1. Introduction

This document reports on the WARM FUNCTIONAL TESTS carried out on the SPIRE Flight Instrument Model in the FM IST test campaign to verify the correct functioning of each of its subsystems before cool down. The Herschel cryostat chamber was in the horizontal configuration (+Y axis pointing upwards) at ambient pressure and temperature. This configuration was necessary in order to perform all the tests which involve unlatching or moving the SMEC. All these tests were performed on 23rd October 2007.

1.1 Scope

To judge the success or failure of a warm functional test by checking that:

- The telecommand sequence generated for a particular functional test is correctly received and executed on board by the SPIRE DPU.
- No error/event reports or command failures are generated during the execution of these commands.
- Telemetry is generated by the instrument as a result of telemetry requests to its different subunits.
- Particular telemetry parameters for each functional test change in an expected manner.
- Success criterion/criteria (specified in this document) is/are met.

1.2 Reference Documents

Ref	Document	Name	Version/Issue Nb.
RD01	SPIRE-RAL-DOC-001652	SPIRE Functional Tests Specification	Issue 1.4
RD02	SPIRE-RAL-DOC-001630	SPIRE EGSE-ILT Start-Up Procedures	Issue 0.7
RD03	SPIRE-RAL-PRC-002222	DRCU Switch ON Procedure	Issue 1.0
RD04	SPIRE-RAL-PRJ-001078	SPIRE Data ICD	Issue 2.1
RD05	Sap-SPIRE-CCa-076-02	DRCU/DPU Interface Control Document	Issue 1.2
RD06	LAM.PJT.SPI.NOT.011011	MCU/DPU Command List ICD	Issue 5.0
RD07	SPIRE-IFS-PRJ-001391	SPIRE OBS User Manual	Issue 2.2
RD08	SPIRE-IFS-PRJ-000650	SPIRE DPU Interface Control Document	Issue 1.1
RD09	SPIRE-RAL-PRC-002841	SPIRE I-EGSE Setup Procedure	Issue 2.1

1.3 Change Record

Document	Change date	Changes
Issue 1.0	23th Oct 2007	First version

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2. Functional Tests Configuration

2.1 SPIRE Instrument Configuration (PRIME)

SPIRE FPU:

- FPU in tank.
- Cryo-harness connected to FPU
- DRCU to Cryostat harnesses connected (Grounding pins not connected)
- DRCU-DPU Harness connected
- Cryostat open

2.2 Software Configuration (PRIME)

The current EGSE software configuration for the PRIME side tests:

EGSE component	Version/Build number	Comment
SCOS2000	SCOS2.3e Patch 5	SCOS archives IST_FM1 under /data/SPIRE/hfiles and /data/SPIRE/TMD SCOS MIB is FM_2.2.G6_PR_
CDMS Simulator	v2.5	NA
HCSS	#1206	
QLA	3.3 Build #555	
QLA scripts	Latest CVS versions	
Test Control scripts		CCS Handler scripts CVS v1.4
CUS Scripts		Mission config fm_ist_wft_config_prime4
Versant	7.0.0.1	
TFCS		NA
TFTS		NA

2.3 EGSE Configuration Checks

To check for the success of failure of a functional test, the real time telemetry of the instrument has to be monitored. The following applications must be running to do so. Before the test sequence starts, make the following checks:

Workstation	EGSE component	Status	Check	Comments
hspireegse	EGSE Router	Started	✓	Running
hspireegse	EGSE Gateway	Started	✓	Running
hspireegse	Pipe GW	Started	✓	Running
spireqla	Telemetry Ingestion	Started	✓	Running
spireqla	Packet Display	Started	✓	Running

spireqla	CCS Handler Server	Started	✓	Running
spires2k	SCOS2000	Started	✓	Running
spireqla	QLA	Started	✓	Running

The following checks were performed to verify the correct initial instrument configuration for the tests.

Step#	Action	Comments	Check
1.	In SCOS open **DPU_AND_OBS_PARAMETERS display** Check if : TM2N is incrementing by one @1Hz. TM1N is incrementing by one @0.5Hz. - If they are, go to step 5. - If they are not, go to step 2.	**Both TM1N and TM2N are incrementing at their nominal rates.** **Will go to step 5.** **DPUM15V=-15.88V** **DPUTEMP = 299.06K**	✓
2.	In SCOS open **SCU PARAMETERS display** - If SCUP5V/P9V/M9V are jittering and **BIAS_PARAMETERS display** - If BIASTEMP show ambient temperature, the DRCU is ON.Go to step 6. - If DRCU is not ON, refer to RD03 on how to start up the DRCU.	**ALL SCU VOLTAGES LOOKING GOOD.** SCUP5V = 5.24V SCUP9V =9.08V SCUM9V = -9.08V **ALL BIAS VOLTAGES LOOKING GOOD.** BIASP5V = 5.18V BIASP9V = 8.99V BIASM9V= -9.05V BIASTEMP=293.8K	✓
3.	**In SCOS open** DPU_AND_OBS_PARAMETERS display **and check that the MODE housekeeping parameter is DRCU_ON.**	**MODE (RAW)= 0x100** **MODE (ENG) = DRCU_ON**	✓

Table 1. Initial configuration check

3. Test procedure

The following two sections describe general pass/fail criteria (Section 3.1), the general test procedure layout (Section 3.1) and the detailed procedure for each functional test (Section 3.2).

3.1 General Pass/Fail Criteria

The general criterion for declaring a single test failed is the repeated failure of 2 consecutive runs of this test. In that case the functional test procedure should be aborted and the overall functional testing declared FAILED.
In the case of a 'first run' failure followed by a successful execution a third run of the same test should be performed and in the unlikely event of this third run being a failure the test procedure should be also aborted and the overall functional testing declared FAILED, as this would imply a not reliable operability of the instrument.
As a general remark ANY failure should be closely analyzed.

4. Detailed Test Results on PRIME instrument.

The following is a detailed (test by test) procedure including the steps performed on each test and the results obtained.

Step#	Action	Comments
0	Open **SCU PARAMETERS** display on SCOS Alpha Numeric Displays.	

4.1 FUNC-SCU-01: SCU Science Generation Check

Test Id:	**FUNC-SCU-01: SCU Science Generation Check**
Initial Configuration:	**DRCU_ON**
Final Configuration:	**DRCU_ON**
Success Criteria:	Test passed if : 1. Two SCU Nominal Science Report telemetry packets are received on QLA with the following characteristics: 2. The frame time difference between consecutive SCU frames within these packets corresponds to the sampling rate. Nominal SCU sampling rate is 80Hz ➔ Δt = 12.5 ms 3. The SPIRE HK parameter SCUFRAMECNT increments by 31. 4. No events are generated during the frame generation. QLA to give go ahead.

APID	**Type**	**Subtype**	**SID**	**FrameID**	**Frame length**
0x508	21	1	0xA20	0x20	0x1E

Test Procedure:

Step#	Action	Comments
1	Write the initial value of SCUFRAMECNT parameter located in SCU PARAMETERS display and the initial value of TM1N located in DPU_AND-OBS_PARAMETERS display.	SCUFRAMECNT = 0
2	Run QLA script FUNC-SCU-01.py on QLA console.	
3	Run FUNC-SCU-01 test procedure from the CCS	
4	Write the final value of SCUFRAMECNT and TM1N.	SCUFRAMECNT = 31
5	Contingency: If test fails repeat steps 1 to 4.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SCU-01	**SCUFRAMECNT TM5N**	**n/ n+ 31 0x3FFF/1**	0/ 31 0x3FFF/1	31	**Success**

Start time: 09:42
OBSID: 0xb00002b8

CUS Input Default Parameters:
scuframes = 0x1F – Number of SCU frames to generate

Comments:
QLA produced QLA-SCU-01_B00002B8.txt file:

```
**********************************************************************
SCU: OBSID = B00002B8, BBTYPE = 0x8000, APID = 0x508, SID  = 0xa20
______________________________________________________________________
Parameter      Initial    Final     Increment Expect Incre. Packet Chars.

SCUFRAMECNT    0          31         31         31           Packet type = 0x15
TM5N           16383      1          2          2            subtype = 0x1
FrameTime      12.4960    12.4992                            Frame ID  = 0x20
                                                             Frame Len = 0x1E
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 12.49803 ms
sigma = 0.00156 ms
```

4.2 FUNC-SCU-03: SCU DC Thermometry Check

Test Id:	**FUNC-SCU-03: SCU DC Thermometry Check**
Initial Configuration:	**DRCU_ON**
Final Configuration:	**DRCU_ON** + DC thermometry ON
Success Criteria:	Test passed if all FPU DC thermometry sensors show temperature values indicating a correct functioning of the sensor, not open/short-circuited. If ANY reading is anomalous check RAW sensor reading. **Open Circuit Criterion:** **RAW reading in the range [0, -100]** **Short Circuit Criterion:** **RAW reading of -32768** **Note:** For some parameters the calibration curve above 75K has only 2 points, thus the linearly interpolated temperature reading given by SCOS is usually not correct at T > 75K.

Test Procedure:

Step#	Action	Comments
1	Run FUNC-SCU-03 test procedure from the CCS	
2	When the test is finished Write the current value of SCUTEMPSTAT and the RAW/converted values of the 16 FPU temperatures located in SCU PARAMETERS display.	
3	Contingency: If test fails execute SCU_OFF procedure from the CCS and repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SCU-03	**SCUTEMPSTAT**	**0/0xFFFF**	**0/0xFFFF**	**N/A**	**Success**

Start time: 09:44
OBSID:0xb00002b9

CUS Input Default Parameters:
dcparam = 0xFFFF – Switch on all 16 SCU DC thermometry channels

Comments: On SCOS all RAW SCU DC temperatures are 32768 except EMCFILTTEMP which is -29822

QLA script produced the file FUNC-SCU-03_B00002B9.txt:

```
SCU-03 Thermometry Check
OBSID = 0xb00002b9

PUMPHTRTEMP  54.11   32768
PUMPHSTEMP   37.26   32768
EVAPHSTMP    36.90   32768
SHUNTTEMP    18.71   32768
EMCFILTMP    286.38   35716
SL0TEMP      19.72   32768
PL0TEMP      20.33   32768
OPTTEMP      154.06   32768
BAFTEMP      181.37   32768
BSMIFTEMP    98.86   32768
SCAL2TEMP    161.08   32768
SCAL4TEMP    156.52   32768
SCALTEMP     83.34   32768
SMECIFTEMP   137.97   32768
SMECTEMP     26.54   32768
BSMTEMP      12.80   32768
```

4.3 FUNC-SCU-06: SCU AC Thermometry Check

Test Id:	**FUNC-SCU-06: SCU AC Thermometry Check**
Initial Configuration:	**DRCU_ON** + DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	Test passed if SUBKSTAT parameter went from 0 to 1. **Open Circuit Criterion:** **RAW reading in the range 0 -100** **Short Circuit Criterion:** **RAW reading of -32768**

Test Procedure:

Step#	Action	Comments
1	Run FUNC-SCU-06 test procedure from the CCS.	
2	When the test is finished Write the current value of SUBKSTAT located in SCU PARAMETERS display. Also write down the RAW value of the SUBKTEMP parameter.	
3	Contingency: If test fails : Send manual command: SEND_DRCU_COMMAND Parameter1 = 0xA0860000 Parameter2 = 0 Then repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SCU-06	**SUBKSTAT**	**0/1**	0/1	**N/A**	**Success**

Start time: 09:47
OBSID:0xb00002ba

CUS Input Default Parameters:
acparam = 0x1 – Switch on SCU AC thermometry channel (SUBKTEMP)

Comments: OK

SUBKTEMP:
Before: RAW = 32754
After : RAW = 32746-32747

QLA output file:

```
SCU-06
Start time @: 23-Oct 09:48:15
End time @: 23-Oct 09:48:30
OBSID: 0xB00002BA

SUBKSTAT:
Start value: 0x0
End value: 0x1

SUBKTEMP
RAW value before: 32756

RAW value after: 32749
Converted after: 271248 mK
```

4.4 FUNC-SCU-02: SCU Nominal Science Contents Check

Test Id:	**FUNC-SCU-02: SCU Nominal Science Contents Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	Test passed if : 1. Parameters in the SCU Nominal science packets and the same parameters in the Nominal HK packet have similar RAW values to within ±10 units. 2. The SPIRE HK parameter SCUFRAMECNT located in **SCU PARAMETERS** display increments by 31. 3. No events are generated during the frame generation. QLA to give the go ahead.

Test Procedure:

Step#	Action	Comments
1	Write the current value of SCUFRAMECNT located in SCU PARAMETERS display.	
2	Run QLA script FUNC-SCU-02.py on QLA console.	
3	Run FUNC-SCU-02 test procedure from the CCS	
4	When the test is finished Write the current value of SCUFRAMECNT.	
5	Contingency: If test fails repeat steps 1 to 4.	

Test Log:

Test Id	**Key Parameter(s)**	**Expected Value Before/After**	**Actual Value Before/After**	**Nb. of frames received**	**Test Result**
FUNC-SCU-02	**SCUFRAMECNT** **TM5N**	**n+31/n+62** **1/3**	31/62 1/3	31	**Success**

Start time: 09:51
OBSID: 0xb00002bb

CUS Input Default Parameters:
scuframes = 0x1F – Number of SCU frames to generate

Comments:
All SCU parameters within the Nominal HK and the Nominal SCU Science Report agree.

QLA produced QLA-SCU-02_B00002BB.txt file:

```
FUNC-SCU-02 version: 1.5

Housekeeping @  Tue Oct 23 09:52:12 UTC 2007
SCU Science @ Tue Oct 23 09:52:08 UTC 2007

 Name           HSK value  SCU value     Equal (within 10 raw units)?
TCHTRV          20.0       21.0          True
PCALCURR        11.0       11.0          True
SCAL4CURR       9.0        11.0          True
SCAL2CURR       12.0       10.0          True
PCALV           9.0        9.0           True
SCAL4V          11.0       12.0          True
SCAL2V          10.0       11.0          True
PUMPHTRTEMP     32768.0    32768.0       True
PUMPHSTEMP      32768.0    32768.0       True
EVAPHSTEMP      32768.0    32768.0       True
SHUNTTEMP       32768.0    32768.0       True
EMCFILTEMP      35716.0    35714.0       True
SL0TEMP         32768.0    32768.0       True
PL0TEMP         32768.0    32768.0       True
OPTTEMP         32768.0    32768.0       True
BAFTEMP         32768.0    32768.0       True
BSMIFTEMP       32768.0    32768.0       True
SCAL2TEMP       32768.0    32768.0       True
SCAL4TEMP       32768.0    32768.0       True
SCALTEMP        32768.0    32768.0       True
SMECIFTEMP      32768.0    32768.0       True
SMECTEMP        32768.0    32768.0       True
BSMTEMP         32768.0    32768.0       True
SUBKTEMP        32749.0    32747.0       True
```

4.5 FUNC-SCU-04: Photometer Calibration Check

Test Id:	FUNC-SCU-04: Photometer Calibration Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	Test passed if PCALCURR/PCALV SCU HK parameters show the following values: • PCALCURR HK parameter which shows the measured PCAL current is ~ 0.1 mA. • PCALV HK parameter which shows the measured PCAL voltage is ~ 0.02V

Test Procedure:

Step#	Action	Comments
1	Write the current value of PCALV and PCALCURR located in SCU PARAMETERS display.	
2	Run FUNC-SCU-04 test procedure from the CCS	
3	While the test is running Write the values of PCALV and PCALCURR.	
4	Contingency: If test fails repeat steps 1 to 3.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/During test	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SCU-04	**PCALCURR** **PCALV**	**0/0.1mA** **0/0.02V**	0 / 0.1010 mA 0 / 0.0217 V	**N/A**	**Success**

Start time: 09:53
OBSID:0xb00002bc

CUS Input Default Parameters:
pcalbias = 0.1mA – PCAL current

Comments:
Test Successful

4.6 FUNC-SCU-05: Spectrometer Calibration Check

Test Id:	FUNC-SCU-05: Spectrometer Calibration Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	Test passed if : • SCAL2CURR ,SCAL4CURR HK parameters which show the measured current read ~ 0.1 mA • SCAL2V,SCAL4V parameters which show the measured voltage read ~ 0.05V.

