PhSWJFetVSS1 0-255

PhSWJFetVSS2 0-255

PhSWJFetVSS3 0-255

PhSWJFetVSS4 0-255

PhSWJFetVSS5 0-255

PhSWJFetVSS6 0-255

PhMWJFetTC 0-255

SpLWJFetVSS 0-255

SpSWJFetVSS1 0-255

SpSWJFetVSS2 0-255

5 -> JFET On successives (Vdd)

PhSWJFetPwr Vdd1

PhSWJFetPwr Vdd2

PhSWJFetPwr Vdd3

PhSWJFetPwr Vdd4

PhSWJFetPwr Vdd5

PhSWJFetPwr Vdd6

PhMLWJFetPwr Vdd1 MW

PhMLWJFetPwr Vdd2 MW

PhMLWJFetPwr Vdd3 MW

PhMLWJFetPwr Vdd4 MW

PhMLWJFetPwr Vdd1 LW

Report of functional tests

PhMLWJFetPwr Vdd2 LW
PhMLWJFetPwr Vdd TC
SpSLWJFetPwr Vdd SLW
SpSLWJFetPwr Vdd1 SSW
SpSLWJFetPwr Vdd2 SSW
All ON

6 -> Photo Heaters

PhotoHeater 0-255

7 -> Spectro Heaters

SpHeater 0-255

The measurement files obtained are :

Script_Spire_01_120606_145420\SPIRE_test_BIAS_1_1.mes

.

.

Script_Spire_01_120606_145420\SPIRE_test_BIAS_7_1.mes

Script_Spire_01_120606_145420\SPIRE_test_BIAS_8_1.mes

.

.

Script_Spire_01_120606_145420\SPIRE_test_BIAS_14_1.mes.

7.2 ANALYSIS

⇒ Check consistency with specification : use the Labview Software

⇒ 7 measurement files to analyze in Main as well as in redundant

Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006

7.2.1 Bias frequency photometer

Measurement file : SPIRE_test_BIAS_1_1.mes for main (resp. SPIRE_test_BIAS_8_1.mes for redundant)

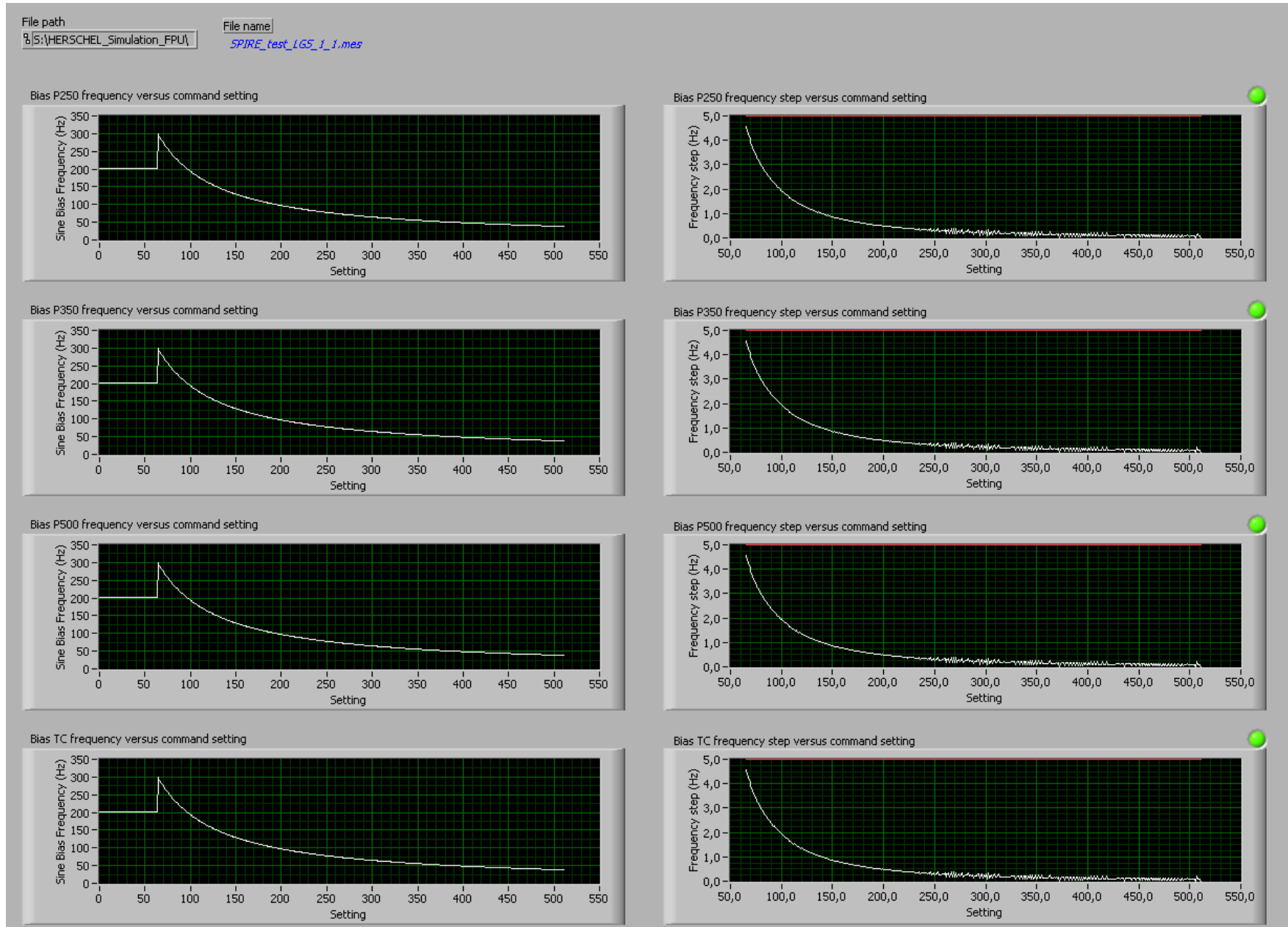
Click on photometer bias frequency button, and select the last generated file SPIRE_test_BIAS_1_1.mes for main (resp. SPIRE_test_BIAS_8_1.mes for redundant).

Check the four green lights.

Include in as run the hardcopy off Labview analysis screen (replace typical view provided here after)

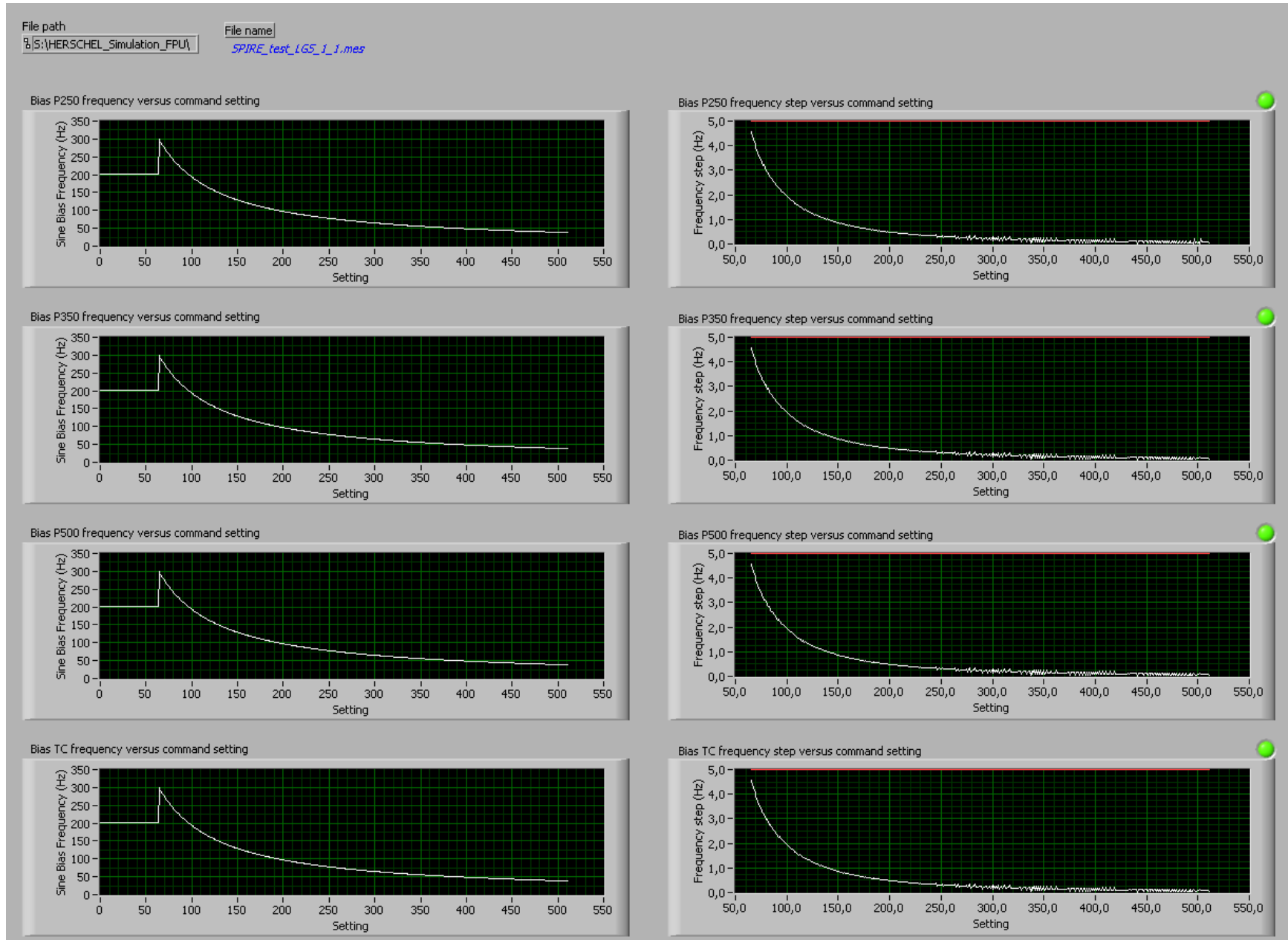
Report of functional tests

Main side :



Report of functional tests

Redundant side :



Report of functional tests

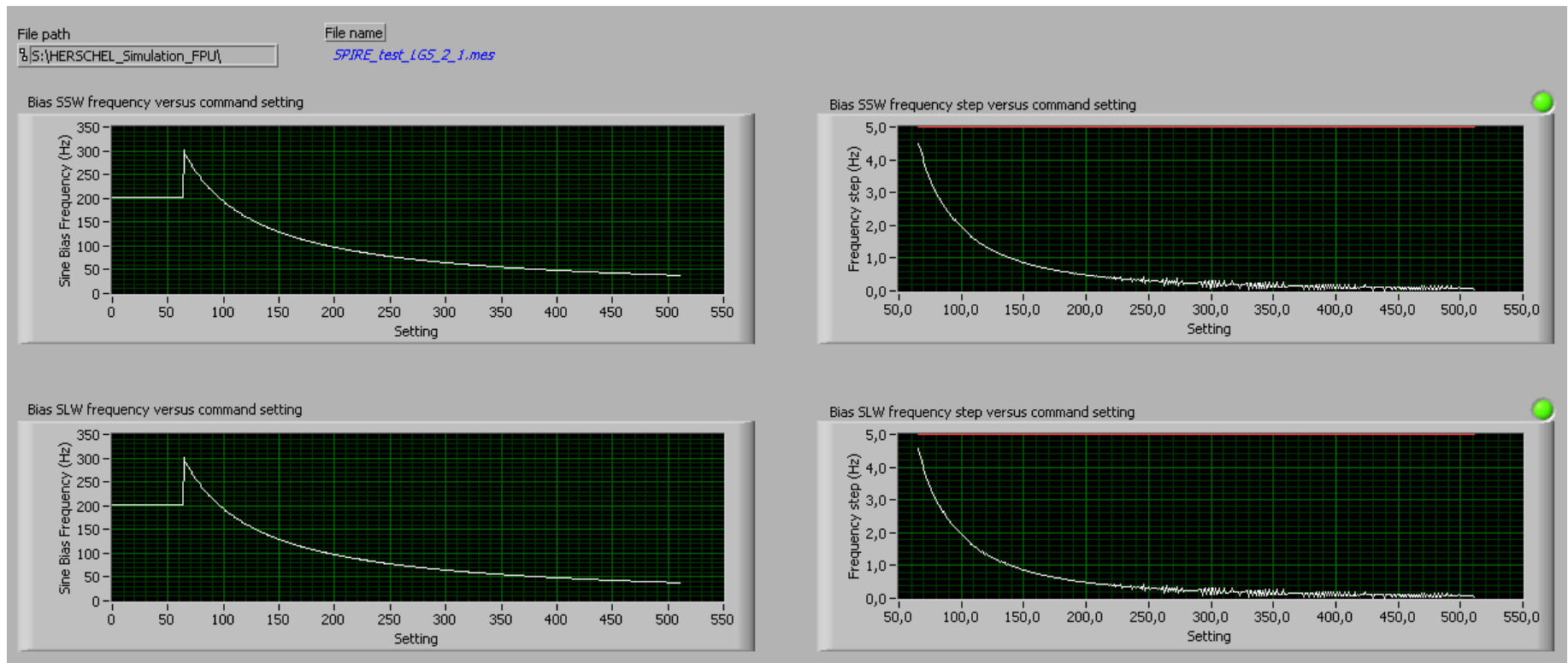
7.2.2 Bias frequency spectrometer

Measurement file : SPIRE_test_BIAS_2_1.mes for main (resp. SPIRE_test_BIAS_9_1.mes for redundant)

Click on spectrometer bias frequency button, and select the last generated file SPIRE_test_BIAS_2_1.mes for main (resp. SPIRE_test_BIAS_9_1.mes for redundant).
Check the two green lights.

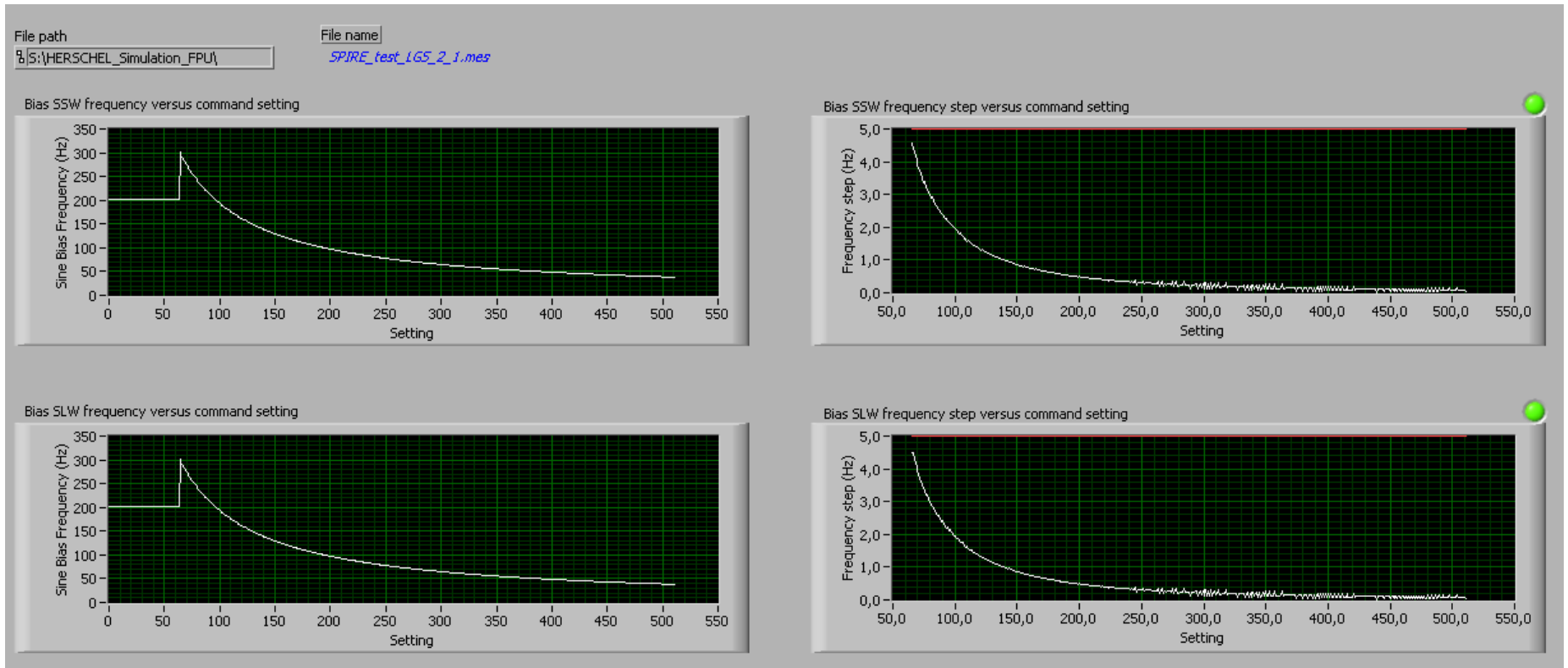
Include in as run the hardcopy off Labview analysis screen (replace typical view provided here after)

Main side :



Report of functional tests

Redundant side :



Report of functional tests

7.2.3 Bias amplitudes

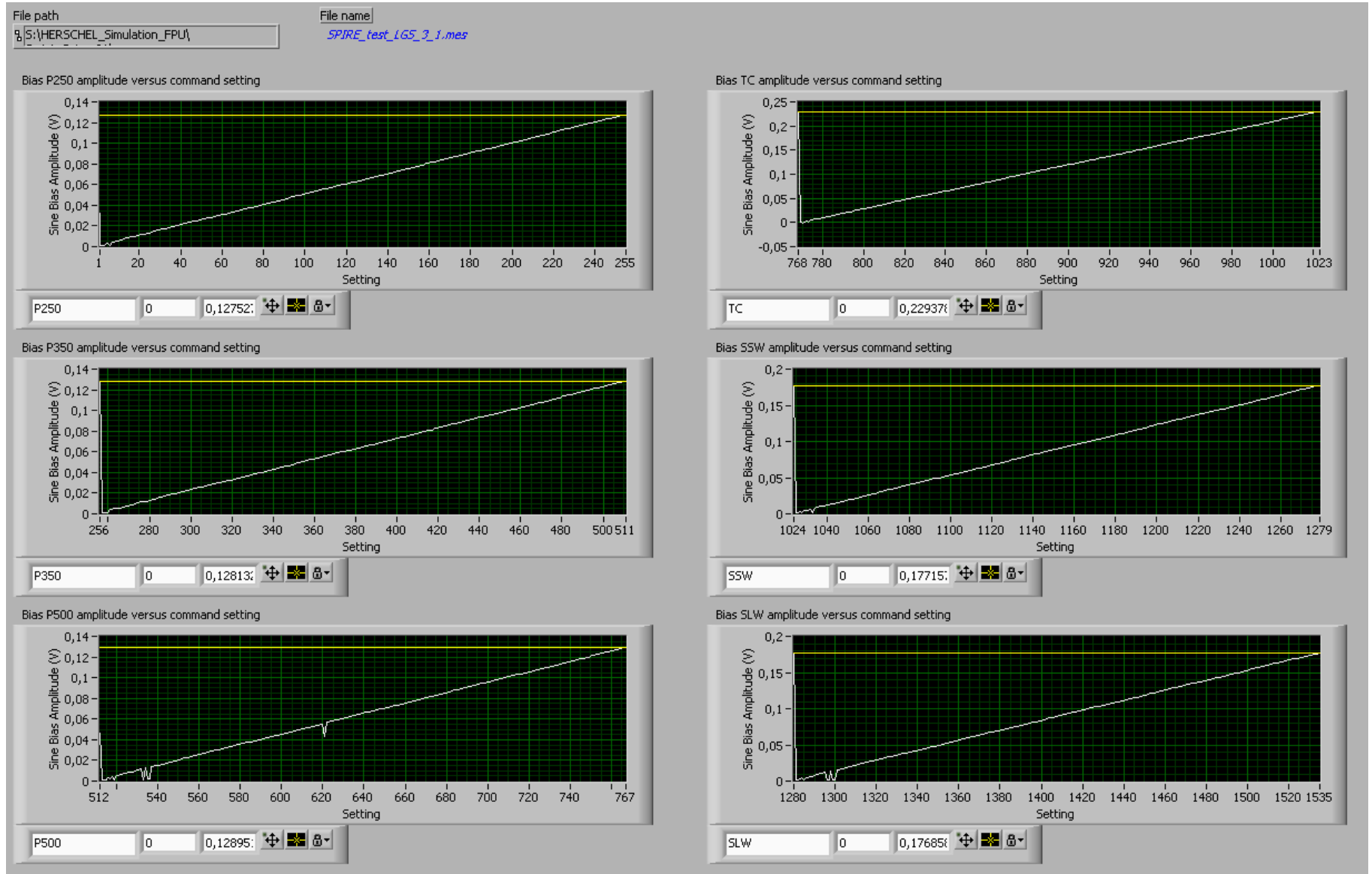
Measurement file : SPIRE_test_BIAS_3_1.mes for main (resp. SPIRE_test_BIAS_10_1.mes for redundant)

Click on photometer bias amplitude button, and select the last generated file SPIRE_test_BIAS_10_1.mes for main (resp. SPIRE_test_BIAS_8_1.mes for redundant).

Include in as run the hardcopy off Labview analysis screen (replace typical view provided here after)

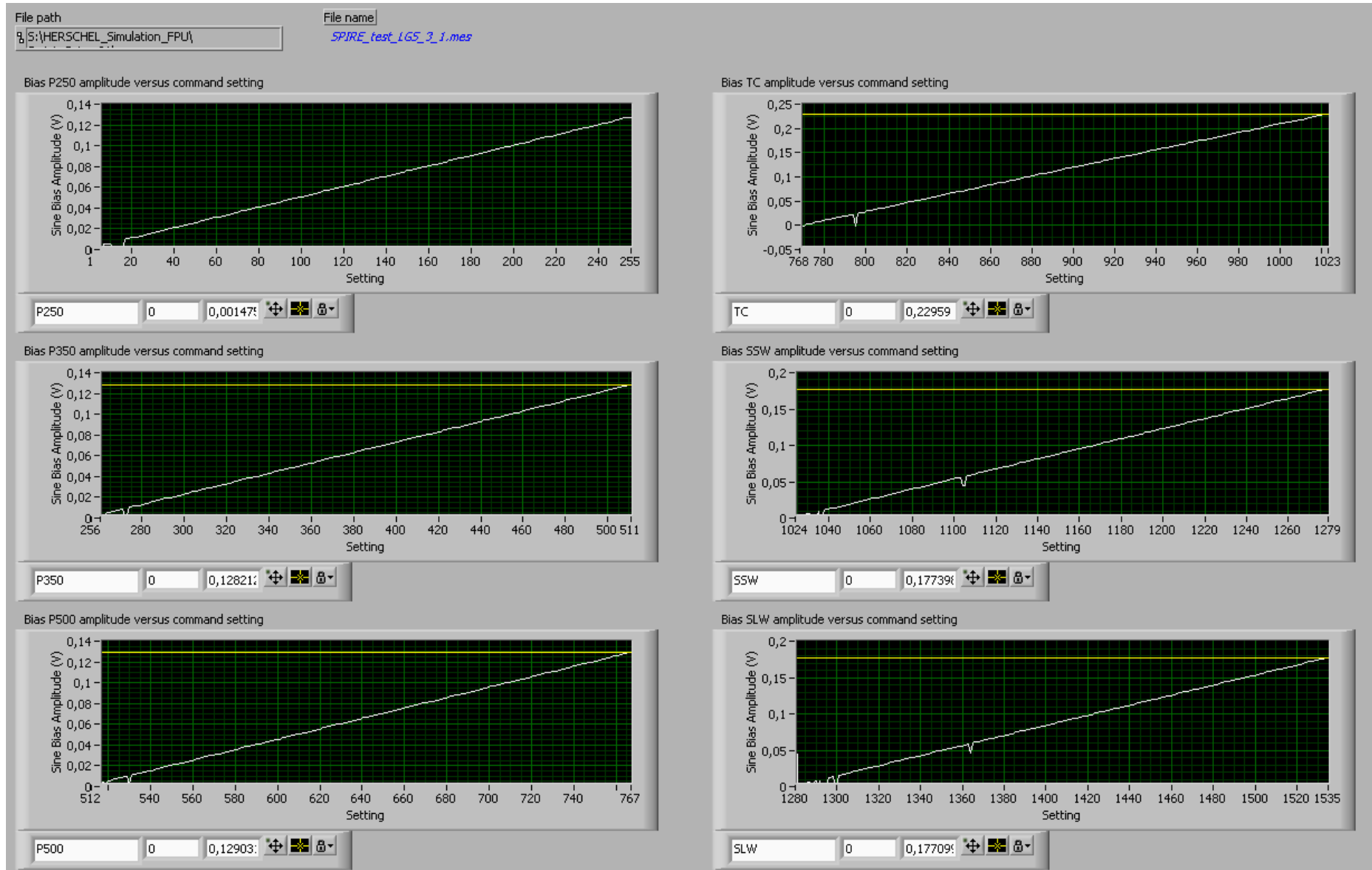
Report of functional tests

Main side :



Report of functional tests

Redundant side :