Test Procedure

Step#	Action	Comments
1	Write the current value of SCAL2V ,SCAL2CURR,SCAL4V,SCAL4CURR located in SCU PARAMETERS display.	
2	Run FUNC-SCU-05 test procedure from the CCS	
3	While the test is running write the values of SCAL2V ,SCAL2CURR, SCAL4V,SCAL4CURR.	
4	Contingency: If test fails repeat steps 1 to 3.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/During test	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SCU-05	**SCAL4CURR** **SCAL4V** **SCAL2CURR** **SCAL2V**	**0/0.1mA** **0/0.05V** **0/0.1mA** **0/0.05V**	0 / 0.1016 mA 0 / 0.0509 V 0 / 0.1014 mA 0 / 0.05 V	**N/A**	**Success**

Start time: 09:55
OBSID:0xb00002bd

CUS Input Default Parameters:
scal4bias = 0.1mA – SCAL4 current
scal2bias = 0.1mA – SCAL2 current

Comments:
Test Successful

4.7 FUNC-SCU-07: SCU Cooler Heater Check

Test Id:	**FUNC-SCU-07: SCU Cooler Heater Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	Test passed if during the execution of the test the following SCU HK parameters give correspondent readings of:

SCU HK parameter	RAW	Converted
SPHSV	**~12715**	**~323mV**
EVHSV	**~12715**	**~323mV**
SPHTRV	**~14390**	**~ 8 V**

Test Procedure:

Step#	Action	Comments
1	Run FUNC-SCU-07 test procedure from the CCS.	Pending
2	While the test is running Write the values of current values of SPHSV, EVHSV, SPHTRV located in SCU PARAMETERS display. (RAW and CONVERTED)	
3	Contingency: If test fails repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/During test	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SCU-07	**SPHSV** **EVHSV** **SPHTRV**	**0/ ~ 323 mV** **0/ ~ 323 mV** **0/ ~ 8 V**	0.1554 / 324.49mV 0.1554 / 324.28 mV 0.0042 / 8.8552 V	**N/A**	**Success**

Start time: 09:56
OBSID:0xb00002be

CUS Input Default Parameters:

evaphs = 0.804mA – Evaporator heat switch current
pumphs = 0.804mA – Sorption pump heat switch current
pumpht = 21.85mA – Sorption pump heater current

Comments:
Test Successful

4.8 FUNC-SCU-08: SCU Test Pattern Check

Test Id:	FUNC-SCU-08: SCU Test Pattern Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	Test passed if : 1. Two SCU Diagnostic Science Report telemetry packets are received with the following characteristics:

APID	Type	Subtype	SID	FrameID	Frame length
0x508	21	3	0x1121	0x21	0x1E

2. The SCU Test Pattern agrees with the reference test pattern.

QLA to give go ahead.

Test Procedure:

Step#	Action	Comments
1	Write the current values of SCUFRAMECNT located in SCU PARAMETERS display.	
2	Run QLA script FUNC-SCU-08.py on QLA console.	
3	Run FUNC-SCU-08 test procedure from the CCS	
4	When the test is finished Write the current value of SCUFRAMECNT.	
5	Contingency: If test fails repeat steps 1 to 4.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SCU-08	**SCUFRAMECNT and SCU test pattern frame parameters**	**n+62/n+93**	62/93	31	**Success**

Start time: 09:59
OBSID:0xb00002bf

CUS Input Default Parameters:
scuframes = 0x1F – Number of SCU frames to generate

Comments: TM5N 3 -> 5

QLA has written file FUNC-SCU-08_B00002BF_8A07.txt:

SCU Test Pattern @ Tue Oct 23 11:00:45 BST 2007
..compared with data from SCU Test Pattern @ Wed Mar 14 14:07:43 GMT 2007, OBSID=0x300125B3

Name	New Value[0]	New Value[20]	Comp Value[0]	Comp Value[20]
SCUTSTOBSID	0xB00002BF	0x0	0x300125B3	0x0
SCUTSTBBID	0x8A070001	0x0	0x8A070001 --> OK	0x0 --> OK
SCUTSTBLKLEN	30.0	30.0	30.0 --> OK	30.0 --> OK
SCUTSTFRAMEID	33.0	33.0	33.0 --> OK	33.0 --> OK
SCUTST001	43690.0	31181.0	43690.0 --> OK	31181.0 --> OK
SCUTST002	21844.0	62363.0	21844.0 --> OK	62363.0 --> OK
SCUTST003	43688.0	59190.0	43688.0 --> OK	59190.0 --> OK
SCUTST004	21840.0	52844.0	21840.0 --> OK	52844.0 --> OK
SCUTST005	43680.0	40153.0	43680.0 --> OK	40153.0 --> OK
SCUTST006	21825.0	14771.0	21825.0 --> OK	14771.0 --> OK
SCUTST007	43650.0	29543.0	43650.0 --> OK	29543.0 --> OK
SCUTST008	21765.0	59086.0	21765.0 --> OK	59086.0 --> OK
SCUTST009	43530.0	52637.0	43530.0 --> OK	52637.0 --> OK
SCUTST010	21524.0	39739.0	21524.0 --> OK	39739.0 --> OK
SCUTST011	43048.0	13943.0	43048.0 --> OK	13943.0 --> OK
SCUTST012	20560.0	27887.0	20560.0 --> OK	27887.0 --> OK
SCUTST013	41120.0	55774.0	41120.0 --> OK	55774.0 --> OK
SCUTST014	16705.0	46012.0	16705.0 --> OK	46012.0 --> OK
SCUTST015	33411.0	26489.0	33411.0 --> OK	26489.0 --> OK
SCUTST016	1287.0	52978.0	1287.0 --> OK	52978.0 --> OK
SCUTST017	2574.0	40420.0	2574.0 --> OK	40420.0 --> OK
SCUTST018	5149.0	15304.0	5149.0 --> OK	15304.0 --> OK
SCUTST019	10298.0	30608.0	10298.0 --> OK	30608.0 --> OK
SCUTST020	20597.0	61216.0	20597.0 --> OK	61216.0 --> OK
SCUTST021	41194.0	56896.0	41194.0 --> OK	56896.0 --> OK
SCUTST022	16852.0	48257.0	16852.0 --> OK	48257.0 --> OK
SCUTST023	33705.0	30978.0	33705.0 --> OK	30978.0 --> OK
SCUTST024	1874.0	61956.0	1874.0 --> OK	61956.0 --> OK
SCUTSTADCFLGS	0.0	0.0	0.0 --> OK	0.0 --> OK
SCUTSTFRAMETIME	4063027.0	4141139.0	4284236.0	4362348.0
SCUTSTCHECKWORD	40139.0	47888.0	15560.0	6994.0

Step#	Action	Comments
0	Open **MCU_PARAMETERS** display on SCOS Alpha Numeric Displays.	

4.9 FUNC-MCU-01: MCU Boot Check

Test Id:	**FUNC-MCU-01: MCU Boot Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON
Success Criteria:	Test passed if: 1. MCU boots. 2. MCU voltages show expected values. 3. MAC, SMEC and BSM board temperatures shows ambient temperature.

Test Procedure:

Step#	Action	Comments
1	Run **FUNC-MCU-01** test procedure from the CCS	
2	When procedure is finished Write the values of the MCU voltages.	
3	Contingency: If test fails repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-MCU-01	**MCUP5V** **MCUP15V** **MCUP14V** **MCUM14V** **MCUM15V** **MCUMACTEMP** **MCUSMECTEMP** **MCUBSMTEMP**	**N/A/ ~ 5V** **N/A / ~15V** **N/A / ~ 14V** **N/A / ~ -14V** **N/A / ~ -15V** **N/A / ~ 300K** **N/A / ~ 300K** **N/A / ~ 300K**	- / 5.01V - / 15.54V - / 14.15V - / -14.47 V - / -15.63 V - / 290.56K - / 295.70K - / 295.29 K	**N/A**	**Success**

Start time: 10:01
OBSID:0xb00002C0

CUS Input Default Parameters: None

Comments:
MCUBITSTAT went from 0 to 1 as expected

Test Successful

4.10 FUNC-MCU-02: MCU Nominal Frame Generation Check

Test Id:	**FUNC-MCU-02: MCU Nominal Frame Generation Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON
Success Criteria:	Test passed if : 1. MCU produces each type of the frames requested and with the following characteristics.

Frame	APID	Type	Subtype	SID	FrameID	Frame length
Eng.	**0x508**	**21**	**3**	**0x814**	**0x14**	**0x15**
BSM	**0x508**	**21**	**1**	**0x612**	**0x12**	**0xD**
SMEC	**0x508**	**21**	**1**	**0x410**	**0x10**	**0xC**
BSM +SMEC						

2. No events are generated during the different frames generation.

Test Procedure:

Step#	Action	Comments
1	Write the current value of MCUFRAMECNT located in MCU_PARAMETERS display	
2	Run QLA script FUNC-MCU-02.py on QLA console.	
3	Run FUNC-MCU-02 test procedure from the CCS	
4	When test is finished Write the current value of MCUFRAMECNT.	
5	Contingency: If test fails repeat steps 1 to 4.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-MCU-02	**MCUFRAMECNT**	**0/ ~ 6600**	0 / 6492		**Success**

Start time: 10:03
OBSID:0xb00002C1

CUS Input Default Parameters:

f_eng_frames = 64.1Hz – MCU Eng frame generation frequency
f_smec_frames = 250.0Hz – SMEC frame generation frequency
f_bsm_frames = 64.1Hz – BSM frame generation frequency
f_bsmsmec_bsm = 50.0Hz – BSM frame generation frequency for BSM+SMEC
f_bsmsmec_smec = 250.0Hz – SMEC frame generation frequency for BSM+SMEC
ftime = 10 – Time for continuous frame generation for each frame type

QLA generated file QLA-MCU-02_B00002C1.txt :

```
**************************************************************************
MCUENG: OBSID = B00002C1, BBTYPE = 0x8901, APID = 0x508, SID  = 0x814
_____________________________________________________________________
Parameter     Initial   Final     Increment Expect Incre. Packet Chars.

MCUFRAMECNT   0         608       608       609         Packet type = 0x15
TM5N          5         32        27        27          subtype = 0x3
FrameTime     16.4223   16.4225                         Frame ID  = 0x14
                                                        Frame Len = 0x15
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 16.42247 ms
sigma = 0.00105 ms


**************************************************************************
BSM: OBSID = B00002C1, BBTYPE = 0x8903, APID = 0x508, SID  = 0x612
_____________________________________________________________________
Parameter     Initial   Final     Increment Expect Incre. Packet Chars.

MCUFRAMECNT   608       1249      641       609         Packet type = 0x15
TM5N          32        49        17        17          subtype = 0x1
FrameTime     15.5807   15.5809                         Frame ID  = 0x12
                                                        Frame Len = 0xD
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 15.58030 ms
sigma = 0.00117 ms


**************************************************************************
SMEC: OBSID = B00002C1, BBTYPE = 0x8902, APID = 0x508, SID  = 0x410
_____________________________________________________________________
Parameter     Initial   Final     Increment Expect Incre. Packet Chars.

MCUFRAMECNT   1249      3623      2374      2375        Packet type = 0x15
TM5N          49        107       58        58          subtype = 0x1
FrameTime     4.2112    4.2112                          Frame ID  = 0x10
                                                        Frame Len = 0xC
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 4.21089 ms
sigma = 0.00095 ms


**************************************************************************
SMEC+BSM: OBSID = B00002C1, BBTYPE = 0x8904, APID = 0x508, SID  = 0x410
_____________________________________________________________________
Parameter     Initial   Final     Increment Expect Incre. Packet Chars.

MCUFRAMECNT   3623      6492      2869      2850        Packet type = 0x15
TM5N          107       178       71        71          subtype = 0x1
FrameTime SMEC 4.2112   4.2112                          Frame ID = 0x10, Len = 0xC
FrameTime BSM  20.2112  20.2143                         Frame ID = 0x12, Len = 0xD

STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 10.73743 ms (SMEC), 20.21228 ms (BSM)
sigma = 323.17900 ms (SMEC), 0.00152 ms (BSM)
```

4.11 FUNC-MCU-03: MCU Nominal Science Contents Check

Test Id:	**FUNC-MCU-03: MCU Nominal Contents Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON
Success Criteria:	Test passed if : 1. MCU produces 99 frames of each type of frames requested with the following characteristics:

Frame	APID	Type	Subtype	SID	FrameID	Frame length
Eng.	**0x508**	**21**	**3**	**0x814**	**0x14**	**0x15**
BSM	**0x508**	**21**	**1**	**0x612**	**0x12**	**0xD**
SMEC	**0x508**	**21**	**1**	**0x410**	**0x10**	**0xC**
BSM +SMEC						

2. No events are generated during the different frames generation.
3. QLA analysis results are correct.

QLA to give go ahead.

Test Procedure:

Step#	Action	Comments
1	Write the current value of MCUFRAMECNT located MCU_PARAMETERS display.	
2	Run QLA script FUNC-MCU-03.py on QLA console.	
3	Run FUNC-MCU-03 test procedure from the CCS	
4	When test is finished Write the current value of MCUFRAMECNT	
5	Contingency: If test fails repeat steps 1 to 4.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-MCU-03	**MCUFRAMECNT**	**n/ n+297** **n~6600**	6492 / 6789	297	**Success**

Start time: 10:07
OBSID:0xb00002c2

CUS Input Default Parameters:

n_eng_frames = 100 – Number of MCU Eng frames
f_eng_frames = 64.1Hz – MCU Eng frame generation frequency
n_smec_frames = 100 – Number of SMEC frames
f_smec_frames = 250.0Hz – SMEC frame generation frequency
n_bsm_frames = 100 – Number of BSM frames
f_bsm_frames = 64.1Hz – BSM frame generation frequency
ftime = 10 – Time for continuous frame generation for each frame type (Parameter NA)

Produced 99 frames instead of 100 as expected for each type of MCU frame

QLA produced three files: QLA-MCU-03_B00002C2_8901.txt (SMEC), QLA-MCU-03_ B00002C2_8902.txt (MCU Eng) and QLA-MCU-03_ B00002C2_8903.txt (BSM).

QLA-MCU-03_B00002C2_8901.txt (SMEC)

Housekeeping Tue Oct 23 10:09:03 UTC 2007
Science Tue Oct 23 10:09:03 UTC 2007

Name	HK before	Science	HK after	Equal (within 10%)?
SMECENCSIG1	12405.0	12406.0	12404.0	True
SMECENCSIG2	20069.0	20070.0	20069.0	True
SMECLVDTDCSIG	32760.0	32758.0	32759.0	True
SMECLVDTACSIG	27339.0	27338.0	27336.0	True
SMECMOTORCURR	32778.0	32776.0	32776.0	True
SMECMOTORVOLT	34517.0	34514.0	34521.0	True
CHOPSENSSIG	32766.0	32762.0	32763.0	True
CHOPMOTORCURR	32777.0	32776.0	32776.0	True
CHOPMOTORVOLT	33636.0	33626.0	33632.0	True
JIGGSENSSIG	32754.0	32755.0	32756.0	True
JIGGMOTORCURR	32776.0	32772.0	32774.0	True
JIGGMOTORVOLT	33360.0	33360.0	33360.0	True

QLA-MCU-03_ B00002C2_8902.txt (MCU Eng)

Housekeeping Tue Oct 23 10:09:20 UTC 2007
Science Tue Oct 23 10:09:20 UTC 2007

Name	HK before	Science	HK after	Equal (within 10%)?
SMECENCPOSN	0.0	0.0	0.0	True
SMECENCFINEPOSN	0.0	0.0	0.0	True
SMECLVDTDCSIG	32758.0	32760.0	32760.0	True
SMECMOTORBEMF	1748.0	1752.0	1749.0	True

QLA-MCU-03_ B00002C2_8903.txt (BSM)

Housekeeping Tue Oct 23 10:09:36 UTC 2007
Science Tue Oct 23 10:09:36 UTC 2007

Name	HK before	Science	HK after	Equal (within 10%)?
CHOPSENSSIG	32763.0	32762.0	32764.0	True
CHOPDACVAL	32768.0	32768.0	32768.0	True
CHOPMOTORVOLT	33637.0	33637.0	33636.0	True
JIGGSENSSIG	32753.0	32756.0	32757.0	True
JIGGDACVAL	32768.0	32768.0	32768.0	True
JIGGMOTORVOLT	33360.0	33360.0	33361.0	True

No discrepancies between HK and science parameter values.

4.12 FUNC-MCU-04: MCU Test Pattern Check

Test Id:	**FUNC-MCU-04: MCU Test Pattern Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON
Success Criteria:	Test passed if: 1. MCU produces 100 frames of Test Pattern with the following characteristics: 2. MCU Test pattern produced is the same as the previous time this test was run. QLA to give go ahead.

Frame	APID	Type	Subtype	SID	FrameID	Frame length
Test	**0x508**	**21**	**3**	**0x915**	**0x15**	**0x15**

Test Procedure:

Step#	Action	Comments
1	Write the current value of MCUFRAMECNT located in MCU_PARAMETERS display.	
2	Run QLA script FUNC-MCU-04.py on QLA console.	
3	Run FUNC-MCU-04 test procedure from the CCS	
4	When test is finished Write the current value of MCUFRAMECNT	
5	Contingency: If test fails repeat steps 1 to 4.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-MCU-04	**MCUFRAMECNT**	**m/ m+99** **m~6600**	6789 / 6888	99	**Success**

Start time: 10:10
OBSID:0xb00002c3

CUS Input Default Parameters:

n_test_frames = 100 – Number of MCU Test Pattern frames
f_test_frames = 64.1Hz – MCU Test Pattern frame generation frequency

Comments:
Produced 99 frames instead of 100 as expected.

QLA generated file QLA-MCU-04_ B00002C3_8905.txt:

MCU Test Pattern @ Tue Oct 23 10:12:06 UTC 2007
..compared with data from MCU Test Pattern @ Wed Mar 14 14:31:00 GMT 2007, OBSID=0x300125B9

Name	New Value[0]	New Value[20]	Comp Value[0]		Comp Value[20]	
MCUTSTOBSID	0xB00002C3	0x0	0x300125B9		0x0	
MCUTSTBBID	0x89050001	0x0	0x89050001	--> OK	0x0	--> OK
MCUTSTBLKLEN	21.0	21.0	21.0	--> OK	21.0	--> OK
MCUTSTFRAMEID	21.0	21.0	21.0	--> OK	21.0	--> OK
MCUTSTACQTIME	3755011.0	3857784.0	3994451.0		4097224.0	
MCUTST001	21845.0	21845.0	21845.0	--> OK	21845.0	--> OK
MCUTST002	43690.0	43690.0	43690.0	--> OK	43690.0	--> OK
MCUTST003	21844.0	21844.0	21844.0	--> OK	21844.0	--> OK
MCUTST004	43688.0	43688.0	43688.0	--> OK	43688.0	--> OK
MCUTST005	21840.0	21840.0	21840.0	--> OK	21840.0	--> OK
MCUTST006	43680.0	43680.0	43680.0	--> OK	43680.0	--> OK
MCUTST007	21825.0	21825.0	21825.0	--> OK	21825.0	--> OK
MCUTST008	43650.0	43650.0	43650.0	--> OK	43650.0	--> OK
MCUTST009	21765.0	21765.0	21765.0	--> OK	21765.0	--> OK
MCUTST010	43530.0	43530.0	43530.0	--> OK	43530.0	--> OK
MCUTST011	21524.0	21524.0	21524.0	--> OK	21524.0	--> OK
MCUTST012	43048.0	43048.0	43048.0	--> OK	43048.0	--> OK
MCUTST013	20560.0	20560.0	20560.0	--> OK	20560.0	--> OK
MCUTST014	41120.0	41120.0	41120.0	--> OK	41120.0	--> OK
MCUTSTTTIME	3755486.0	3858258.0	3994925.0		4097699.0	
MCUTSTCHECKWORD	61998.0	61913.0	62861.0		61848.0	

Comparison successful

Step#	Action	Comments
0	Open **CHOP & JIGGLE PARAMETERS displays** on SCOS Alpha Numeric Displays.	

4.13 FUNC-BSM-01: BSM Chop/Jiggle Sensor Check

Test Id:	**FUNC-BSM-01: BSM Chop/Jiggle Sensor Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Success Criteria:	Test passed if: 1. CHOPSENSPWR HK parameter goes from 0 to 1 2. CHOPDACVAL HK parameter stays at or goes to 0x8000 3. CHOPSENSIG HK parameter shows variation from off to on 4. JIGGSENSPWR HK parameter goes from 0 to 1 5. JIGGDACVAL parameter stays at or goes to 0x8000 6. JIGGSENSSIG HK parameter shows variation from off to on

Test Procedure

Step#	Action	Comments
1	On QLA bring up a time series display of the following HK parameters: CHOPSENSPWR CHOPDACVAL CHOPSENSIG JIGGSENSPWR JIGGDACVAL JIGGSENSSIG	
2	Run FUNC-BSM-01 test procedure from the CCS	
3	When the test is finished record all the Key parameters noted below	
	Contingency: If test fails repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-01	**CHOPSENSPWR** **CHOPLOOPMODE** **CHOPDACVAL** **CHOPFFGAIN** **CHOPSENSSIG** **JIGGSENSPWR** **JIGGLOOPMODE** **JIGGDACVAL** **JIGGFFGAIN** **JIGGSENSSIG**	**0/1** **3/3** **0x8000/0x8000** **0xBEB/0x700** **~0x8000** **0/1** **3/3** **0x8000/0x8000** **0xBEB/0xF6E** **~0x8000/?**	0/1 3/3 0x8000/0x8000 0xBEB/0x770 ~0x7FFE/~0x8EB9 0/1 3/3 0x8000/0x8000 0xBEB/0xF6E 0x7FF2/~ 0x8F3A	N/A	Success

Start time: 10:15
OBSID:0xb00002c4

CUS Input Default Parameters: None

Comments:
The BSM was switched ON correctly. The Chop and Jiggle FF gains are consistent with the latest BSMNominalSettings.txt table in the CUS.

4.14 FUNC-BSM-02C: BSM Chop Sensor Polarity Check

Test Id:	FUNC-BSM-02C: BSM Chop Sensor Polarity Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Success Criteria:	Test passed if the chop sensor signal evolves in the same way as the positions set.(i.e if (pos1 > pos2 ➔ sig1 > sig2)

Test Procedure:

Step#	Action	Comments
1	On QLA open up a time series display of HK parameter CHOPDACVAL and CHOPSENSSIG	
2	Run FUNC-BSM-02C test procedure from the CCS	
3	Contingency: If test fails repeat steps 1.	

Test Log:

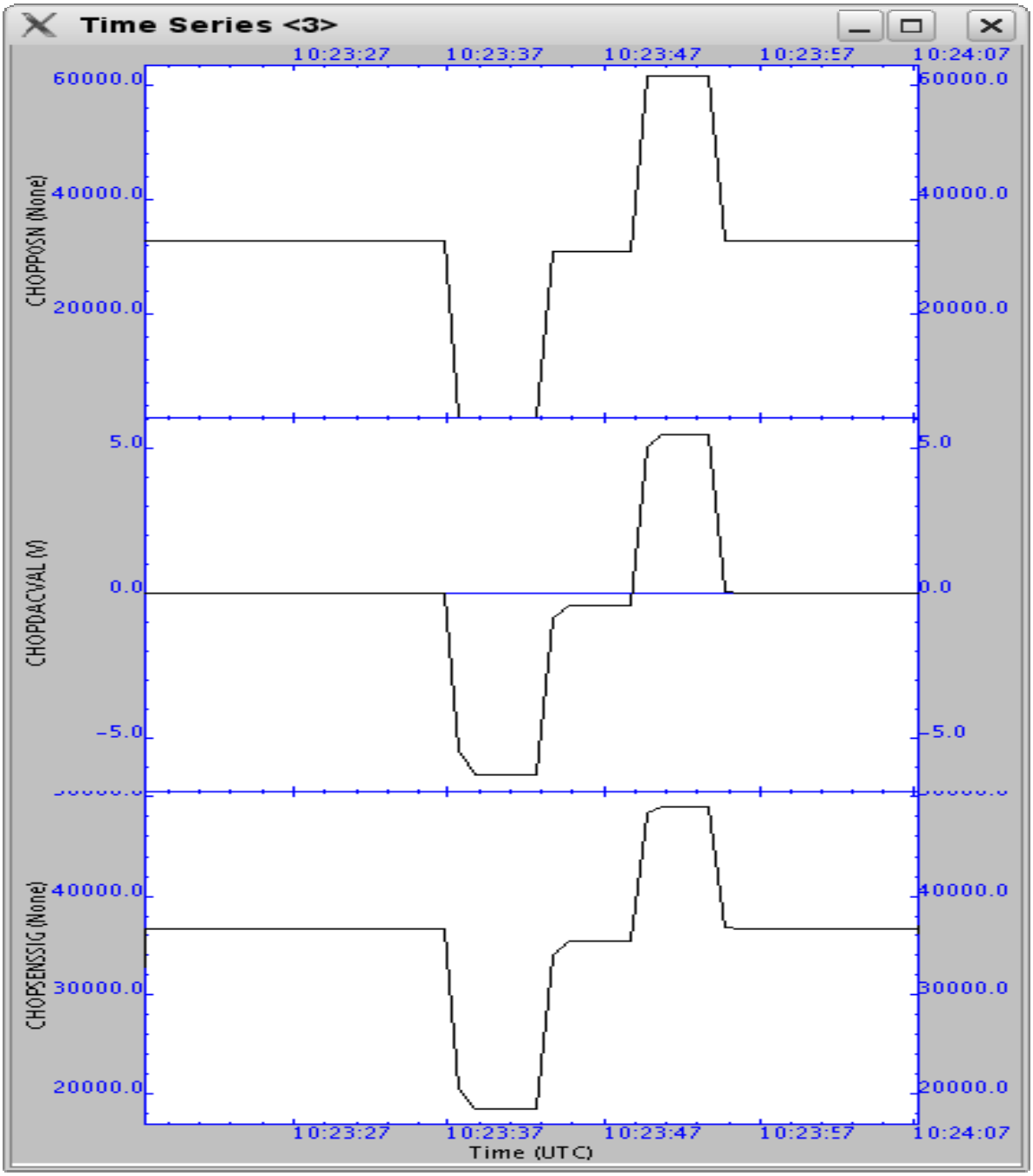
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-02C	**CHOPDACVAL** **CHOPSENSSIG**		See below	**N/A**	**Success**

Start time: 10:22
OBSID:0xb00002c5

CUS Input Default Parameters: None

Comments:
The BSM moved along the chop axis in the same direction as expected.

QLA plots:



4.15 FUNC-BSM-02J: BSM Jiggle Sensor Polarity Check

Test Id:	FUNC-BSM-02J: BSM Jiggle Sensor Polarity Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Success Criteria:	Test passed if the jiggle sensor signal evolves in the same way as the positions set.(i.e if (pos1 > pos2 ➔ sig1 > sig2)

Test Procedure:

Step#	Action	Comments
1	On QLA open up a time series display of HK parameter JIGGDACVAL and JIGGSENSSIG	
2	Run FUNC-BSM-02J test procedure from the CCS	
3	Contingency: If test fails repeat steps 1.	