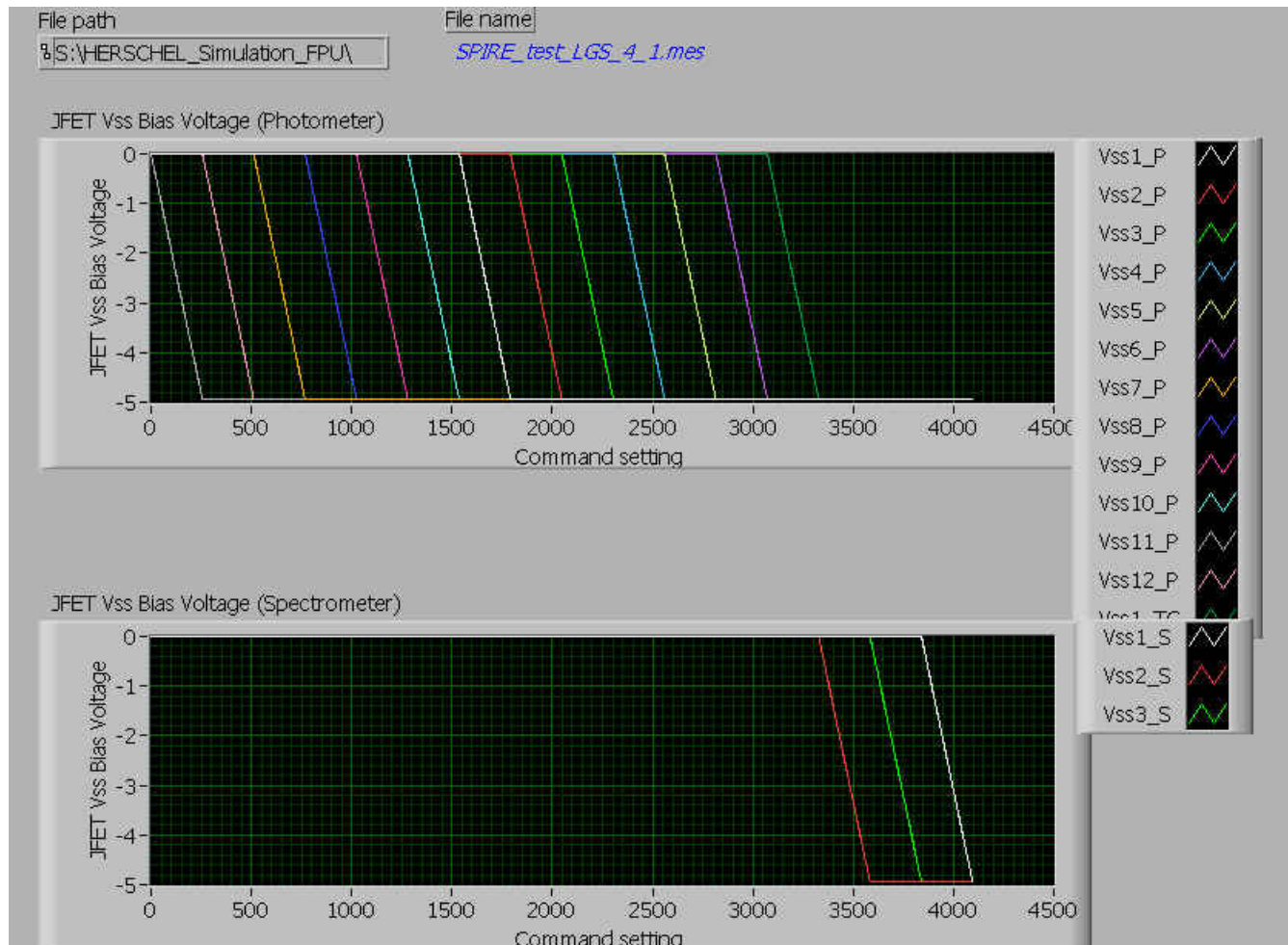
Report of functional tests

7.2.4 JFET amplitudes Vss

Measurement file : SPIRE_test_BIAS_4_1.mes for main (resp. SPIRE_test_BIAS_11_1.mes for redundant)

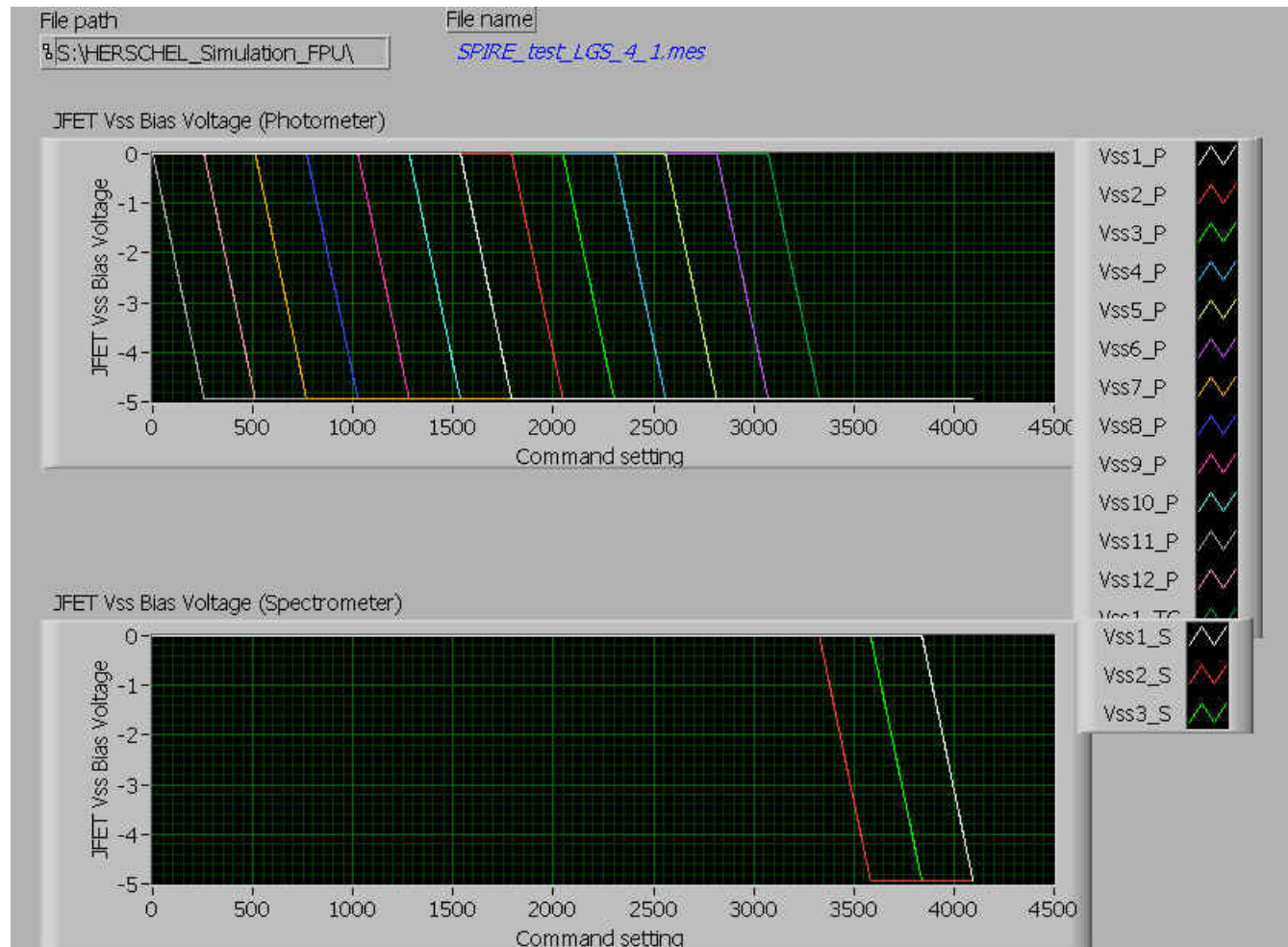
Click on JFET Vss bias button, and select the last generated file SPIRE_test_BIAS_4_1.mes for main (resp. SPIRE_test_BIAS_11_1.mes for redundant).

Main side :



Report of functional tests

Redundant side :



Report of functional tests

SAP-SPIRE- HT-0425-06 **V1.0**

Issue : 1.0

Date : 13/06/2006

7.2.5 JFET On successives (Vdd)

Measurement file : SPIRE_test_BIAS_5_1.mes for main (resp. SPIRE_test_BIAS_12_1.mes for redundant)

Click on JFET VDD bias button, Enter low level 0,0023V and select the last generated file SPIRE_test_BIAS_5_1.mes for main (resp. SPIRE_test_BIAS_12_1.mes for redundant).

Include in as run the hardcopy off Labview analysis screen (replace typical view provided here after)

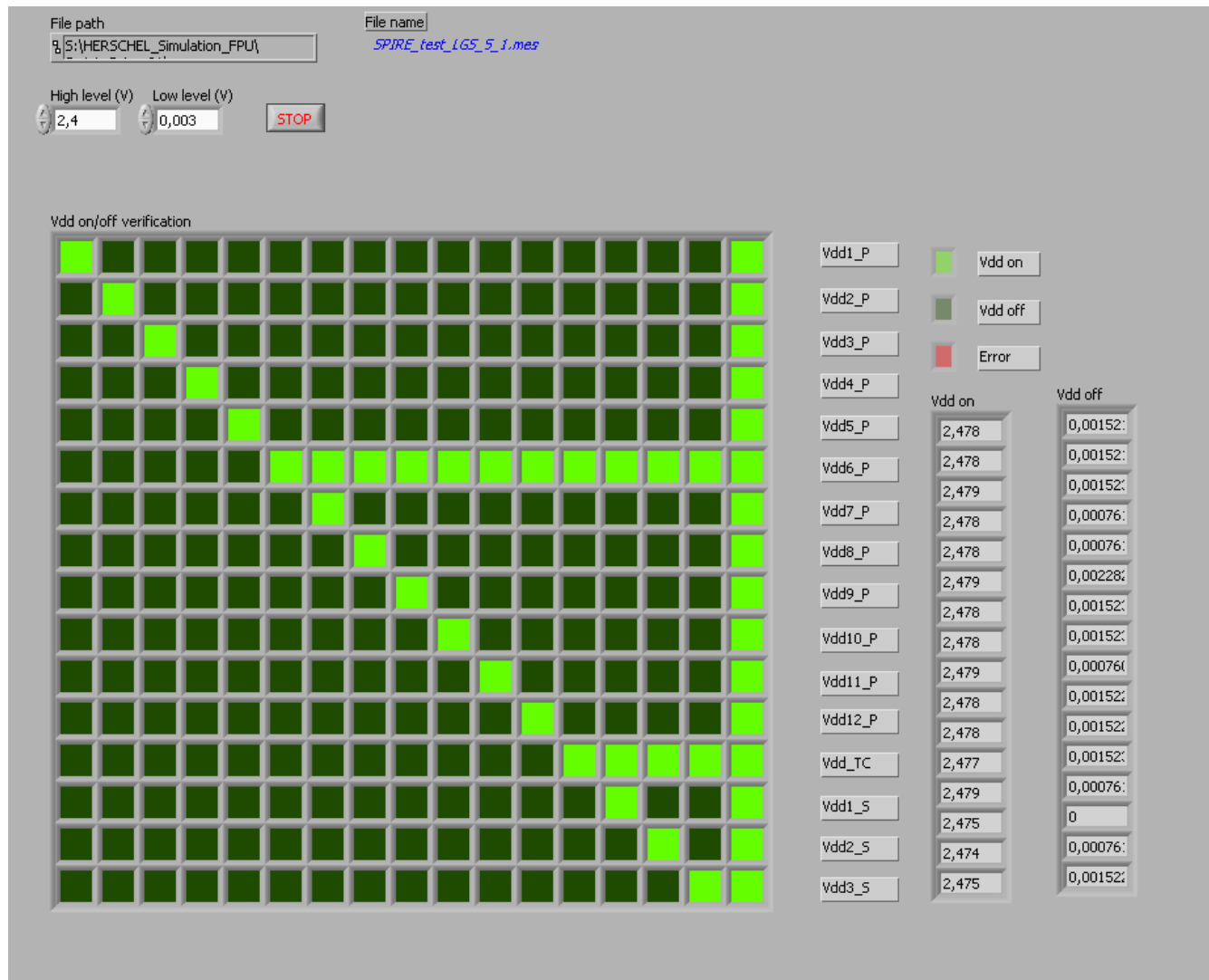
Report of functional tests

SAP-SPIRE- HT-0425-06 **V1.0**

Issue : 1.0

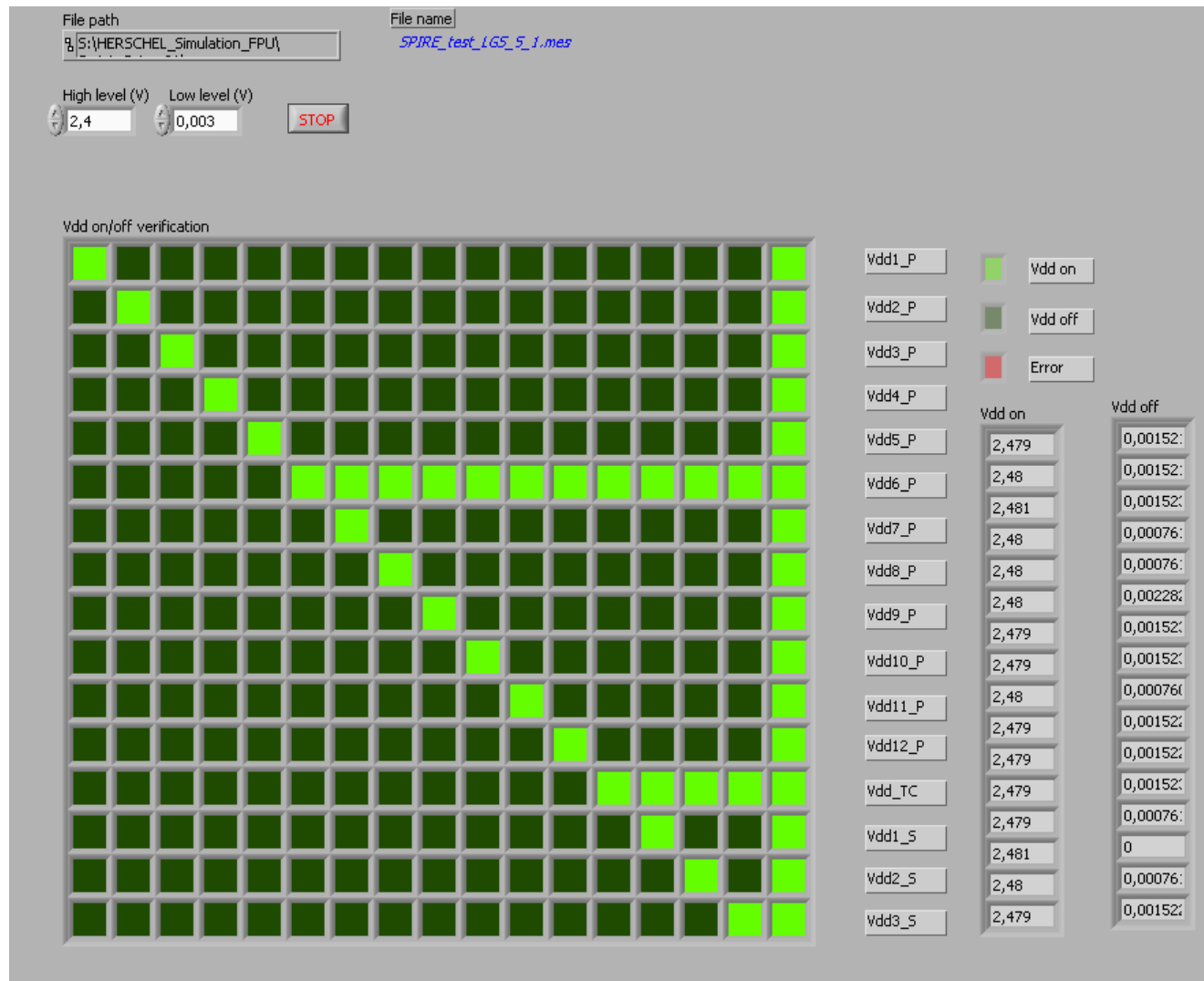
Date : 13/06/2006

Main side :



Report of functional tests

Redundant side :



7.2.6 Photo Heaters and Spectro Heaters

Measurement file : SPIRE_test_BIAS_6_1.mes for main (resp. SPIRE_test_BIAS_13_1.mes for redundant)

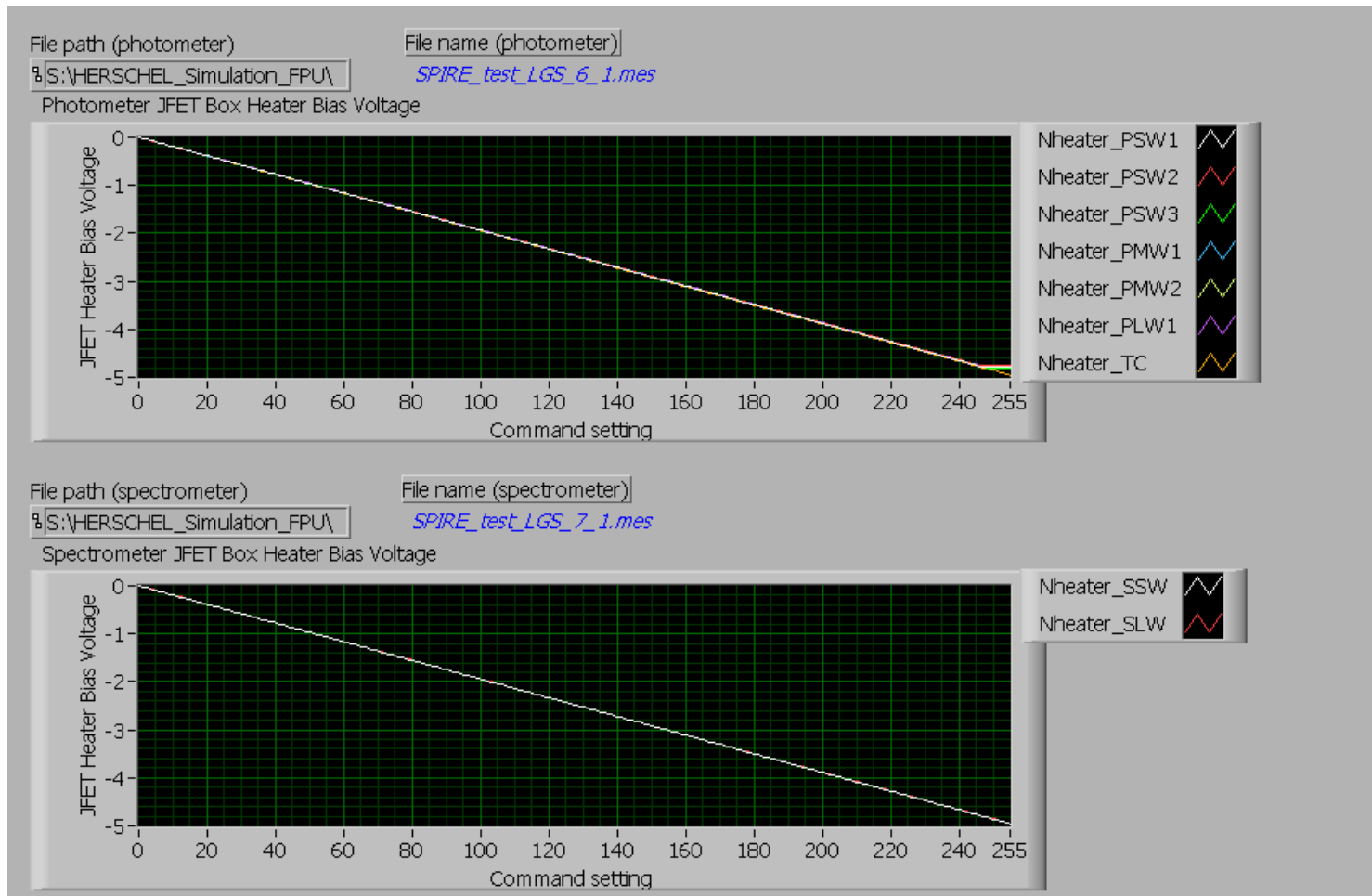
Measurement file : SPIRE_test_BIAS_7_1.mes for main (resp. SPIRE_test_BIAS_14_1.mes for redundant)

Click on photometer & spectrometer & JFET heater bias button, and select the last generated file SPIRE_test_BIAS_6_1.mes & SPIRE_test_BIAS_7_1.mes for main (resp. SPIRE_test_BIAS_13_1.mes and SPIRE_test_BIAS_14_1.mes for redundant)

Include in as run the hardcopy off Labview analysis screen (replace typical view provided here after)

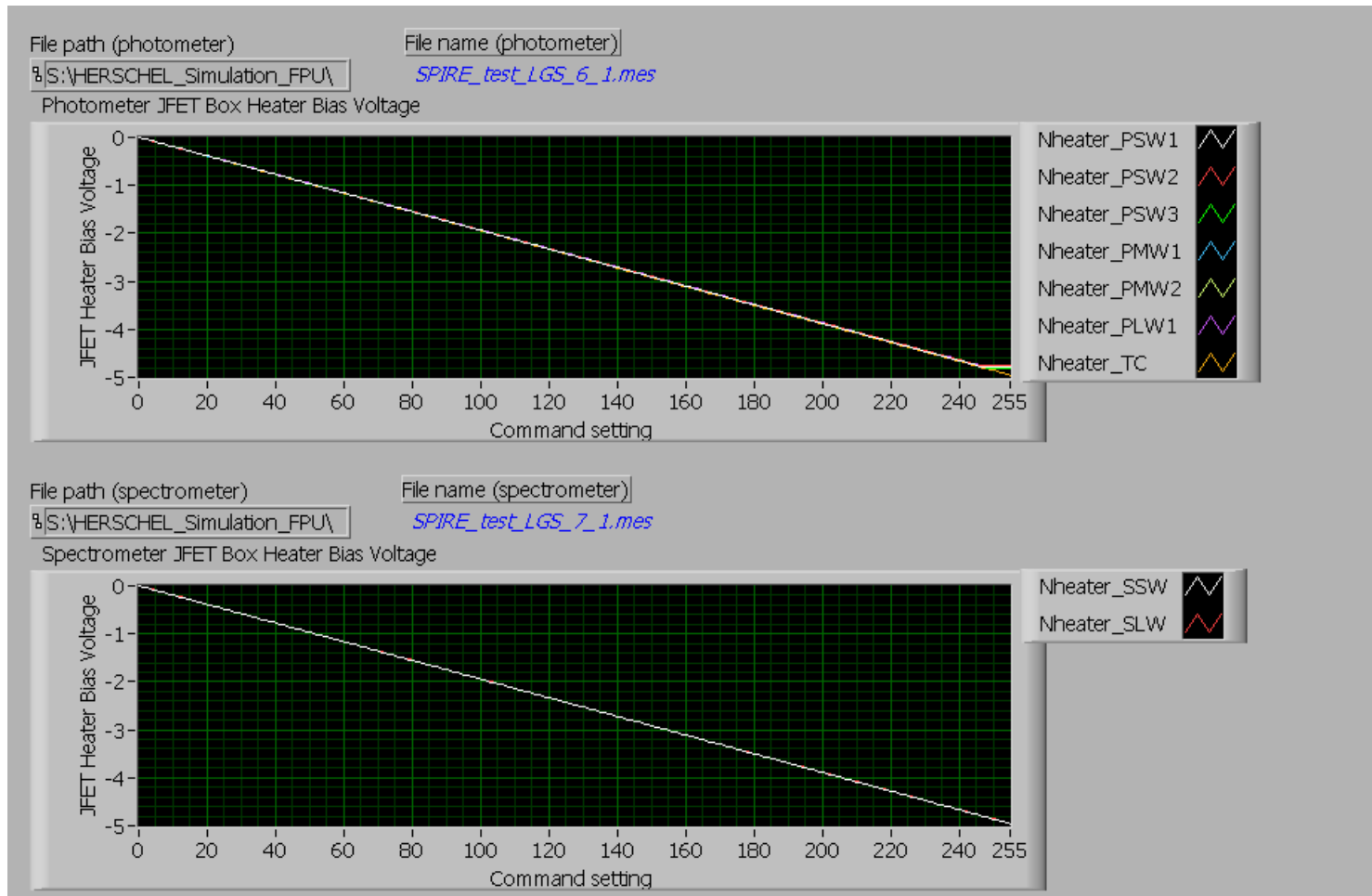
Report of functional tests

Main side :



Report of functional tests

Redundant side :



Report of functional tests

7.3 Conclusion

BIAS TEST	OK	NON OK
Test responsible Henri TRIOU Technical specialist Quality	Comments : TEST SUCCESSFULL	

Report of functional tests

8 BIAS test in stand alone mode : Monitoring of BIAS

When in SLAVE mode, we can check all the BIAS on a given working point. We the use the test sequence BIAS-TEST(stand alone).txt. (FPU simul in standalone, automatique, measure at 1Hz (script_spire_BIAS.spt)
 Check the measurement file on the FPU simulator : Values of all the BIAS at a given level (refer to the batch)
 The measurement file obtained is : Script_Spire_01_130606_092942\SPIRE_test_BIAS_1_1.mes.

We set the DAC to their maximum (test sequence : DCU BIAS-TEST(half level)Main Redundant.txt) and measure the BIAS at simulator level. The results are the following :
 Refer to file : SPIRE_test_BIAS_1_1.mes

Check BIAS amplitudes
 Check consistency with FPU simulator input files

Note : When the half maximum amplitude level is sent by the BIAS boars, the FPU simulator should measure about the following BIAS amplitude (to upate) :

	<u>Main</u>	<u>Red</u>
<i>PhotoBiasAmpl SW : Level 80 (HEXA), 128 (dec) :</i>	64,341 mV	64,341 mV
<i>PhotoBiasAmpl MW : Level 80 (HEXA), 128 (dec) :</i>	64,656 mV	64,736 mV
<i>PhotoBiasAmpl LW : Level 80 (HEXA), 128 (dec) :</i>	65,139 mV	65,139 mV
<i>PhotoBiasAmpl TC : Level 80 (HEXA), 128 (dec) :</i>	128,069 mV	128,069 mV
<i>SpectroBiasAmpl SW: Level 80 (HEXA), 128 (dec) :</i>	89,154 mV	89,154 mV
<i>SpectroBiasAmpl LW: Level 80 (HEXA), 128 (dec) :</i>	89,001 mV	89,001 mV

These new values are therefore the ones to set in the simulator input files :

GainInputAmplMiMax(05mv_Offset0)FM.in
Cross_Talk_Ampl_MiMax(05mv_Offset0)FM.in

The associated script files are :

Script_Spire_GainInputAmplMiMax(05mv_Offset0)FM.spt
Script_Spire_Cross_Ampl_MiMax(05mv_Offset0)FM.spt

Report of functional tests

9 Demodulation Tests

9.1 Procedure

Check LIAP LIAS are both OFF and

	As run
Check LIAP & LIAS OFF	OK

⇒ FPU simulator switched ON in stand alone

⇒ Run the Script *Script_Spire_GainInputAmplMiMax(05mv_Offset0)FM.spt*

⇒ Signal frequency = 1 Hz ⇒ simulator setting = 32 Hz

Note : The test is performed with a BIAS frequency of 203 Hz (photo and spectro)

⇒ Batch executed by LTU : "4 DCU DEMODULATION Main redundant.txt"

⇒ 4 TM file generated by LTU (DPU) (Photometer and spectrometer in Main and Redundant)

Note : If the FCU is not there, we need to switch ON the LIAP and the LIAS using the resistor load box. There need to proceed then in two steps (demodulation for photometer and demodulation for spectrometer).