Test Log:

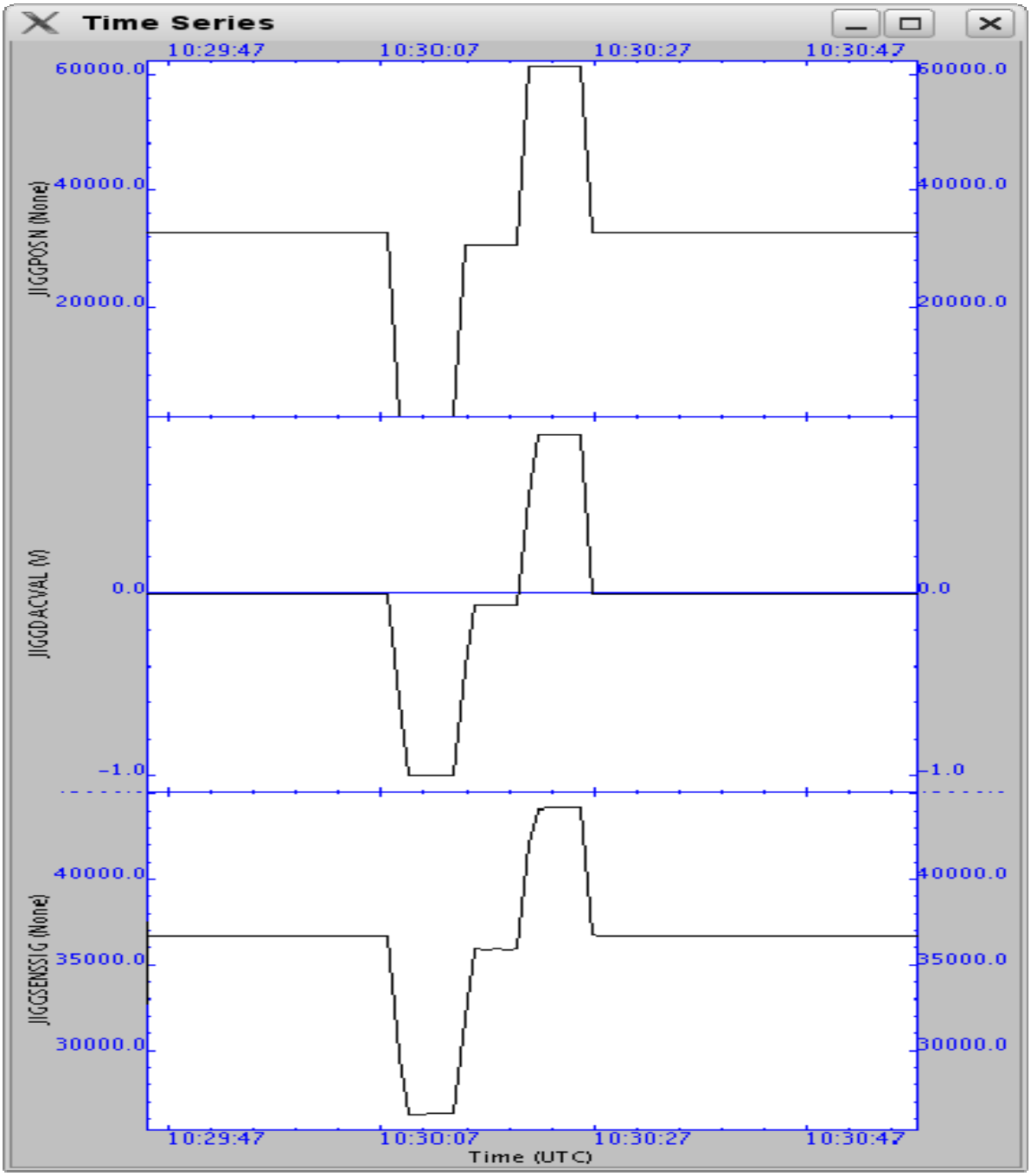
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-02J	**JIGGDACVAL** **JIGGSENSSIG**		See below	**N/A**	**Success**

Start time: 10:29
OBSID:0xb00002c6

CUS Input Default Parameters: None

Comments:
The BSM moved along the jiggle axis in the same direction as expected.

QLA plots:



4.16 FUNC-BSM-03: BSM Open Loop Dynamics Check

Test Id:	FUNC-BSM-03: BSM Open Loop Dynamics Test
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Success Criteria:	Test passed if the chop sensor signal evolves in the same way as the positions set.(i.e if (pos1 > pos2 ➔ sig1 > sig2) for each jiggle position. **Note:** During warm tests the voltages on both chop and jiggle motors are likely to be saturated (CHOP/JIGGMOTORVOLT RAW values of ~ 0xFFFF) due to the high resistance of the motor coil at ambient temperature.

Test Procedure

Step#	Action	Comments
1	On QLA open up a time series display of HK parameters: CHOPPOSN CHOPDACVAL CHOPMOTORCURR CHOPSENSSIG CHOPMOTORVOLT JIGGPOSN JIGGDACVAL JIGGMOTORCURR JIGGSENSSIG JIGGMOTORVOLT	
2	Run FUNC-BSM-03 test procedure from the CCS	
3	Contingency: If test fails repeat step 2.	

Test Log:

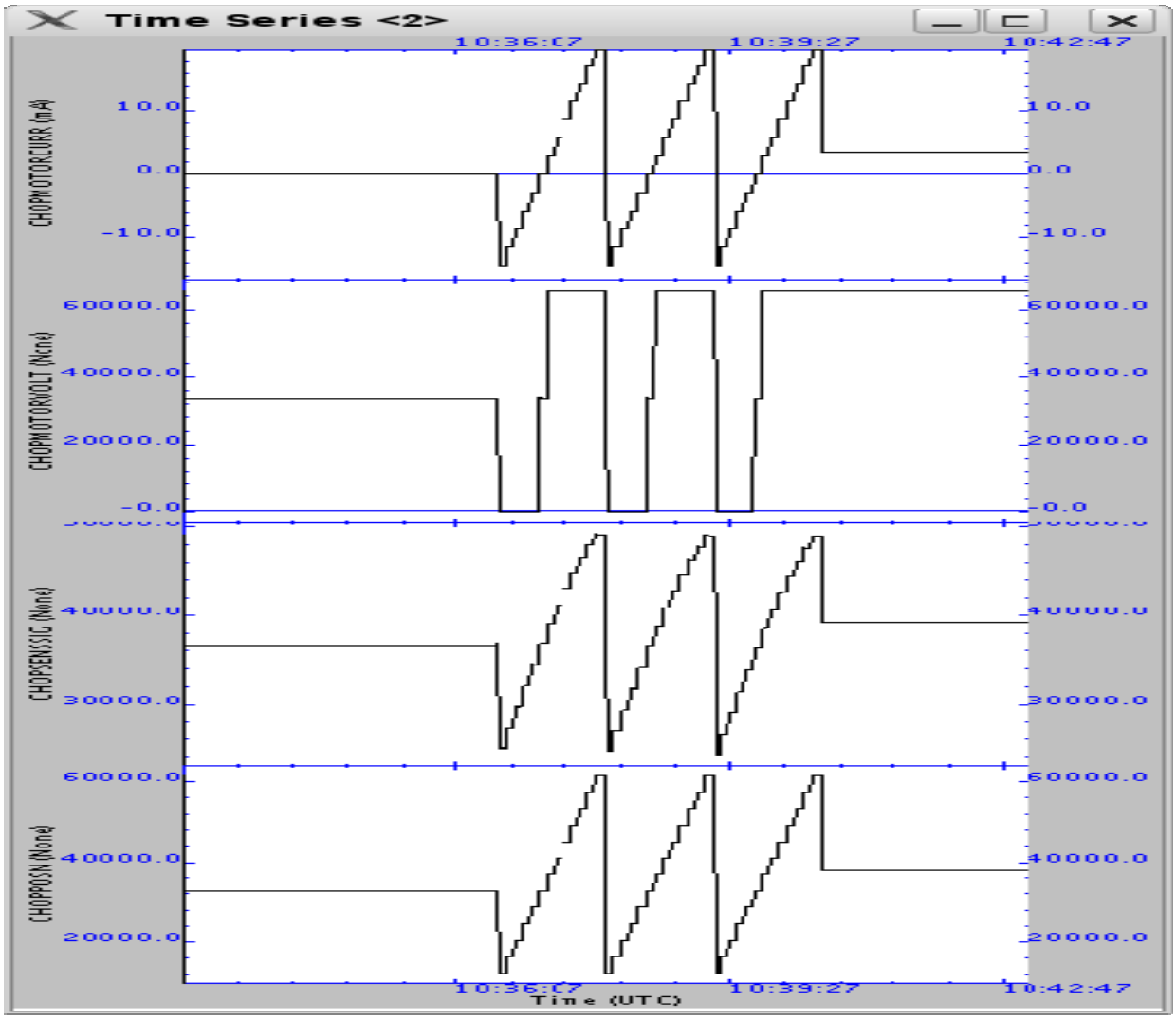
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-03				**N/A**	**Success**

Start time: 10:34
OBSID:0xb00002c7
CUS Input Default Parameters:

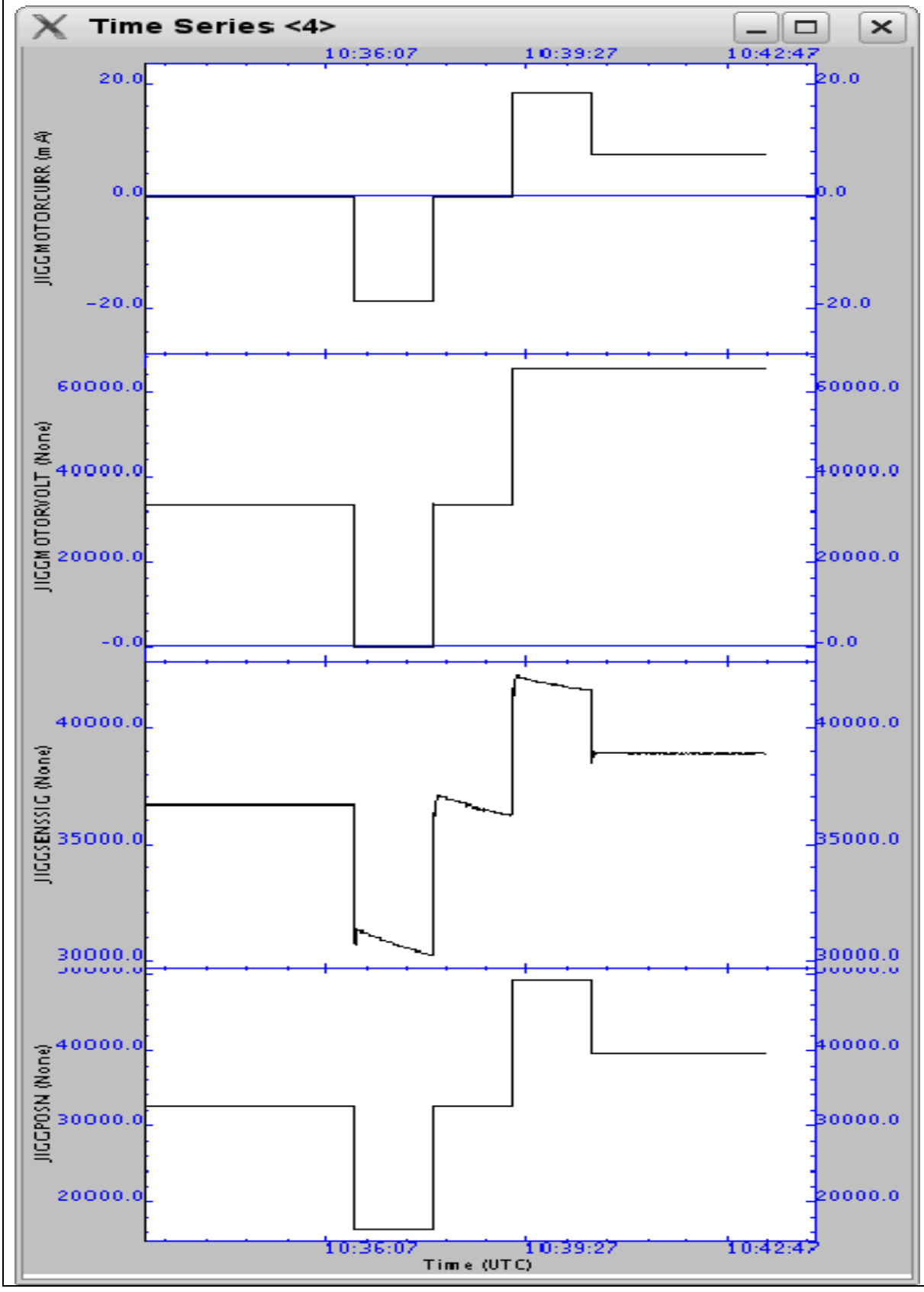
string frametype = "BSM"; // Specifies MCU frame type [
double framerate = 64.0; // Specifies the frame rate
int j_start = 0x4000; // RAW jiggle target start position
int j_end = 0xc000; // RAW jiggle target end position
int j_step = 0x4000; // RAW jiggle target step in position
int j_delay = 2; // Time at each jiggle target position in seconds
int c_start = 0x3000; // RAW chop target start position
int c_end = 0xf000; // RAW chop target end position
int c_step = 0x1000; // RAW chop target step in position
int c_delay = 5; // Time at each chop target position in seconds

Comments:
MCUFRAMECNT: 6888 -> 22676
Jiggle position as given by senssig shows going to position then coming back as the chop position is stepped. This is due to the coupling between the axes.

QLA plots for Chop Axis:



QLA plots for Jiggle Axis:



4.17 FUNC-BSM-05A: BSM Open Loop Chop Test

Test Id:	FUNC-BSM-05A: Open Loop Chop Test
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Success Criteria:	**Note:** The purpose of this test is to check the correctness of the BSM open loop chop test.

Test Procedure

Step#	Action	Comments
1	On QLA open up a time series display of HK parameters: BSMCHOPSENSSIG BSMCHOPMOTORCURR BSMCHOPMOTORVOLT BSMJIGGSENSSIG BSMJIGGMOTORCURR BSMJIGGMOTORVOLT	
2	Run FUNC-BSM-05A test procedure from the CCS	
3	Contingency: None contemplated.	

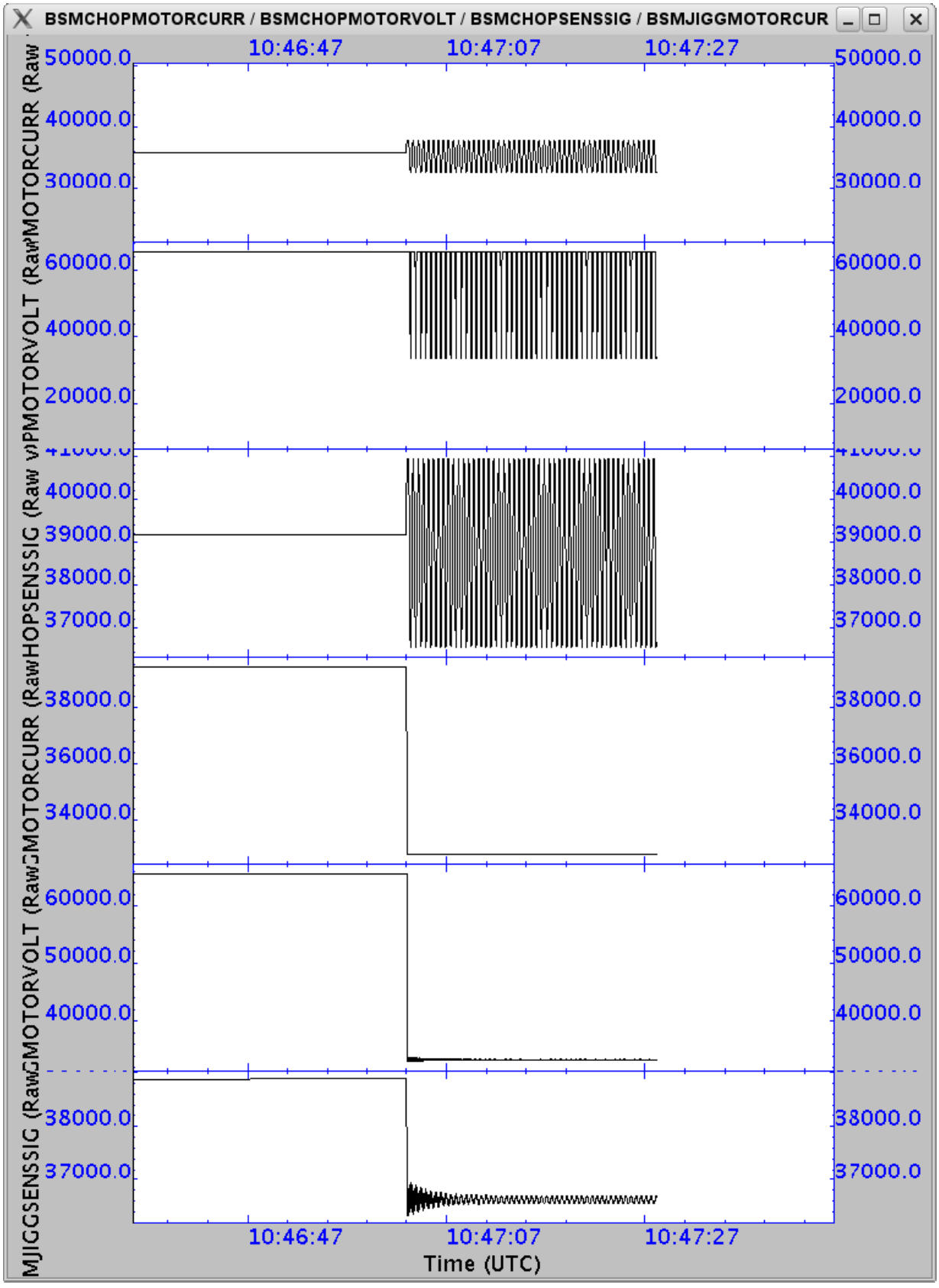
Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-05A				**N/A**	**Success**

Start time: 10:45
OBSID:0xb00002c8
CUS Input Default Parameters:

```
string frametype = "BSM"; // Specifies MCU frame type
double framerate = 125.0; // Specifies the frame rate
int on_source_chop = 0xa000; // On source chop position
int on_source_jiggle = 0x8000; // On source jiggle position
int off_source_chop = 0x8000; // Off source chop position
int off_source_jiggle = 0x8000; // Off source jiggle position
int ncycles = 50; //Number of chop cycles
int chop_period = 500000; //period of chop cycles in microsec
int dcumode = 0; //Data type
int dcusample = 4; //Number of DCU samples per chop position
int dcudelay = 34959; //Dealy to start sampling the DCU
int bsmsample = 31; //Number of BSM samples per position
```

Comments: Plots from QLA below


BSMCHOPMOTORCURR / BSMCHOPMOTORVOLT / BSMCHOPSENSSIG / BSMJIGGMOTORCUR
10:46:47
10:47:07
10:47:27
Time (UTC)

4.18 FUNC-BSM-05B: BSM Closed Loop Chop Test

Test Id:	FUNC-BSM-05B: BSM Closed Loop Chop Test
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Success Criteria:	**Note:** The purpose of this test is to check the correctness of the BSM close loop initialisation procedure and the default PID parameters If the dynamical behaviour of the BSM during chopping with these PID parameters is close or within requirements this indicates that the PID parameters used can be applied to cold testing with certain adjustment. If NOT these indicates that the PID parameters need further tuning **BUT NOT TO BE DONE DURING THESE TEST.** In any case the success/fail criteria are NOT applicable for this test.

Test Procedure

Step#	Action	Comments
1	On QLA open up a time series display of HK parameters: BSMCHOPSENSSIG BSMCHOPMOTORCURR BSMCHOPMOTORVOLT BSMJIGGSENSSIG BSMJIGGMOTORCURR BSMJIGGMOTORVOLT	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-05B	**CHOPLOOPMODE** **JIGGLOOPMODE**	**3/1** **3/1**		**N/A**	**Success**

10:52 BSM_INIT
OBSID:0xb00002c9
CHOPLOOPMODE 3 to 1
JIGGLOOPMODE 3 to 1

Comments:

10:54 BSM-05B
OBSID:0xb00002ca

CUS Input Default Parameters:

```
string frametype = "BSM"; // Specifies MCU frame type
double framerate = 125.0; // Specifies the frame rate
int on_source_chop = 0xb600; // On source chop position
int on_source_jiggle = 0x9a60; // On source jiggle position
int off_source_chop = 0x6a28; // Off source chop position
int off_source_jiggle = 0x9a60; // Off source jiggle position
int ncycles = 50; //Number of chop cycles
int chop_period = 500000; //period of chop cycles in microsec
int dcumode = 0; //Data type
int dcusample = 4; //Number of DCU samples per chop position
int dcudelay = 34959; //Dealy to start sampling the DCU
int bsmsample = 31; //Number of BSM samples per position
```

Plots from QLA for 0xb00002ca:

4.19 FUNC-BSM-06: BSM Operational Mode Check

Test Id:	FUNC-BSM-05B: BSM Operational Mode Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + BSM ON (open loop)
Success Criteria:	**Note:** The purpose of this test is to check the operational behaviour of the BSM in closed loop.

Test Procedure

Step#	Action	Comments
1	On QLA open up a time series display of HK parameters: BSMCHOPSENSSIG BSMCHOPMOTORCURR BSMCHOPMOTORVOLT BSMJIGGSENSSIG BSMJIGGMOTORCURR BSMJIGGMOTORVOLT	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-06				**N/A**	**Success**

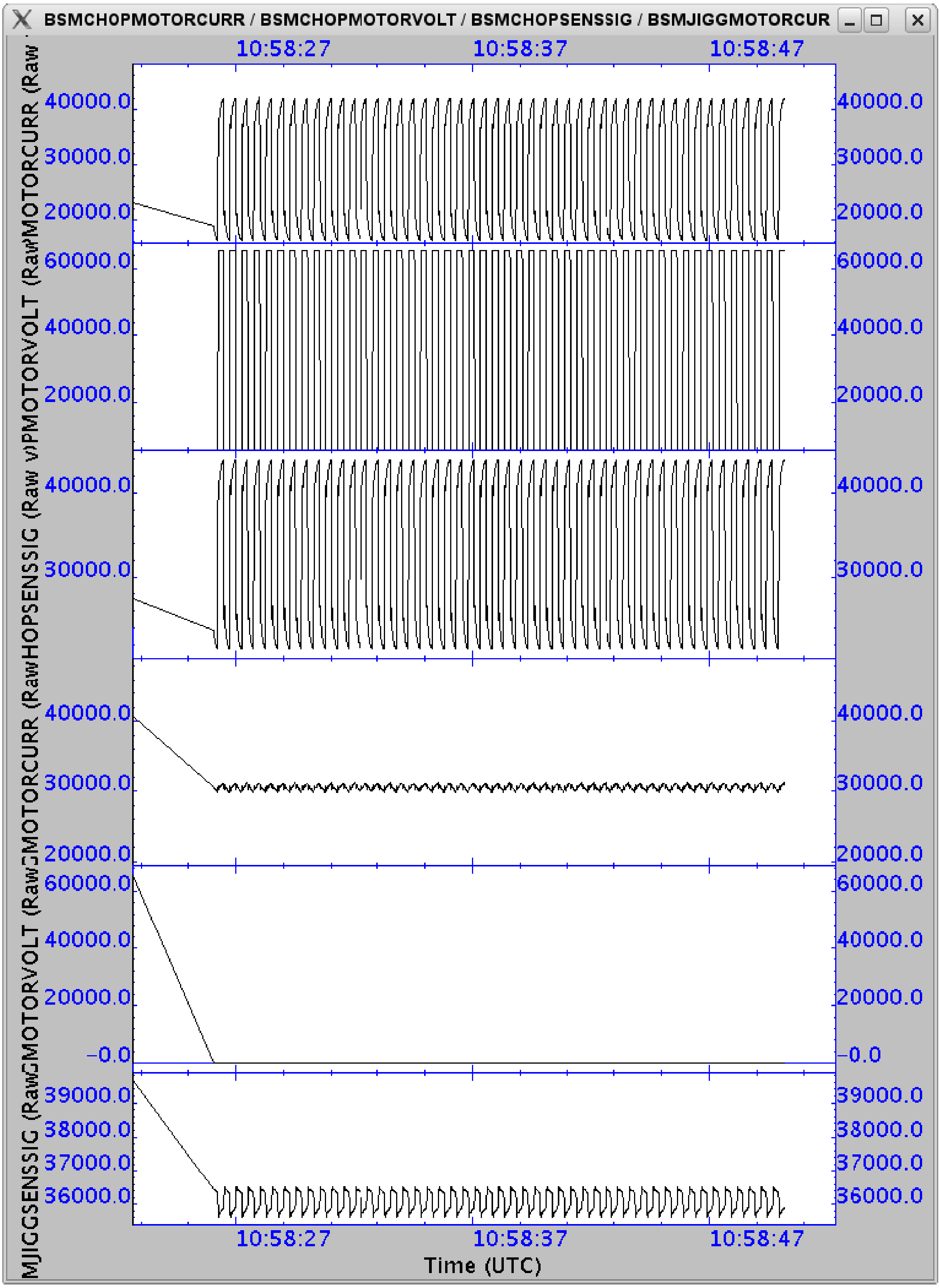
Start time: 10:57
OBSID:0xb00002cb

CUS Input Default Parameters:

string frametype = "BSM"; // Specifyes MCU frame type]
double framerate = 125.0; // Specifies the frame rate
int on_source_chop = 0x5279; // On source chop position
int on_source_jiggle = 0x8d00; // On source jiggle position
int off_source_chop = 0xad87; // Off source chop position
int off_source_jiggle = 0x8d00; // Off source jiggle position
int ncycles = 50; //Number of chop cycles
int chop_period = 500000; //period of chop cycles in microsec
int dcumode = 0; //Data type
int dcusample = 4; //Number of DCU samples per chop position
int dcudelay = 34959; //Dealy to start sampling the DCU
int bsmsample = 65535; //Number of BSM samples per position

Comments: Transparent packets seen on the CCS.

Output from QLA script for BSM-06 below.


BSMCHOPMOTORCURR / BSMCHOPMOTORVOLT / BSMCHOPSENSSIG / BSMJIGGMOTORCUR
10:58:27
10:58:37
10:58:47
40000.0
30000.0
20000.0
60000.0
40000.0
20000.0
40000.0
30000.0
40000.0
30000.0
20000.0
60000.0
40000.0
20000.0
-0.0
39000.0
38000.0
37000.0
36000.0
Time (UTC)

BSM_OFF:

Start time: 10:01

OBSID: 0xb00002cc

CHOP/JIGGLOPPMODE 1 to 3

CHOP/JIGGSENSPWR: 1 to 0

Step#	Action	Comments
0	Open **DCU PARAMETERS** SCOS Alpha Numeric Display	

4.20 FUNC-DCU-01: DCU Nominal Science Packet Generation Check

Test Id:	**FUNC-DCU-01: DCU Nominal Science Packet Generation Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON
Success Criteria:	Test passed if: 1. DCU produces each type of DCU nominal science frame with the following characteristics.

APID	Type	S.type	SID	Frame ID	Frame type	Nb. Of frames	Nb. of pkts.
0x504	**21**	**1**	**0x200**	**0**	**PF**	**100**	**100**
0x506	**21**	**1**	**0x201**	**1**	**SF**	**100**	**17**
0x504	**21**	**2**	**0x102**	**2**	**PSW**	**100**	**34**
0x504	**21**	**2**	**0x103**	**3**	**PMW**	**100**	**25**
0x504	**21**	**2**	**0x104**	**4**	**PLW**	**100**	**12**
0x506	**21**	**2**	**0x105**	**5**	**SSW**	**100**	**12**

	0x506	**21**	**2**	**0x106**	**6**	**SLW**	**100**	**7**

2. The frame time difference between consecutive DCU frames of each type corresponds to the sampling rate.
   Photometer Sampling rate is 15.3Hz → Δt ~ 65.5 ms
   Spectrometer Sampling rate is 80Hz → Δt = 12.5 ms
3. The SPIRE HK parameter DCUFRAMECNT increments by 700.
4. No events are generated during the frames generation.

Test Procedure:

Step#	Action	Comments
1	Write the current value of DCUFRAMECNT located d in DCU PARAMETERS AND	
2	Run FUNC-DCU-01 test procedure from the CCS	
3	Write the current value of DCUFRAMECNT located d in DCU PARAMETERS AND	
4	Contingency: If test fails repeat steps 1 to 3.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-01	**DCUFRAMECNT**	**n/n+700** **n depends on the BSM chop operations on FUNC-BSM-06**	1200 / 1900	700	**Success**

Start time: 11:03
OBSID:0xb00002cd

CUS Input Default Parameters:

double photbiasfreq = 130.0;
double photsampfreq = 18.0;
double specbiasfreq = 160.0;
double specsampfreq = 80.0;
int frames = 100;

Comments: CCS cannot carry out step 2 of the DCU-01 as they cannot see science packets on their system in the new version

QLA created file QLA-DCU-01_B00002CD.txt:

```
**************************************************************************
PHOTF: OBSID = B00002CD, BBTYPE = 0x8800, APID = 0x504, SID  = 0x200
_____________________________________________________________________
Parameter      Initial    Final     Increment Expect Incre. Packet Chars.

DCUFRAMECNT    1200       1300       100        100          Packet type = 0x15
```

```
TM3N            1199        1299        100         100           subtype = 0x1
FrameTime       53.7600     53.7600                               Frame ID  = 0x0
                                                                  Frame Len = 0x126
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 53.75938 ms
sigma = 0.00127 ms


************************************************************************
PHOTSW: OBSID = B00002CD, BBTYPE = 0x8802, APID = 0x504, SID  = 0x102
________________________________________________________________________
Parameter       Initial     Final     Increment Expect Incre. Packet Chars.

DCUFRAMECNT     1300        1400        100         100           Packet type = 0x15
TM3N            1299        1333        34          34            subtype = 0x2
FrameTime       53.7568     53.7600                               Frame ID  = 0x2
                                                                  Frame Len = 0x96
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 53.75935 ms
sigma = 0.00131 ms


************************************************************************
PHOTMW: OBSID = B00002CD, BBTYPE = 0x8803, APID = 0x504, SID  = 0x103
________________________________________________________________________
Parameter       Initial     Final     Increment Expect Incre. Packet Chars.

DCUFRAMECNT     1400        1500        100         100           Packet type = 0x15
TM3N            1333        1358        25          25            subtype = 0x2
FrameTime       53.7600     53.7568                               Frame ID  = 0x3
                                                                  Frame Len = 0x66
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 53.75936 ms
sigma = 0.00127 ms


************************************************************************
PHOTLW: OBSID = B00002CD, BBTYPE = 0x8804, APID = 0x504, SID  = 0x104
________________________________________________________________________
Parameter       Initial     Final     Increment Expect Incre. Packet Chars.

DCUFRAMECNT     1500        1600        100         100           Packet type = 0x15
TM3N            1358        1370        12          12            subtype = 0x2
FrameTime       53.7568     53.7600                               Frame ID  = 0x4
                                                                  Frame Len = 0x36
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 53.75935 ms
sigma = 0.00129 ms


************************************************************************
SPECF: OBSID = B00002CD, BBTYPE = 0x8801, APID = 0x506, SID  = 0x201
________________________________________________________________________
Parameter       Initial     Final     Increment Expect Incre. Packet Chars.

DCUFRAMECNT     1600        1700        100         100           Packet type = 0x15
TM4N            16383       16          16          17            subtype = 0x1
FrameTime       12.4928     12.4928                               Frame ID  = 0x1
                                                                  Frame Len = 0x4E
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 12.49263 ms
sigma = 0.00074 ms


************************************************************************
SPECSW: OBSID = B00002CD, BBTYPE = 0x8805, APID = 0x506, SID  = 0x105
________________________________________________________________________
Parameter       Initial     Final     Increment Expect Incre. Packet Chars.

DCUFRAMECNT     1700        1800        100         100           Packet type = 0x15
TM4N            16          28          12          12            subtype = 0x2
FrameTime       12.4928     12.4928                               Frame ID  = 0x5
                                                                  Frame Len = 0x36
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 12.49265 ms
```

```
sigma = 0.00066 ms


**************************************************************************
SPECLW: OBSID = B00002CD, BBTYPE = 0x8806, APID = 0x506, SID  = 0x106
_____________________________________________________________________
Parameter      Initial    Final     Increment Expect Incre. Packet Chars.

DCUFRAMECNT    1800       1900       100        100          Packet type = 0x15
TM4N           28         35         7          7            subtype = 0x2
FrameTime      12.4928    12.4928                            Frame ID  = 0x6
                                                             Frame Len = 0x1E
STATISTICS ON TIME BETWEEN RECEPTION OF 2 CONSECUTIVE FRAMES:
mean  = 12.49264 ms
sigma = 0.00071 ms
```