⇒ Rename the files as follows :

	As run (Photometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_demod_photo_main</u>

	As run (Spectrometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_demod_spectro_main</u>

	As run (Photometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_demod_photo_redundant</u>

	As run (Spectrometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_demod_spectro_redundant</u>

Check LIAP and LIAS are OFF at the end of the test sequence

Report of functional tests

	As run
Check LIAP & LIAS OFF	OK

9.2 Data analysis

⇒ Analysis of the two TM files (photo or spectro) with the Labview software that computes the optimal phases (button demodulation analysis, with photometer and spectrometer selected); select the two TM files renamed above (spectro first, photo last). Wait for end of data analysis by labview (lights "psw completed", "pmw completed", "plw completed", "tc_completed", "ssw completed" and "slw completed")

Optimal Phase/setting Channel group	Main Side		Redundant Side	
	Optimal phase (°)	Optimal setting	Optimal phase (°)	Optimal setting
PSW	5,2	4	5,2	4
PMW	5,2	4	5,2	4
PLW	5,5	4	5,5	4
PTC	5,6	4	5,6	4
SSW	1,6	1	1,6	1
SLW	1,6	1	1,6	1

Check the criterions :
channel dispersion < 0,3°
mean optimal phase in [0°;+20°]

9.3 Batch edition

⇒ Set the optimal photometer and spectrometer demodulation values in the test sequences :

DCU ACQUISITIONS (Offsets a zero) Main redundant.txt

	As run	
Renamed batch files	<i>DCU ACQUISITIONS (Offsets a zero) Main redundant.txt</i>	<i>DCU ACQUISITIONS (Offsets a zero) Main redundant.txt</i>

Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006

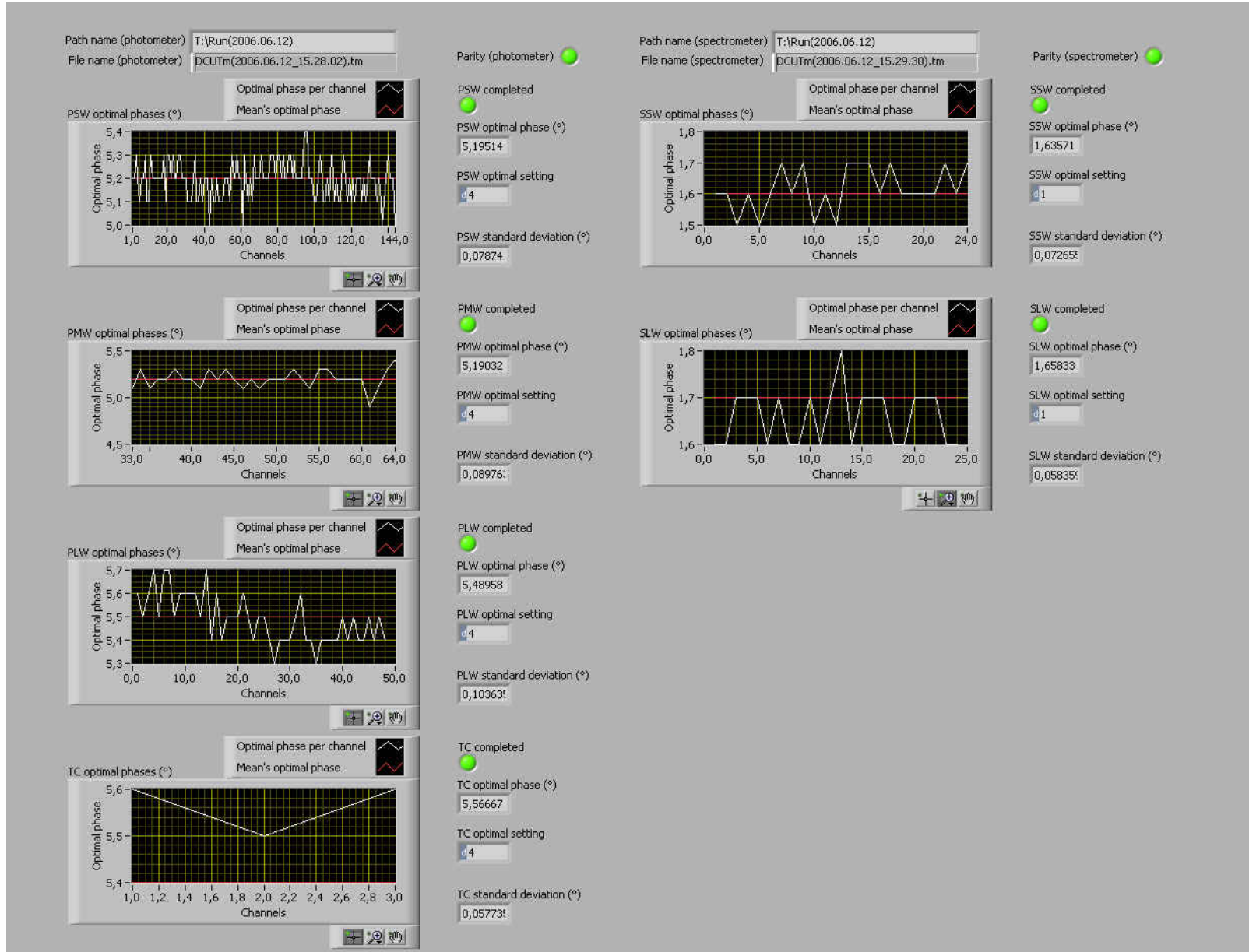
(nécessité de *Acquisitions_photomètre_ampl_mi-max.txt* et *Acquisitions_spectromètre_ampl_mi-max.txt*)

Example : set the xx, yy, zz, tt values to the computed ones

```
//-----  
/ Réglage des paramètres de démodulation  
//-----  
/ SetPhotoDemodSW 17 tempo0  
# D 0 41A 00xx 0000  
/ SetPhotoDemodMW 17 tempo0  
# D 0 41B 00yy 0000  
/ SetPhotoDemodLW 17 tempo0  
# D 0 41C 00zz 0000  
/ SetPhotoDemodTC 17 tempo0  
# D 0 41D 00tt 0000
```

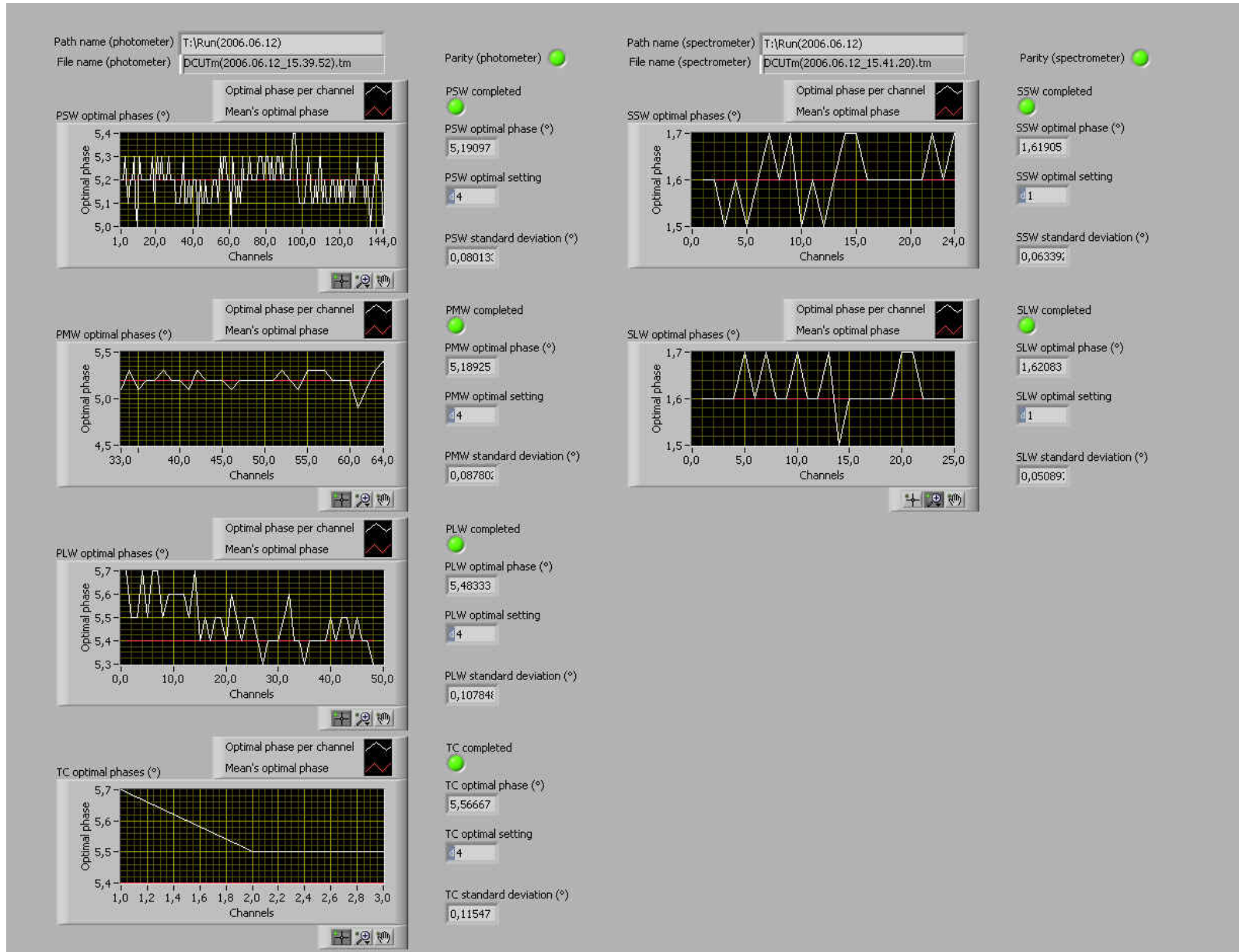
Report of functional tests

Main side



Report of functional tests

Redundant side



9.4 Conclusion

Demodulation TEST	OK	NON OK
Test responsible Henri TRIOU Technical specialist Quality	Comments : TEST SUCCESSFULL	

Report of functional tests

10 Gain Tests

10.1 Procedure

Check LIAP and LIAS are both OFF

	As run
Check LIAP & LIAS OFF	OK

⇒ FPU simulator switched ON in stand alone mode

⇒ Run the Script *Script_Spire_GainInput _Ampl_MiMax(05mv_Offset0)FM.spt* : sinusoidal signal with magnitude 0,5 mv pic pic. The FPU simulator sends on all channels a sinusoidal signal with a magnitude of 0,5 mV pic pic modulated at 100 % (Offset = 0)

⇒ We use a signal at 0,1 Hz ⇒ simulator frequency = 3,2 Hz

⇒ Batch executed by LTU : use the batch edited in previous § (5 DCU ACQUISITIONS (Offsets a zero) Main *redundant.txt*) : the LTU sets all offsets at 0 and performs TM acquisitions.

⇒ 4 TM file generated by LTU (DPU) (Photometer and spectrometer in Main and Redundant)

⇒ Rename the files as follows :

	As run (Photometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_gain_photo_main</u>

	As run (Spectrometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_gain_spectro_main</u>

	As run (Photometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_gain_photo_redundant</u>

	As run (Spectrometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_gain_spectro_redundant</u>

Check LIAP and LIAS are both OFF at the end of the test sequence

10.2 Data analysis

10.2.1 Photometer

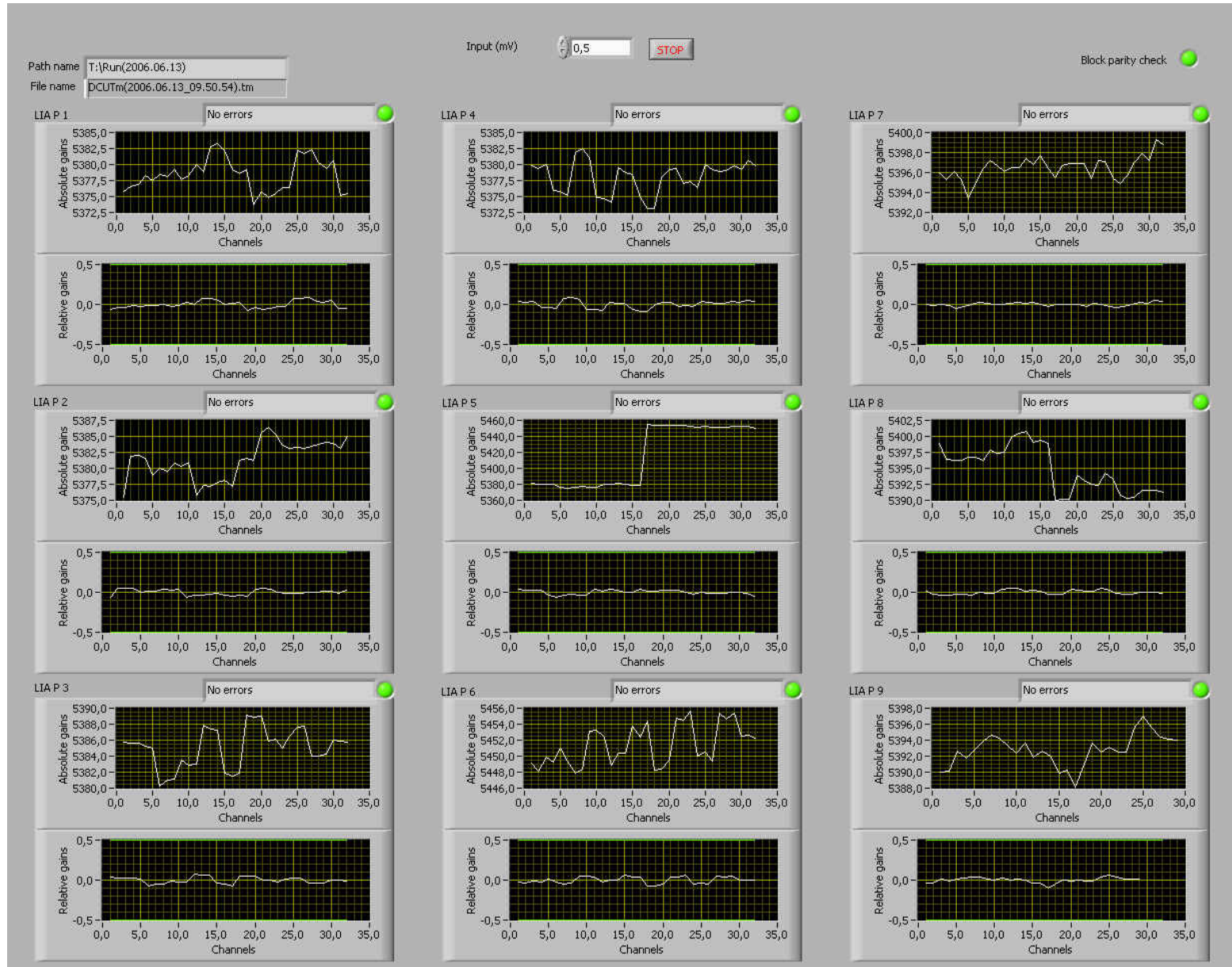
⇒ Analysis of the TM files with the Labview software (photometer_gain button and select last renamed TM files)

Enter the input signal level in the box "input(mV)" : 0,5

Check green lights for LIAP and paste the hard copy of labview screen here after

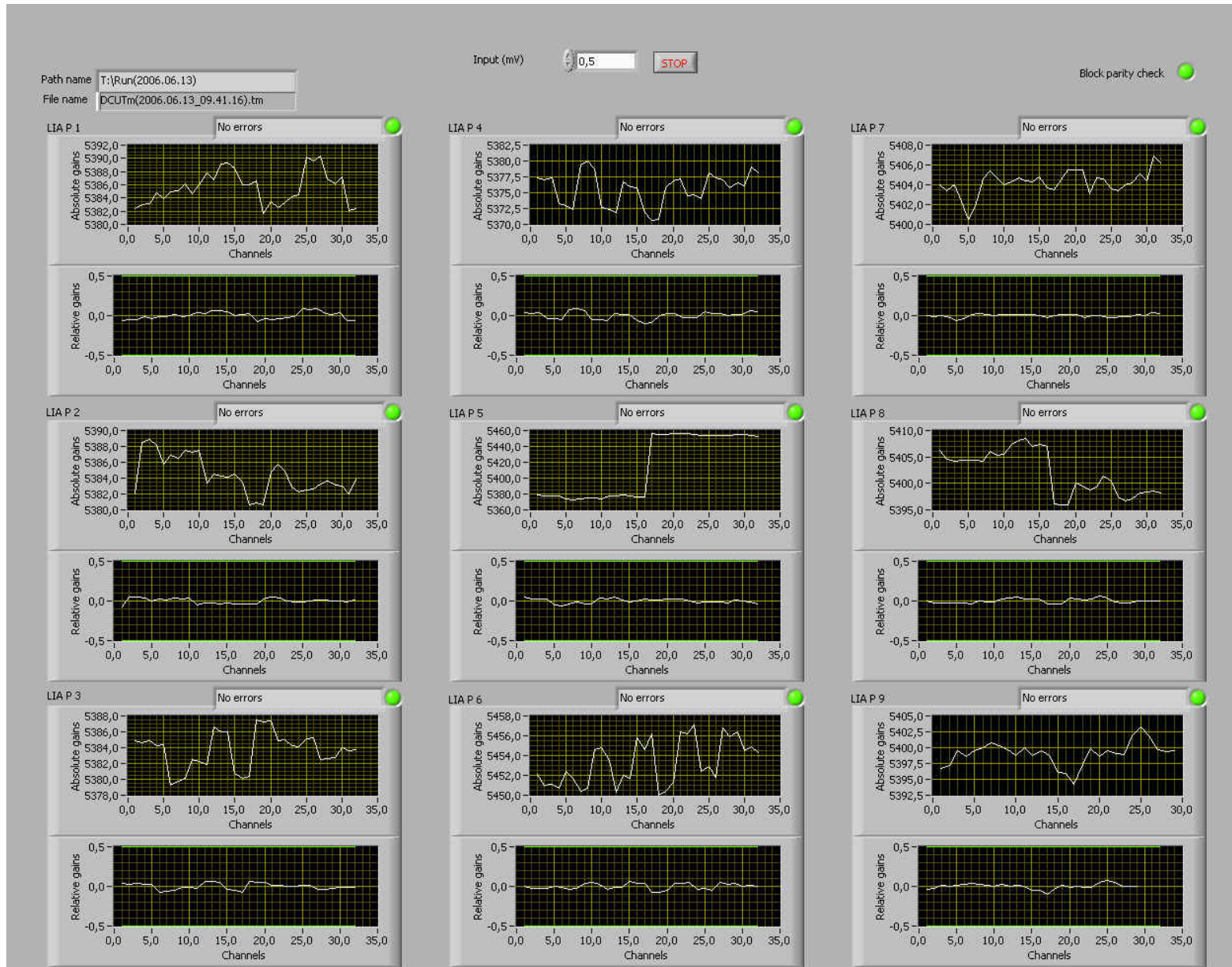
Report of functional tests

Main side :



Report of functional tests

Redundant side :



Report of functional tests

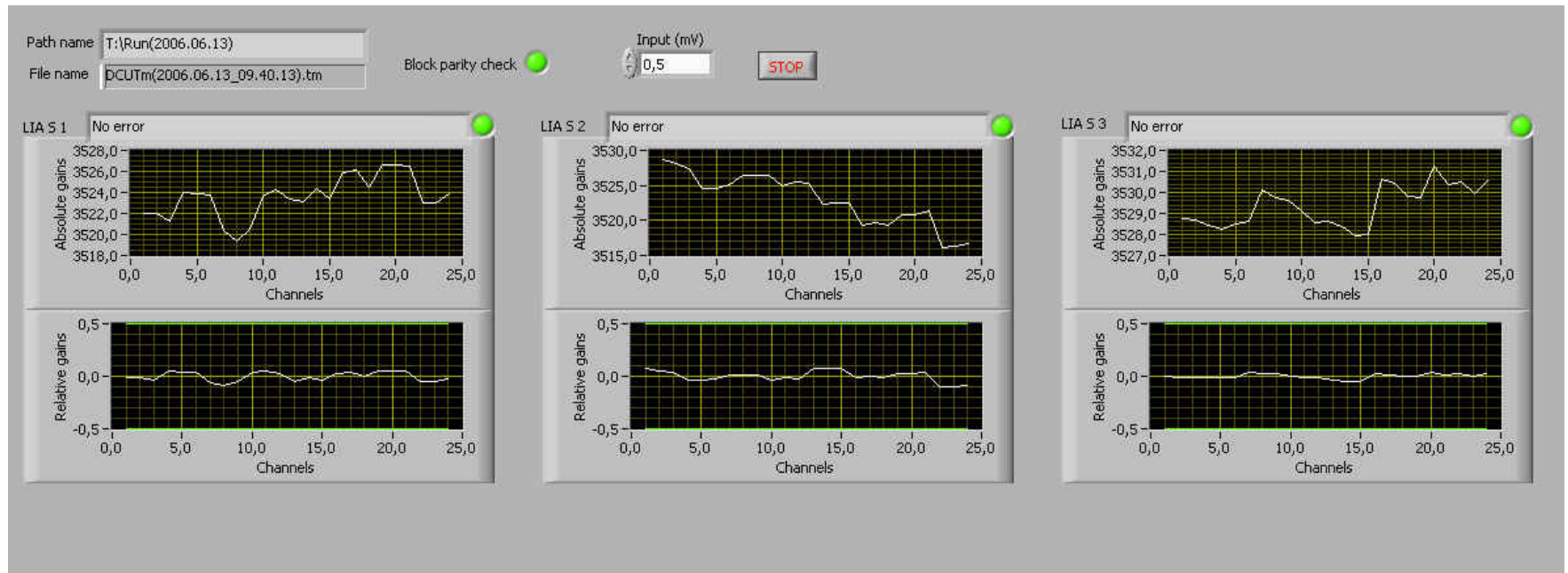
10.2.2 Spectrometer

⇒ Analysis of the TM files with the Labview software (photometer_gain button and select last renamed TM files)

Enter the input signal level in the box "input(mV)" : 0,5

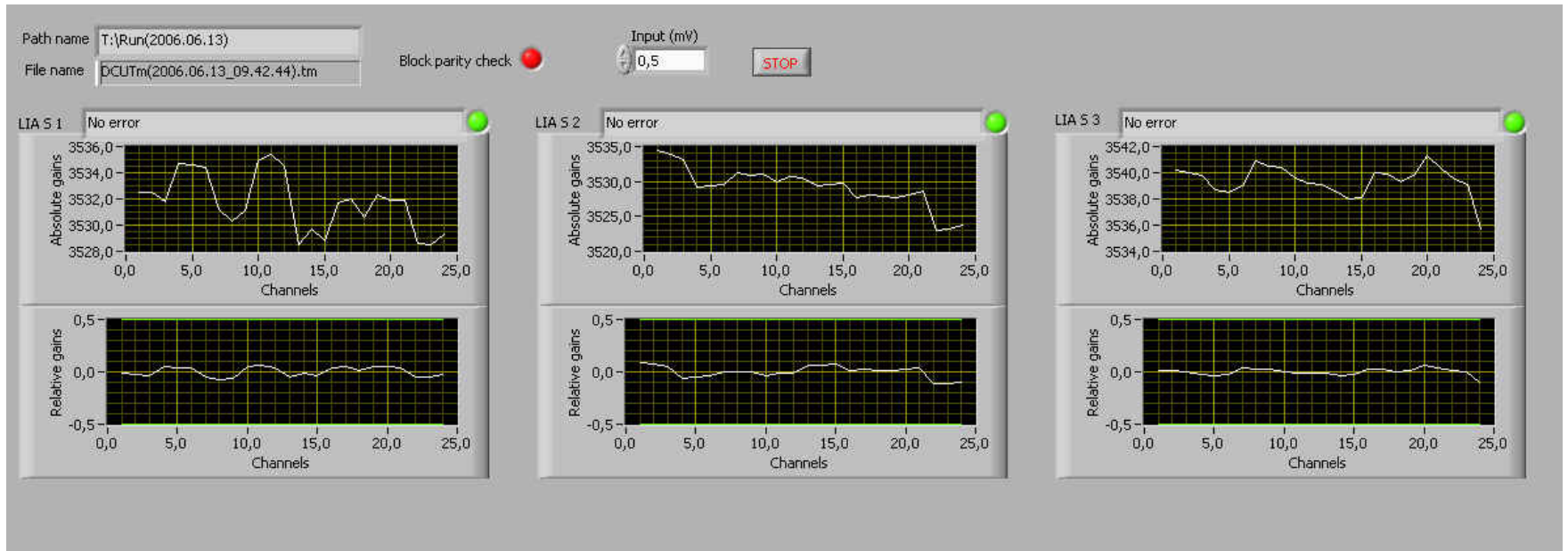
Check green lights for LIAS and paste the hard copy of labview screen here after

Main side



Report of functional tests

Redundant Side



Report of functional tests

10.3 Conclusion

Gain TEST	OK	NON OK
Test responsible Henri TRIOU	Comments : TEST SUCCESSFULL	
Technical specialist	Erreur de checksum sur fichier TM main Photo => re executed successfully	
Quality		

Report of functional tests

11 Cross Talk

11.1 Procedure

11.1.1 Photometer

Check LIAP LIAS are both OFF

	As run
Check LIAP & LIAS OFF	OK

Switch LIAP ON.