4.21 FUNC-DCU-02: DCU High Speed Link Check

Test Id:	FUNC-DCU-02: DCU High Speed Link Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON
Success Criteria:	Test passed if DCUFRAMECNT goes from 700 to 1400 and the frametime difference between consecutive frames computed by QLA script is in agreement with the expected differences based on commanded sampling rate: 1. Photometer Sampling rate is 15.3Hz → Δt ~ 65.5 ms 2. Spectrometer Sampling rate is 80Hz → Δt = 12.5 ms

Test Procedure:

Step#	Action	Comments
1	Write the current value of DCUFRAMECNT located d in DCU PARAMETERS AND	
2	Run QLA script FUNC-DCU-02.py on QLA console.	
3	Run FUNC-DCU-02 test procedure from the CCS	
4	Write the current value of DCUFRAMECNT located d in DCU PARAMETERS AND	
5	Contingency: If test fails repeat steps 1 to 4.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-02	**DCUFRAMECNT**	**m/m+1400**	1900 / 2600	700	**Success**

Start time: 11:08
OBSID: 0xb00002ce

CUS Input Default Parameters:

double photbiasfreq = 200.0;
double photsampfreq = 15.3;
double specbiasfreq = 160.0;
double specsampfreq = 80.0;
int frames = 100;

Comments:
QLA script produced 7 files, QLA-DCU-02_B00002CE_800<n>.txt – where n=0 to 6

Contents of QLA created files show sampling times to be consistent with input parameters entered for sampling frequencies of photometer ~15.3Hz ($\Delta t \sim 65.5$ ms**) and spectrometer 80Hz** $\Delta t \sim 12.5$ ms**.**

4.22 FUNC-DCU-03: DCU Test Pattern Check

Test Id:	FUNC-DCU-03: DCU Test Pattern Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON
Success Criteria:	Test passed if : 1. DCU produces 100 frames of Full Photometer Test Pattern and 100 frame of Full Spectrometer Test Pattern test. 2. QLA analysis shows that phot/spec test patterns are the same as the reference phot/spec test patterns.

Test Procedure:

Step#	Action	Comments
1	Write the current value of DCUFRAMECNT located d in DCU PARAMETERS AND	
2	Run QLA script FUNC-DCU-03.py on QLA console.	
3	Run FUNC-DCU-03 test procedure from the CCS	
4	Write the current value of DCUFRAMECNT located d in DCU PARAMETERS AND	
5	Contingency: If test fails repeat steps 1 to 4.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-03	**DCUFRAMECNT**	**j/j+200**	2600 / 2800	200	**Success**

Start time: 11:13
OBSID: 0xb00002cf

CUS Input Default Parameters:

double photbiasfreq = 200.0;
double photsampfreq = 15.3;
double specbiasfreq = 160.0;
double specsampfreq = 80.0;
int phase = 0;
int frames = 100;

Comments:
Files produced by QLA:

QLA-DCU-03_B00002CF_8807.txt – DCU Photometer Test Pattern
QLA-DCU-03_B00002CF_8808.txt – DCU Spectrometer Test Pattern

Test pattern file shows agreement with reference DCU test pattern files– see Annexe 1

4.23 FUNC-DCU-04-PHOT: Photometer LIAs Check

Test Id:	FUNC-DCU-04P: Photometer LIAs Check
Initial Configuration:	DRCU_ON + AC/DC thermometry ON+MCU ON
Final Configuration:	DRCU_ON + AC/DC thermometry ON+MCU ON + Photometer LIAs ON
Success Criteria:	Test passed if : 1. SCUDCDCSTAT parameter goes from 4 to 5. 2. Photometer LIA card voltages are showing correct readings of +5V,+9V,-9V. 3. Photometer LIA temperatures show an increase indicating that they are ON.

Test Procedure:

Step#	Action	Comments
1	On QLA bring up a time series display of the HK parameters: PLIAP5V PLIAP9V PLIAM9V LIAP1/2/3/4/5/6/7/8/9TEMP	
2	Run FUNC-DCU-04-PHOT test procedure from the CCS	
5	Contingency: If test fails repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-04-PHOT	**SCUDCDCSTAT** **PLIAP5V** **PLIAP9V** **PLIAM9V** **LIAP1TEMP to LIAP9TEMP**	**4/5** **0/~ +5V** **0/~+11V** **0/~-11V** **N/A/ [290-300]K**	**4/5** 0/+5.23V 0/+11.58V 0/-11.58V ~293/warming up		**Success**

Start time: 11:19
OBSID: 0xb00002d0

CUS Input Default Parameters:
int mcu_status = 1; //default 0 = off, 1= on

Comments: PLIABITSTAT 0 to 1

Photometer LIAs switched on OK

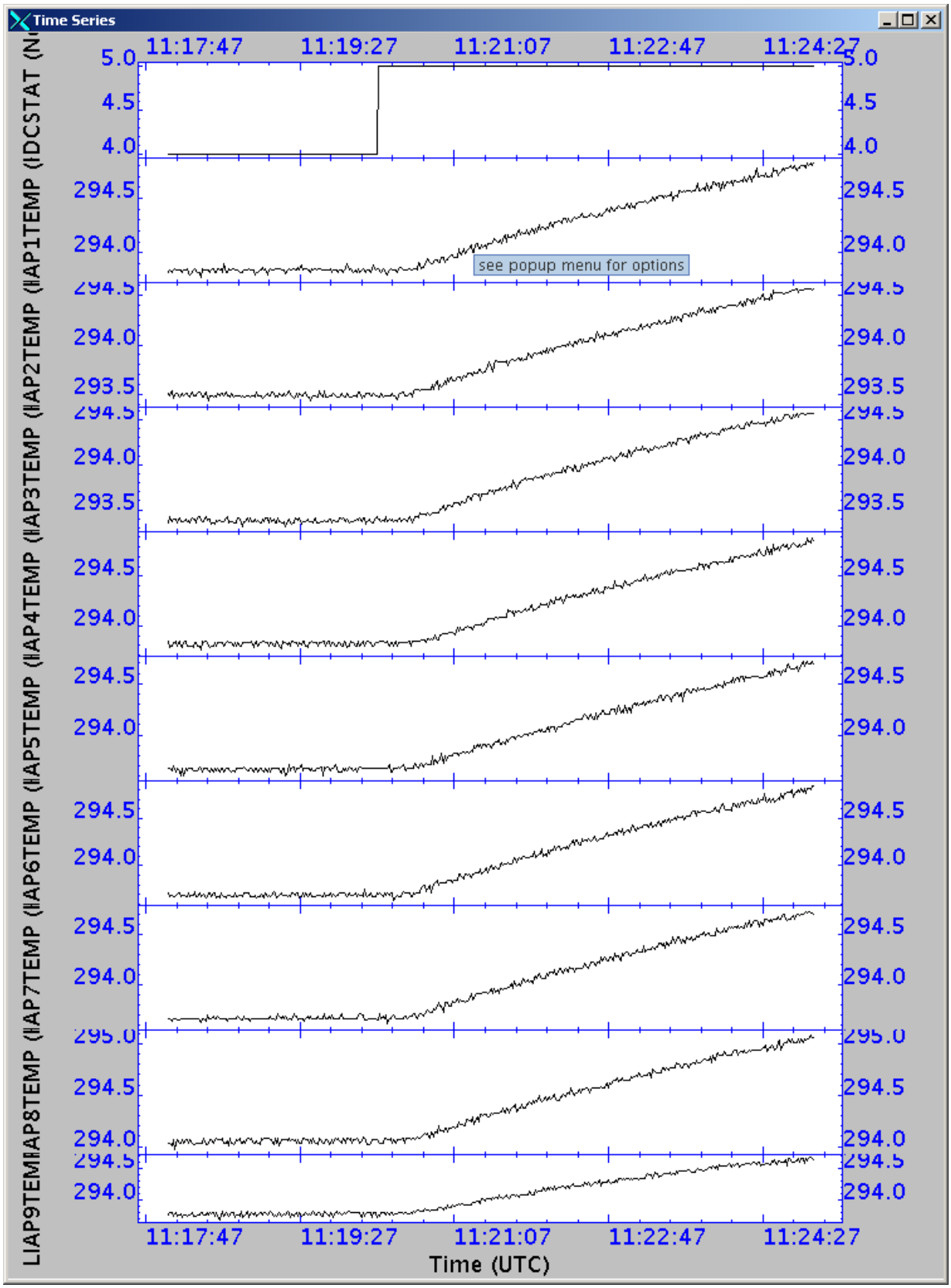
Output file FUNC-DCU-04p_B00002D0.txt from QLA script:

```
DCU-04-phot
Start time @: 23-Oct 11:20:08
End time @: 23-Oct 11:20:22
OBSID: 0xB00002D0

PLIABITSTAT:
Start value: OFF
End value: 1.0

                 Before/After
SCUDCDCSTAT     4/5
PLIAP5V         0.22/5.23 V
PLIAP9V         0.02/11.58 V
PLIAM9V         0.02/-11.58 V
```

QLA plots below for Phot LIA temperatures


Time Series
11:17:47
11:19:27
11:21:07
11:22:47
11:24:27
see popup menu for options
LIAP9TEMIAP8TEMP (IIAP7TEMP (IIAP6TEMP (IIAP5TEMP (IIAP4TEMP (IIAP3TEMP (IIAP2TEMP (IIAP1TEMP (IDCSTAT (N
Time (UTC)

4.24 FUNC-DCU-11-PHOT: Photometer BDAs Switch ON Check

Test Id:	FUNC-DCU-11-PHOT: Photometer BDAs Switch ON Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ Photometer LIAs ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ Photometer LIAs ON + Photometer BIAS ON +Photometer JFETs ON
Success Criteria:	Test passed if Photometer JFET source and drain voltages are as commanded: 1. PSWJFETVSS1/2/3/4/5/6 2. PMLWJFETVSS1/2/3/4 3. PSWJFETSTAT = 0x3F 4. PMLWJFETSTAT = 0x7F

Test Procedure:

Step#	Action	Comments
1	Run FUNC-DCU-11-PHOT test procedure	
2	After the test Write the values RAW and converted values of: PSWJFETSTAT,PMLWJFETSTAT, PSWJFET1/2/3/4/5/6V PMWJFET1/2/3/4V PLWJFET1/2V located in DCU PARAMETERS AND	
3	Contingency: If test fails repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-11P	**PSWJFETSTAT** **PMLWJFETSTAT** **PSWJFET1/2/3/4/5/6V** **PMWJFET1/2/3/4V** **PLWJFET1/2V**	**0/0x3f** **0/0x7f** **0V/-1.5V** **0V/~-1.5V** **0V/~-1.5V**	0/0x03f 0/0x07f See comments	**N/A**	**Pass**

Start time: 11:22
OBSID: 0xb00002d1
CUS Input Default Parameters:
int heater_V = 0; // Specifies if the heater is to be switched ON or not
string array = "PF"; //default array to switch ON
Comments:
The Vss values were the ~ -1.5V, as agreed with SPIRE instrument team, i.e.

PSWJFET1V: -1.47V
PSWJFET2V: -1.47V
PSWJFET3V: -1.47V
PSWJFET4V: -1.47V
PSWJFET5V: -1.47V
PSWJFET6V: -1.47V
PMWJFET1V: -1.47V
PMWJFET2V: -1.47V
PMWJFET3V: -1.47V
PMWJFET4V: -1.47V
PLWJFET1V: -1.47V
PLWJFET2V: -1.47V
TCJFETV: -1.47V

The PSW, PMW and PLW arrays on QLA are all OK
DCU data were generated for ~1min after JFET switch on.
QLA produced output file FUNC-DCU-11p_B00002D1.txt:

DCU-11-phot
Start time @: 23-Oct 11:24:10
End time @: 23-Oct 11:25:59
OBSID: 0xB00002D1

PLIABITSTAT:
Start value: 0x0
End value: 0x4C

	Before/After
PSWJFETSTAT	0x0/0x3F
PMLWJFETSTAT	0x0/0x7F

PSWJFET1V	-0.00/-1.47 V
PSWJFET2V	-0.00/-1.47 V
PSWJFET3V	-0.00/-1.47 V
PSWJFET4V	-0.00/-1.47 V
PSWJFET5V	-0.00/-1.47 V
PSWJFET6V	-0.00/-1.47 V

PMWJFET1V	-0.00/-1.47 V
PMWJFET2V	-0.00/-1.47 V
PMWJFET3V	-0.00/-1.47 V
PMWJFET4V	-0.00/-1.47 V

PLWJFET1V	-0.00/-1.47 V
PLWJFET2V	-0.00/-1.47 V

TCJFETV 0.00/-1.47 V

4.25 FUNC-DCU-13-PHOT: Photometer BDAs Integrity Check

Test Id:	FUNC-DCU-13P: Photometer BDAs Integrity Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ Photometer LIAs ON + Photometer BIAS ON +Photometer JFETs ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ Photometer LIAs ON + Photometer BIAS ON +Photometer JFETs ON
Success Criteria:	Test passed if : The photometer detectors show a small linear variation on the output voltage when different bias is applied through the load curve.

Test Procedure:

Step#	Action	Comments
1	On QLA bring up a time series display of a couple of pixels on each of the photometer BDAs	
2	Run FUNC-DCU-13-PHOT test procedure from the CCS	
3	Contingency: If test fails repeat step 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-13-PHOT				**N/A**	**Success**

Start time: 11:37
OBSID: 0xb00002d2

CUS Input Default Parameters:

string dcumode = "PF"; // Specifies array in which to perform LC
int mclkdiv = 0x95; // Master clock divisor ,which specifies bias freq
int biasdiv = 0x6; // Sampling divisor ,which specifies sampling rate
int psw_phase = 0x80; // PSW demod phase
int pmw_phase = 0x80; // PMW demod phase
int plw_phase = 0x80; // PLW demod phase
int ftime = 10; // Time at each bias level

– Took ~2 minutes to receive all the TC stream from the I-EGSE from the start of execution from the CCS

Comments: Most pixels look better than or same as for PFM5 ILT, except PSW-D15 and PTC3 which appear to have their polarity reversed. NCR HP-112000-ASED-NC-3734 raised.

QLA load curve plots in Annexe 2.

Photometer detector settings at the end of the test:

Bias F: ~130.2 Hz
Samp F: 18.6 Hz
Phases: all ~180.7
Biases are ~31mV,
TC BIAS: ~61mV

4.26 FUNC-DCU-14-PHOT: Photometer BDAs Noise Check

Test Id:	FUNC-DCU-14-PHOT: Photometer BDAs Noise Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Photometer LIAs ON + Photometer BIAS ON + Photometer JFETs ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Photometer LIAs ON + Photometer BIAS ON + Photometer JFETs ON
Success Criteria:	Test passed if : The Photometer detectors don't show excess noise.

Test Procedure:

Step#	Action	Comments
1	Run FUNC-DCU-14-PHOT test procedure from the CCS	
2	Contingency: If test fails repeat step 1.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-14-PHOT				**N/A**	**Success**

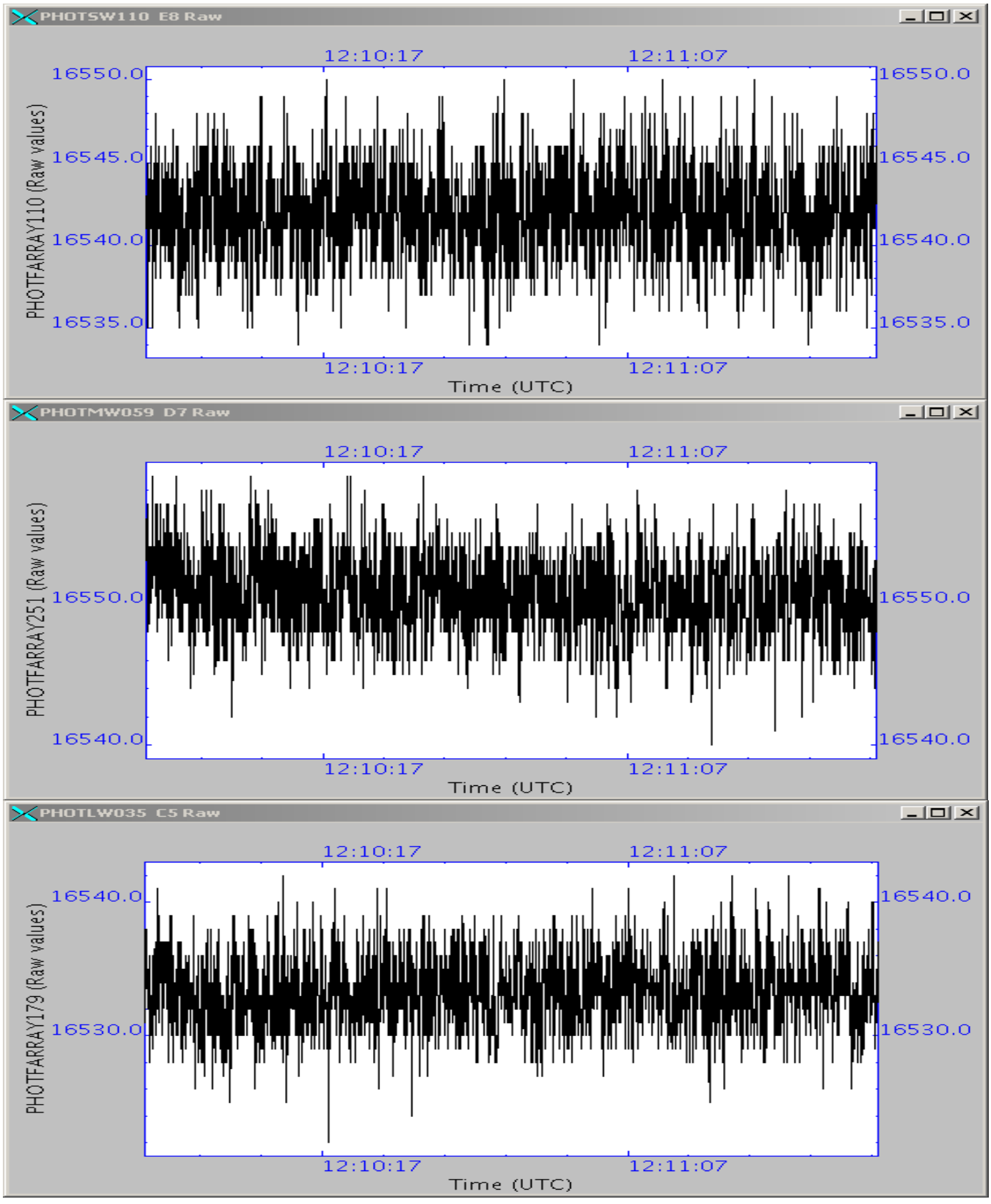
Start time: 12:08
OBSID: 0xb00002d3

CUS Input Default Parameters:
string dcumode = "PF"; //Array
int ftime = 120; //time

Comments: Test OK
Detectors settings:
Bias frequency: 130.2Hz
Sampling frequency: 18.6 Hz
PSW phase: 180.71 deg
PMW phase: 180.71 deg
PLW phase: 180.71 deg
PSW bias : ~ 31mV
PMW bias : ~ 31mV
PLW bias : ~ 31mV
TC bias : ~ 62 mV

Duration of test: 2 minutes

QLA plots below (one pixel per array)


PHOTSW110 E8 Raw
12:10:17
12:11:07
16550.0
16545.0
16540.0
16535.0
PHOTFARRAY110 (Raw values)
Time (UTC)
PHOTMW059 D7 Raw
PHOTFARRAY251 (Raw values)
PHOTLW035 C5 Raw
16530.0
PHOTFARRAY179 (Raw values)

Switched off the Photometer:

PDET_OFF: 0xb00002d4

Start time: 12:13

4.27 FUNC-DCU-04-SPEC: Spectrometer LIAs Check

Test Id:	**FUNC-DCU-04-SPEC: Spectrometer LIAs Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Spectrometer LIAs ON
Success Criteria:	Test passed if : 1. SCUDCDCSTAT parameter goes from 4 to 6. 2. Spectrometer LIA card voltages are showing correct readings of +5V,+9V,-9V. 3. Spectrometer LIA temperatures show an increase indicating that they are ON.

Test Procedure:

Step#	Action	Comments
1	On QLA bring up a time series display of the HK parameters: SLIAP5V SLIAP9V SLIAM9V LIAS1/2/3TEMP	
2	Run FUNC-DCU-04-SPEC test procedure from the CCS	
5	Contingency: If test fails repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-04-SPEC	**SCUDCDCSTAT** **SLIAP5V** **SLIAP9V** **SLIAM9V** **LIA1/2/3TEMP**	**4/6** **0/~ +5V** **0/~+11V** **0/~-11V** **N/A/ [290-300]K**	4/6 0.11 / 5.25 0.016/ 11.59 0.016/-11.56 /~296-297K warming up		**Success**

Start time: 12:14
OBSID: 0xb00002d5
CUS Input Default Parameters:
int mcu_status = 1; //default 0 = off, 1= on

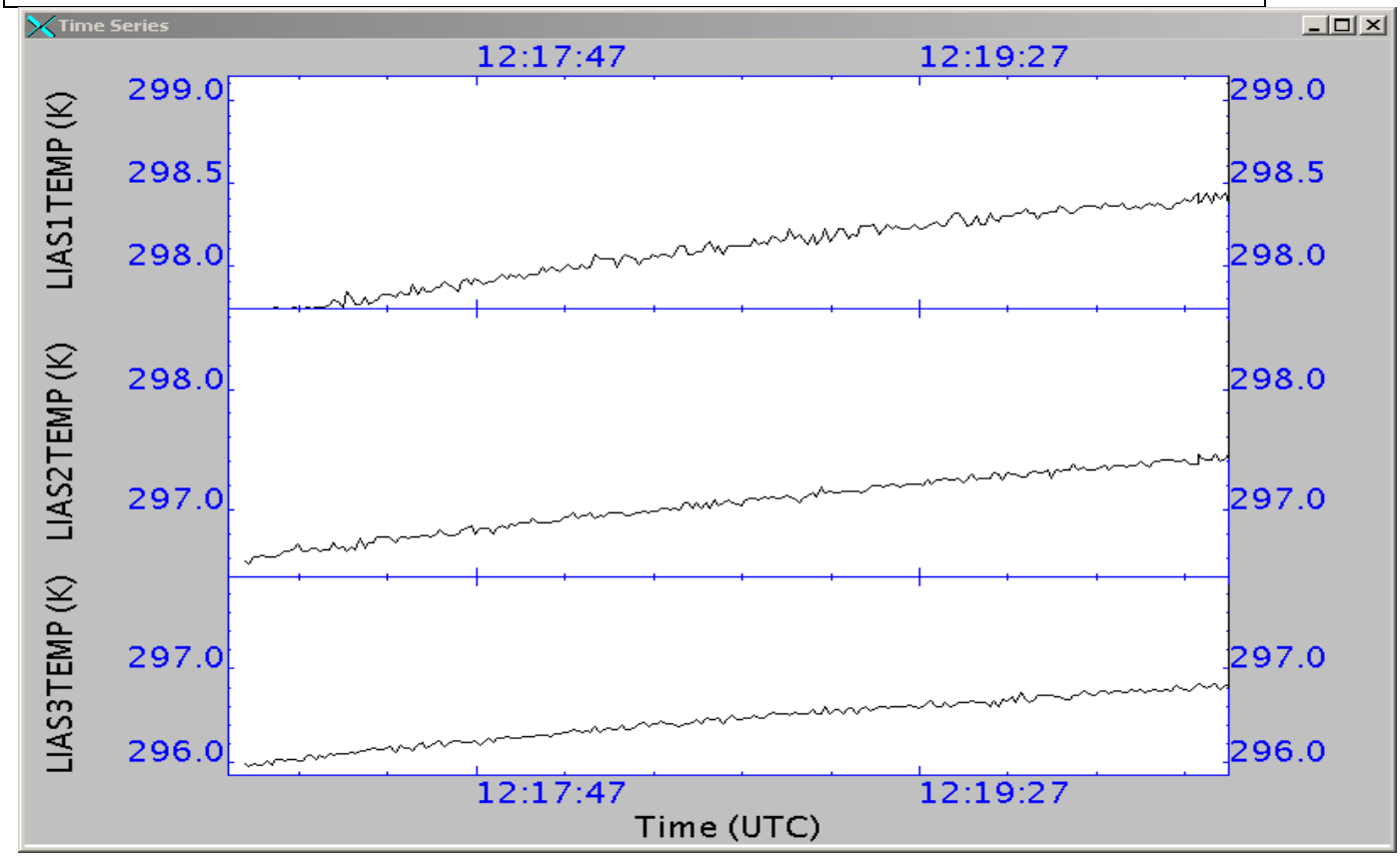
Comments: SLIABITSTAT 0 to 1
Spectrometer LIAs switched ON correctly
Output file FUNC-DCU-04s_B00002D5.txt from QLA script:

```
DCU-04-spec
Start time @: 23-Oct 12:21:02
End time @: 23-Oct 12:22:42
OBSID: 0xB00002D6

SLIABITSTAT:
Start value: ON
End value: 1.0

                  Before/After
SCUDCDCSTAT      6/6
SLIAP5V          5.25/5.25 V
SLIAP9V          11.59/11.59 V
SLIAM9V          -11.56/-11.56 V
```

QLA plots below for Spec LIA temperatures



4.28 FUNC-DCU-11-SPEC: Spectrometer BDAs Switch On Check

Test Id:	FUNC-DCU-11-SPEC: Spectrometer BDAs Switch On Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Spectrometer LIAs ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Spectrometer LIAs ON + Spectrometer BIAS ON + Spectrometer JFETs ON
Success Criteria:	Test passed if SCUDCDCSTAT goes from 4 to 6, Spectrometer LIAs voltages are correct and SJFET voltages are also correct.

Test Procedure:

Step#	Action	Comments
1	Run FUNC-DCU-11-SPEC test procedure from the CCS	
2	After the test Write the values RAW and converted values of: LIASTAT SLIAP5V, SLIAP9V, SLIAN9V, SSWJFETSTAT,SLWJFETSTAT, SSWJFET1V,SLWJFET2V located in DCU PARAMETERS AND	
3	Contingency: If test fails repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-11-SPEC	**SCUDCDCSTAT** **LIASTAT** **SLIAP5V** **SLIAP9V** **SLIAM9V** **SPECJFETSTAT** **SSWJFET1/2V** **SLWJFET1/2V**	**6/6** **0/0** **0V/ ~ 5V** **0V/~11V** **0V/-11V** **0/0x7** **0V/~-1.5V** **0V/~-1.5V**	6/6 0/0 /5.25 /11.59 /-11.59 0/0x7 See comments below	**N/A**	**Success**

Start time: 12:19
OBSID: 0xb00002d6
CUS Input Default Parameters:

int heater_V = 0; // Specifies if the heater is to be switched ON or not
string array = "SF"; //default array to switch ON

Comments:
The Vss values were the ~ -1.5V, as agreed with SPIRE instrument team, i.e.
SSWJFET1V: -1.47V
SSWJFET2V: -1.47V
SLWJFET1V: -1.47V

QLA produced file FUNC-DCU-11s_B00002D6.txt:

```
DCU-11-spec
Start time @: 23-Oct 12:21:00
End time @: 23-Oct 12:22:42
OBSID: 0xB00002D6

SLIABITSTAT:
Start value: 0x1
End value: 0x1

                  Before/After
SCUDCDCSTAT      0x6/0x6
LIASTAT          0x0/0x0
SLIAP5V          5.25/5.25 V
SLIAP9V          11.59/11.59 V
SLIAM9V          -11.56/-11.56 V
SPECJFETSTAT     0x0/0x7
SSWJFET1V        -0.00/-1.47 V
SSWJFET2V        -0.00/-1.47 V
SLWJFET1V        -0.00/-1.47 V
```

4.29 FUNC-DCU-13-SPEC: Spectrometer BDAs Integrity Check

Test Id:	FUNC-DCU-13-SPEC: Spectrometer BDAs Integrity Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Spectrometer LIAs ON + Spectrometer BIAS ON + Spectrometer JFETs ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Spectrometer LIAs ON + Spectrometer BIAS ON + Spectrometer JFETs ON
Success Criteria:	Test passed if : The spectrometer detectors show a small linear variation on the output voltage when different bias is applied through the load curve.