⇒ FPU simulator switched ON in stand alone mode

⇒ Run the Script [Scrip_Spire_Cross_Ampl_MiMax\(05mv_Offset0\)FM.spt](#) : sinusoidal signal with magnitude 1 mv (1 mV pic pic 0,3536 rms)

⇒ We use a signal at 1 Hz => simulator frequency = 32 Hz

⇒ The FPU simulator sends on some channels a sinusoidal signal with a magnitude of 1mV pic pic modulated at 100 % (Offset = 0). The illuminated channels are indicated below (Y) :

Index	0	1	2	3	4	5	6	7
LIAP 1								
0	Y	Y	Y	N	N	N	N	N
8	N	N	N	N	N	N	N	Y
16	Y	Y	N	N	N	N	N	N
24	N	N	N	N	N	N	Y	Y
LIAP 2								
32	Y	N	N	N	N	N	N	N
40	N	N	N	N	N	Y	Y	Y
48	Y	Y	Y	N	N	N	N	N
56	N	N	N	N	N	N	N	Y
LIAP 3								
64	Y	Y	N	N	N	N	N	N
72	N	N	N	N	N	N	Y	Y

Report of functional tests

80	Y	N	N	N	N	N	N	N
88	N	N	N	N	N	Y	Y	Y
LIAP 4								
96	Y	N	N	N	N	N	N	N
104	N	N	N	N	N	Y	Y	Y
112	Y	Y	Y	N	N	N	N	N
120	N	N	N	N	N	N	N	Y
LIAP 5								
128	Y	N	N	N	N	N	N	N
136	N	N	N	N	N	Y	Y	Y
144	Y	Y	Y	N	N	N	N	N
152	N	N	N	N	N	N	N	Y
LIAP 6								
160	Y	Y	N	N	N	N	N	N
168	N	N	N	N	N	N	Y	Y
176	Y	N	N	N	N	N	N	N
184	N	N	N	N	N	Y	Y	Y
LIAP 7								
192	Y	N	N	N	N	N	N	N
200	N	N	N	N	N	Y	Y	Y
208	Y	Y	Y	N	N	N	N	N
216	N	N	N	N	N	N	N	Y
LIAP8								
224	Y	N	N	N	N	N	N	N
232	N	N	N	N	N	Y	Y	Y
240	Y	Y	Y	N	N	N	N	N
248	N	N	N	N	N	N	N	Y
LIAP9								
256	Y	Y	N	N	N	N	N	N
264	N	N	N	N	N	N	Y	Y
272	Y	N	N	N	N	N	N	N
280	N	N	N	N	N	Y	Y	Y

Report of functional tests

Index	0	1	2	3	4	5	6	7
LIAS 1								
0	Y	Y	Y	N	N	N	N	N
8	N	N	N	N	N	N	N	Y
16	Y	Y	N	N	N	N	N	N
LIAS 2								
24 Y	Y	Y	N	N	N	N	N	
32 N	Y	Y	Y	Y	Y	Y	Y	N
40 N	N	N	N	N	N	N	N	N
LIAS 3								
48 Y	Y	Y	N	N	N	N	N	
56 N	Y	Y	Y	Y	Y	Y	Y	N
64 N	N	N	N	N	N	N	N	N

⇒ Batch executed by LTU : use the batch edited in § 9.3 (5 DCU ACQUISITIONS (Offsets a zero) Main *redundant.txt*): the LTU sets all offsets at 0 and performs TM acquisitions.

⇒ 4 TM file generated by LTU (DPU) (Photometer and spectrometer in Main and Redundant)

⇒ Rename the files as follows :

	As run (Photometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_cross_photo_main</u>

	As run (Spectrometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_cross_spectro_main</u>

	As run (Photometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_cross_photo_redundant</u>

	As run (Spectrometer)
Renamed TM file	DCUTm(yyyy.mm.dd_hh.mm.ss) <u>_cross_spectro_redundant</u>

Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

Date : 13/06/2006

Check LIAP LIAS are both OFF at the end of the procedure

11.2 Data analysis

⇒ Analysis of the two TM files (photo and spectro) with the Labview software (button cross talk with photometer and spectrometer selected)

Fill the "Photometer input (V)" box with value=0,5, and Input frequency box" with value=1.

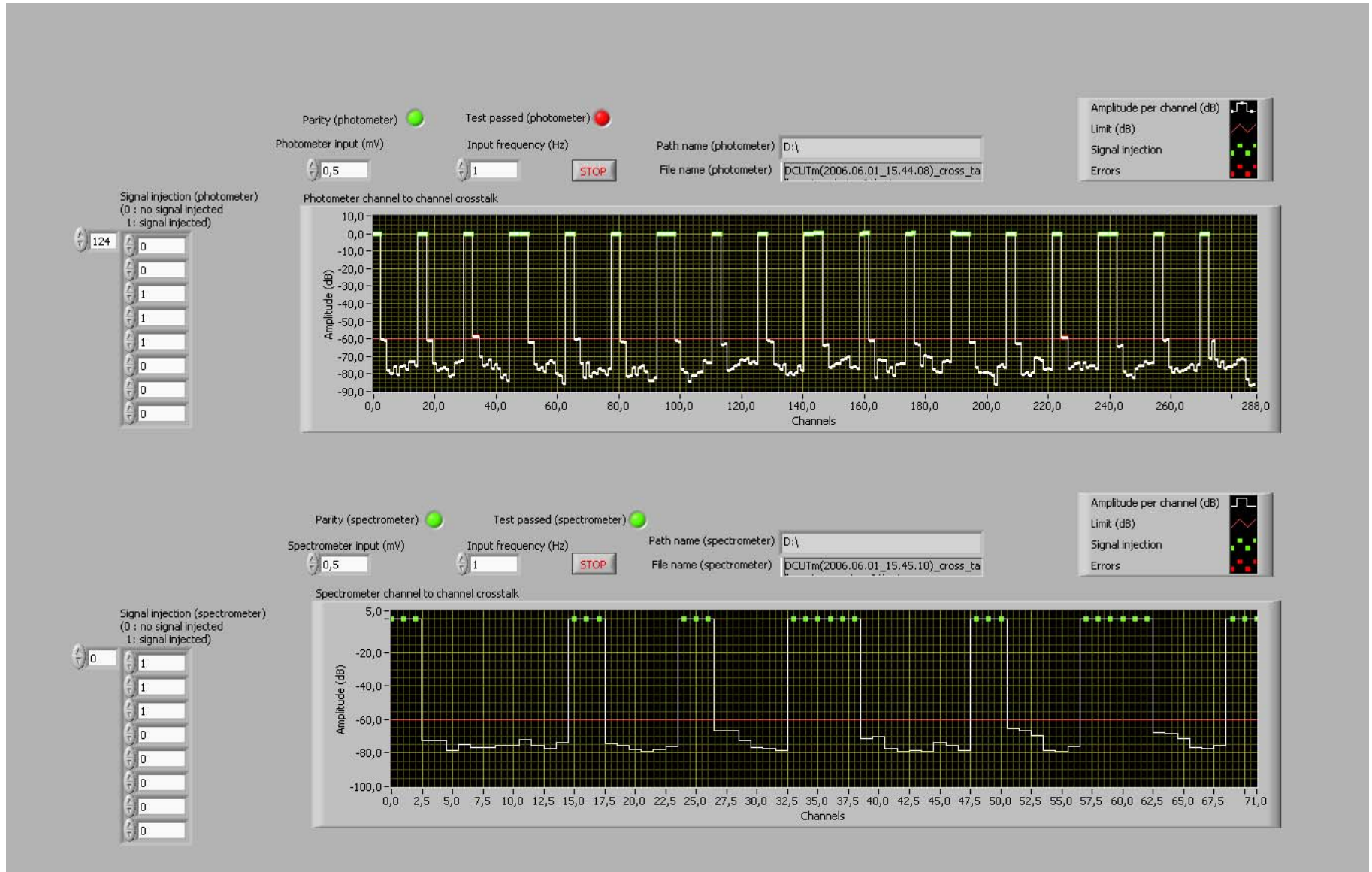
Fill the "Spectrometer input (V)" box with value=0,5, and Input frequency box" with value=1.

⇒ The labview software represents the results, check green light (note that the global green light is not functional since some LIAS boards are missing).

Paste the hard copy of labview screen here after :

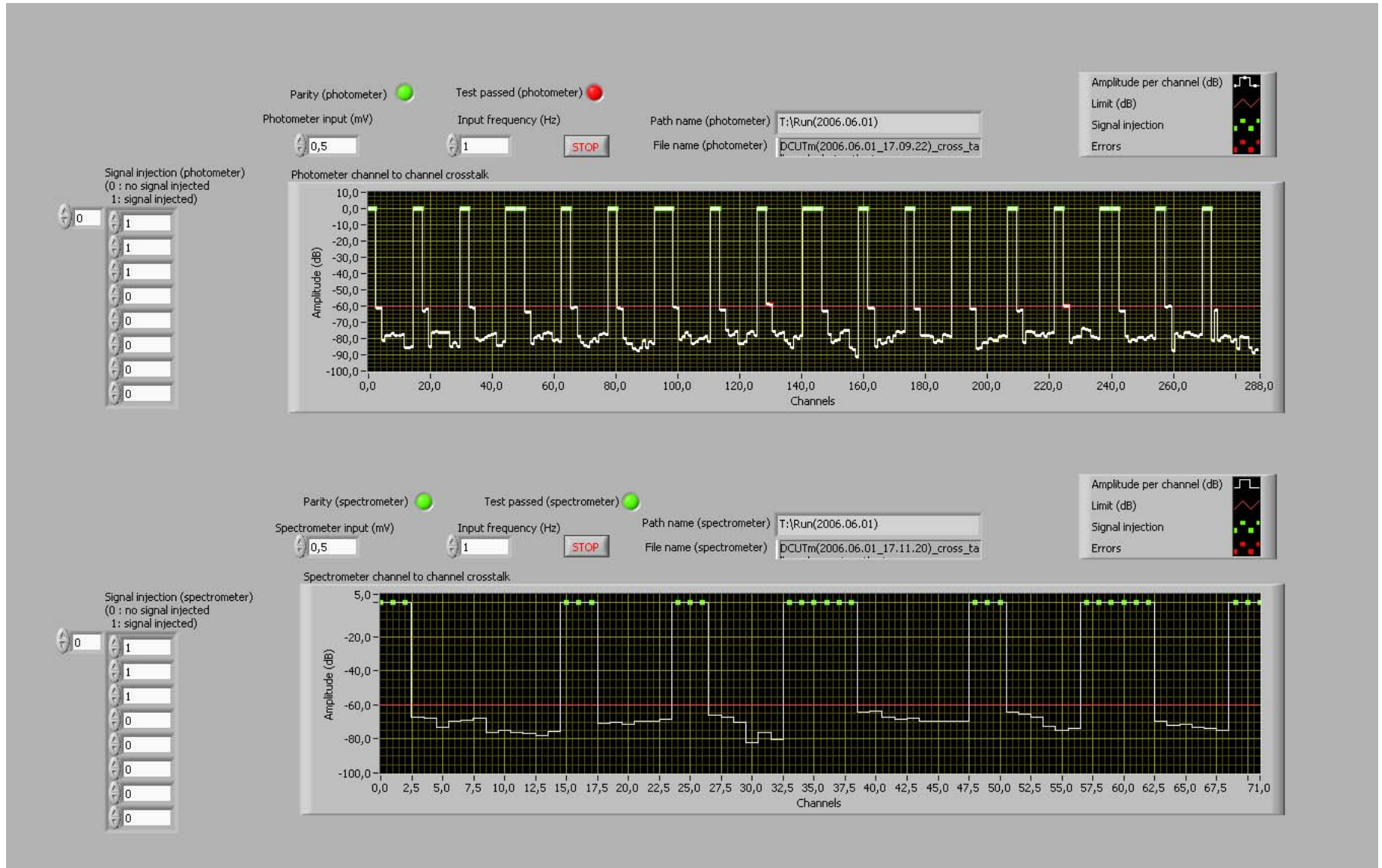
Report of functional tests

Main side



Report of functional tests

Redundant side



Report of functional tests

11.3 Conclusion

Cross talk TEST	OK	NON OK
Test responsible Henri TRIOU Technical specialist Quality	Comments : TEST SUCCESSFULL	

Report of functional tests**12 Noise**

Place the short circuits on the DCU LIAP and DCU LIAS connectors and perform signal acquisition.

We represent the noise, expresses in ADC steps rms values and in nV/sqrt(Hz). This latter value is computed taking into account the gain value as well as the cut off frequencies associated with photometer and spectrometer channels.

We use the following formula, applicable to the kind of differential signal the DCU generates :

$$\text{Noise}(nV/\text{sqrt}(Hz)) = 10^9 \cdot \sigma_{\text{ADC}}(\text{rms value}) / [(ADC\text{steps range}/Voltage\ range) \cdot Gain \cdot \sqrt{\pi \cdot f_{\text{cut off}}(Hz)}]$$

$$ADC\text{steps range} = 65535$$

$$Voltage\ range = 5\text{ V}$$

$$Gain = 5448\text{ (photometer)}$$

$$Gain = 3528\text{ (spectrometer)}$$

$$f_{\text{cut off}} = 5\text{ Hz (photometer)}$$

$$f_{\text{cut off}} = 25\text{ Hz (spectrometer)}$$

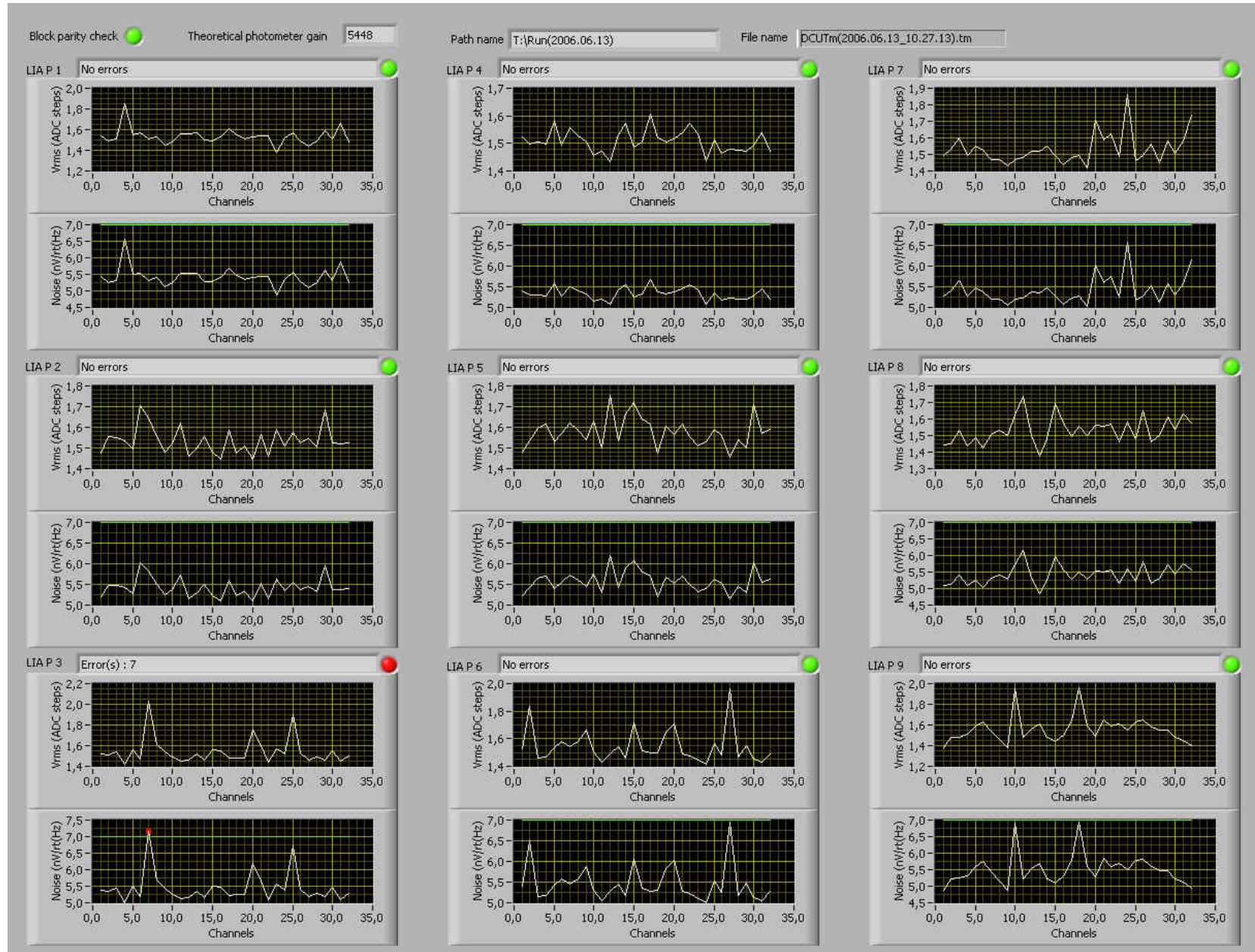
Report of functional tests

SAP-SPIRE- HT-0425-06 V1.0

Issue : 1.0

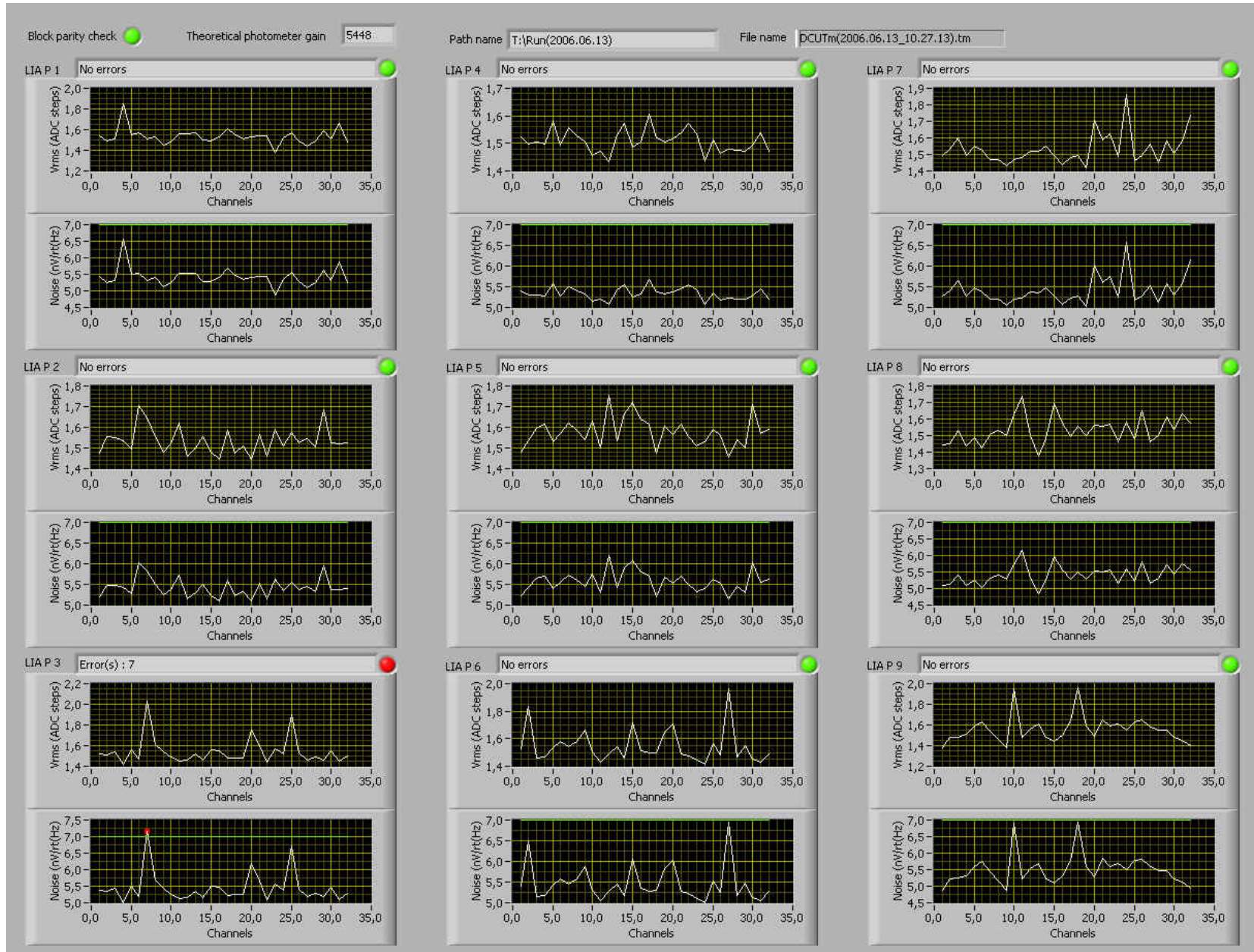
Date : 13/06/2006

Photometer Main side



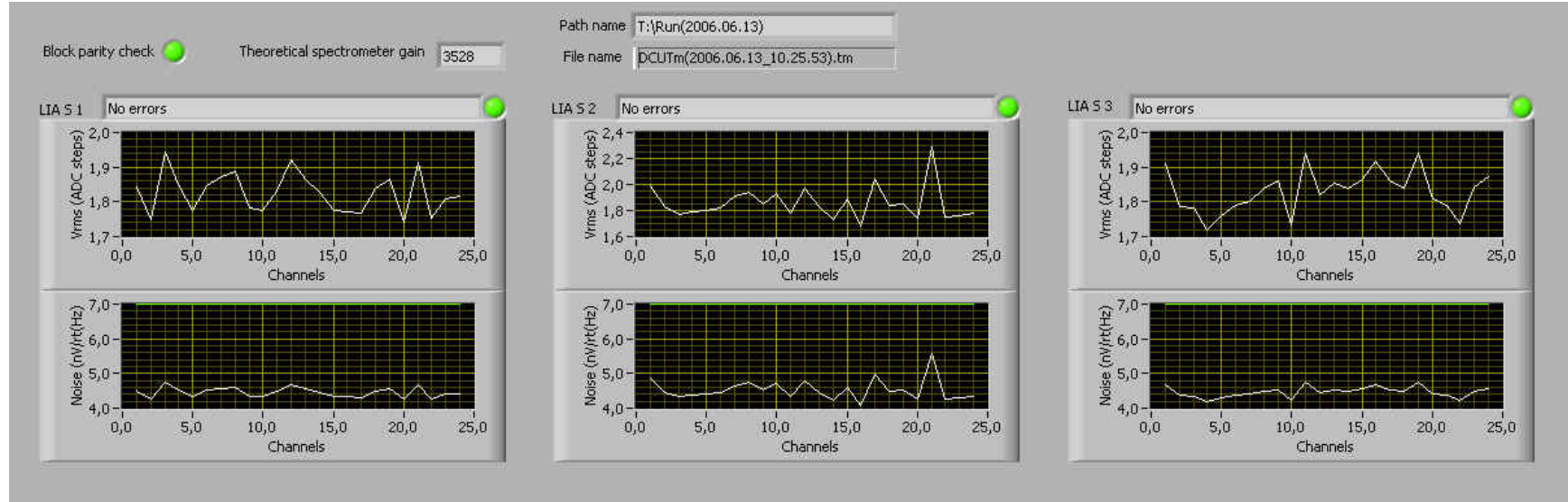
Report of functional tests

Photometer Redundant side

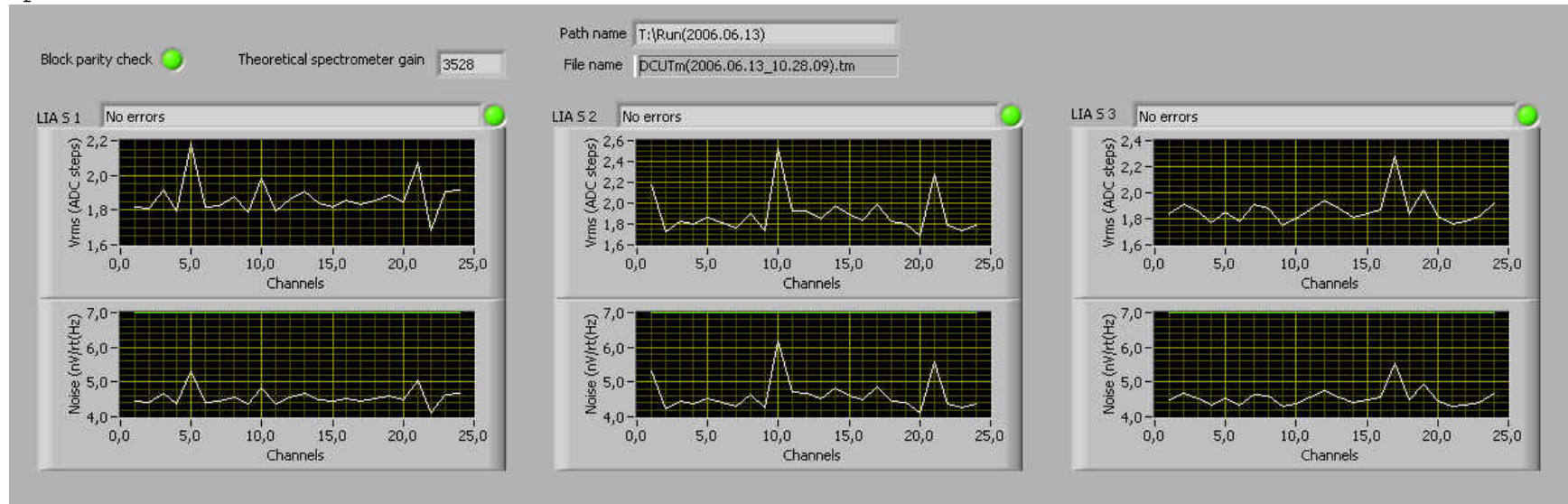


Report of functional tests

Spectrometer Main side



Spectrometer Redundant side



12.1 Conclusion

Noise	OK	NON OK
Test responsible Henri TRIOU Technical specialist Quality	Comments : TEST SUCCESSFULL	