Test Procedure:

Step#	Action	Comments
1	Run FUNC-DCU-13-SPEC test procedure from the CCS	
2	Contingency: If test fails repeat step 1.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-13-SPEC				N/A	Success

Start time: 12:24 -
OBSID: 0xb00002d7

CUS Input Default Parameters:

string dcumode = "SF"; //DCU data mode
int mclkdiv = 0x79; //Master clock divisor
int biasdiv = 0x1; // Bias divisor
int ssw_phase = 0x80; // SSW demod phase
int slw_phase = 0x80; // SLW demod phase
int ftime = 10; // Time at each bias level

Comments: – Took ~2 minutes to receive all the TC stream from the I-EGSE from the start of execution from the CCS

Generally all (SSW/SLW) pixels looking responsive. All pixels look better than or same as for PFM5 ILT
See Annexe 2 for detailed results.

4.30 FUNC-DCU-14-SPEC: Spectrometer BDAs Noise Check

Test Id:	FUNC-DCU-14S: Spectrometer BDAs Noise Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Spectrometer LIAs ON + Spectrometer BIAS ON + Spectrometer JFETs ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON + Spectrometer LIAs ON + Spectrometer BIAS ON + Spectrometer JFETs ON
Success Criteria:	Test passed if : The spectrometer detectors show a signal with some noise.

Test Procedure:

Step#	Action	Comments
1	Run FUNC-DCU-14-SPEC test procedure from the CCS	
2	Contingency: If test fails repeat step 1.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-DCU-14-SPEC				N/A	Success

Start time: 12:38
OBSID: 0xb00002d8

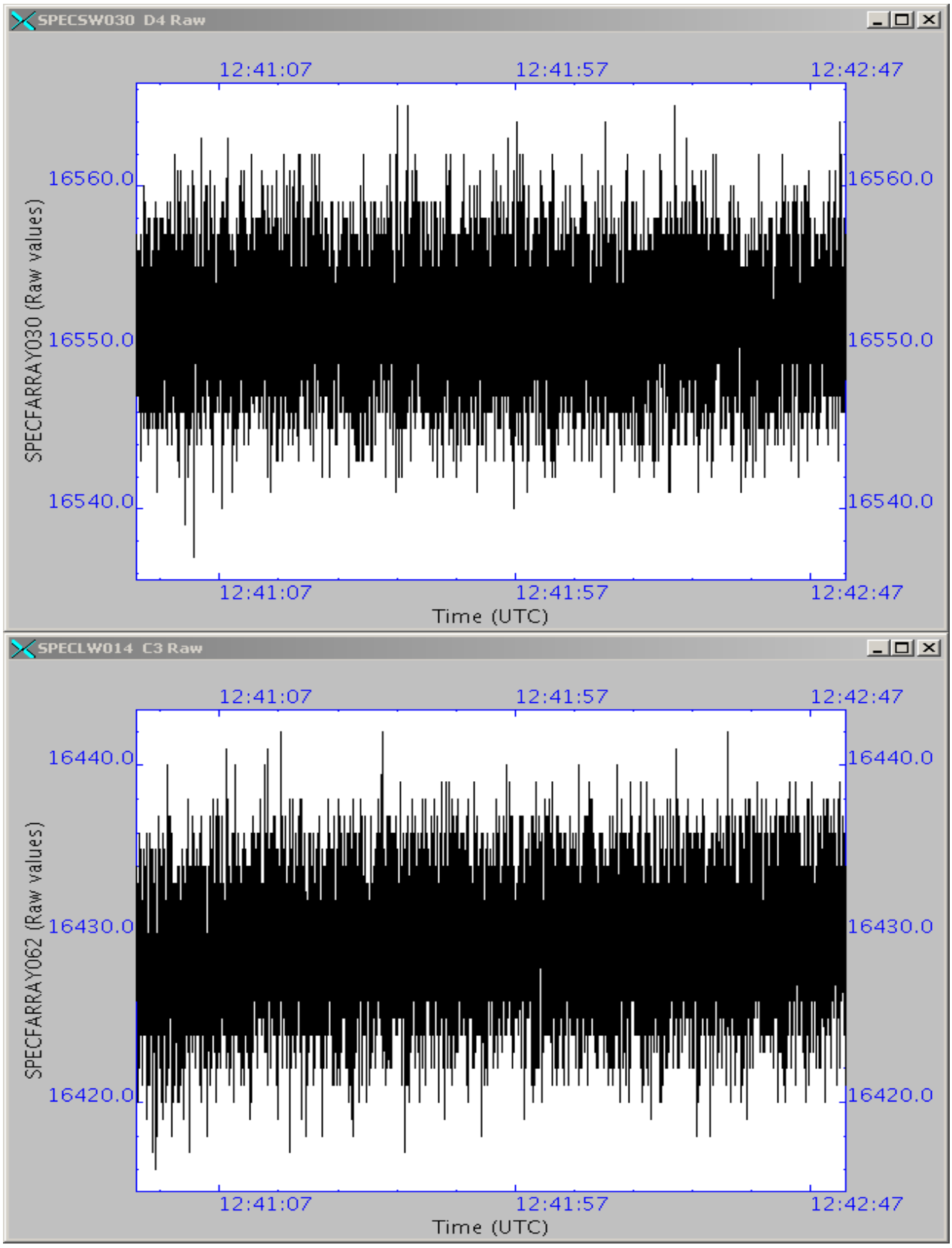
CUS Input Default Parameters:
string dcumode = "PF"; //Array
int ftime = 120; //time

Comments:

Test run in order to collect noise data at nominal spectrometer settings:
Array: SF
Bias frequency: 160 Hz
Sampling frequency: 80 Hz
SSW phase shift: ~180.71 deg
SLW phase shift: ~180.71 deg

Duration of test: 5 minutes

QLA plots below (one pixel per array)


SPECSW030 D4 Raw
12:41:07
12:41:57
12:42:47
16560.0
16550.0
16540.0
SPECFARRAY030 (Raw values)
Time (UTC)
SPECLW014 C3 Raw
16440.0
16430.0
16420.0
SPECFARRAY062 (Raw values)

Switched off the Spectrometer: **SDET_OFF: 0xb00002d9** **Start time: 12:48**

4.31 FUNC-SMEC-01: SMEC Encoder and LVDT Check

Test Id:	**FUNC-SMEC-01: SMEC Encoder and LVDT Check**
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON+ SMEC ON (open loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON+ SMEC ON (open loop)
Success Criteria:	Test passed if : 1. SMECENCPWR HK parameter changes from 0 to 6. 2. SMEC encoder signals 1 and 2 show variation when encoder is switched ON. 3. SMEC LVDT is switched ON. 4. SMEC LVDT DC and AC signals show variation when LVDT is switched ON.

Test Procedure:

Step#	Action	Comments
0	Open **SMEC PARAMETERS display** on SCOS Alpha Numeric Displays.	
1	On QLA bring up a display of the following HK parameters: SMECENCPWR SMECENCSIG1AMP SMECENCSIG2AMP SMECLVDTDCSIG SMECLVDTACSIG	
2	Run FUNC-SMEC-01 test procedure from the CCS	
	Contingency: If test fails repeat steps 1.	

Test Log:

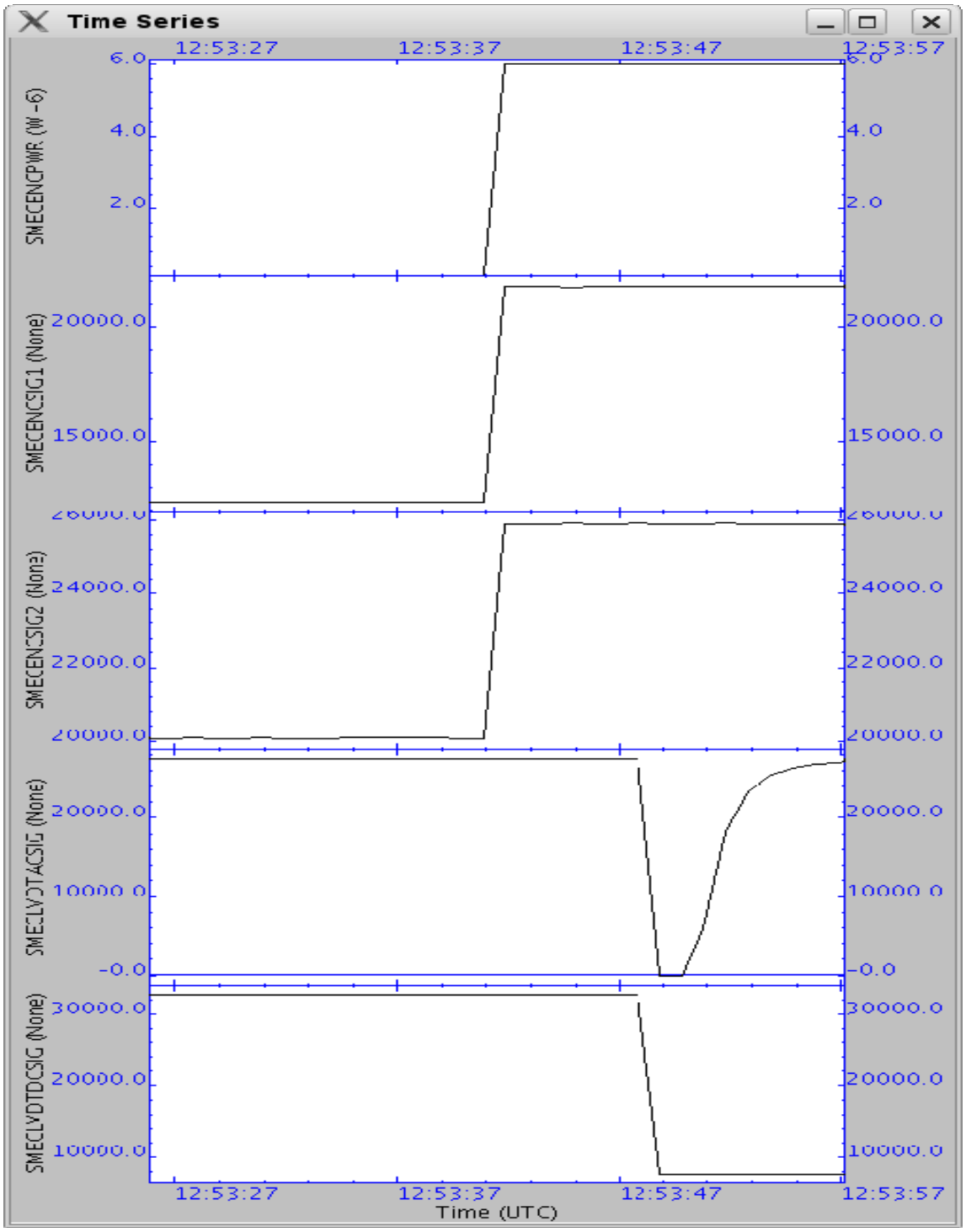
Test Id	Key Parameter(s)	Expected Value Before/ After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SMEC-01	**SMECENCPWR** **SMECLVDTPWR** **SMECENCSIG1** **SMECENCSIG1AMP** **SMECENCSIG1OFF** **SMECENCSIG2** **SMECENCSIG2AMP** **SMECENCSIG2OFF**	**0/6** **0/1** **Changes** **0/0** **-/0x57E4** **Changes** **0/0** **-/0x6D60**	0/6 0/1 ~0x3079/~0x54c1 0/0 0xCE20/0x57E4 ~0x4E6B/~0x6534 0/0 0xCE20/0x6D60	**N/A**	**Success**

Start time: 12:52
OBSID: 0xb00002da

CUS Input Default Parameters:

string smec_temp = "warm"; //(cold/warm) Used to specify the encoder power level

Comments:



4.32 FUNC-SMEC-03: SMEC Encoder Levels Check

Test Id:	FUNC-SMEC-03: SMEC Encoder Levels Check
Initial Configuration:	DRCU_ON + AC/DC thermometry ON +MCU ON+ SMEC ON (open loop)
Final Configuration:	DRCU_ON + AC/DC thermometry ON +MCU ON+ SMEC ON (open loop)
Success Criteria:	Test passed if: SMEC encoder signals 1 and 2 show a variation on their amplitudes from one LED illumination level to another.

Test Procedure:

Step#	Action	Comments
1	On QLA bring up a time series display of the following Nominal HK parameters: SMECENCSIG1 SMECENCSIG2	
2	Run FUNC-SMEC-03 test procedure from the CCS	
3	Contingency: If test fails repeat steps 1 and 2.	

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SMEC-03	SMECENCSIG1 SMECENCSIG2	Signals change with LED levels	See below		Success

Start time: 13:00
OBSID: 0xb00002db

CUS Input Default Parameters:

```
string frametype = "ENG"; // Specifies MCU frame type
double framerate = 64.0; // Specifies the frame rate
int framenumber = 0xffff; // Frame number
int level_init = 6; //
int level_start = 4;
int level_end = 6;
int level_step = 1;
int led_delay = 5; // Time at each level in seconds
```

Comments:

LED Level	SMECENCSIG1	SMECENCSIG2
4	~14800	~22000
5	~17000	~23200
6	~21700	~25800

4.33 FUNC-SMEC-02A: SMEC Open Launch Latch

Test Id:	FUNC-SMEC-02A: SMEC Open Launch Latch
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + SMEC ON SMEC Latched
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + SMEC ON SMEC Unlatched
Success Criteria:	Test passed if : Prior to un-latching the resistance across pins 7 and 8 of the launch latch is ~ 368 Ohms. After un-latching the resistance is 483 Ohms. **Note:** These resistance values were recorded for the CQM SMEC model, for the flight SMEC, these values are expected to vary.

Step#	Action	Comments
1	Measure the resistance across pins 7 and 8 of the launch latch.	This step is not applicable anymore
2	Run FUNC-SMEC-02A test procedure from the CCS	
3	Measure the resistance across pins 7 and 8 of the launch latch.	
4	Contingency: If test fails repeat steps 1.	

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SMEC-02A				**N/A**	**See below**

Start time: 13:13
OBSID: 0xb00002dc

CUS Input Default Parameters:
string ltch = "latch"; // Command SMEC to unlatch

Comments: It was ensured that the Herschel Cryostat was horizontal (+Y pointing upwards) for all tests which involved unlatching or moving the SMEC.

The script executed successfully but it cannot be confirmed at this stage if the SMEC is unlatched, as the SMEC was not moved.

Post Test Comment: After the tests it was discovered that the implementation of the SMEC Latch and Unlatch commands in the OBS is reversed. SPIRE System Problem Report SPR-629 has been raised.

4.34 FUNC-SMEC-04A: SMEC Open Loop Position Check

Test Id:	FUNC-SMEC-04A: SMEC Open Loop Position Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ SMEC ON (open loop) **UNLATCHED**
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ SMEC ON (open loop) **UNLATCHED**
Success Criteria:	Test passed if the SMEC parameters show variation indicating that the mechanism has moved.

Test Procedure:

Step#	Action	Comments
1	On QLA bring up a time series display of the following Nominal HK parameters: SMECENCSIG1 SMECENCSIG2 SMECLVDTDCSIG SMECLVDTACSIG SMECMOTORCURR	
2	Run FUNC-SMEC-04a test procedure from the CCS	
3	Contingency: If test fails repeat steps 1.	

Test Log:

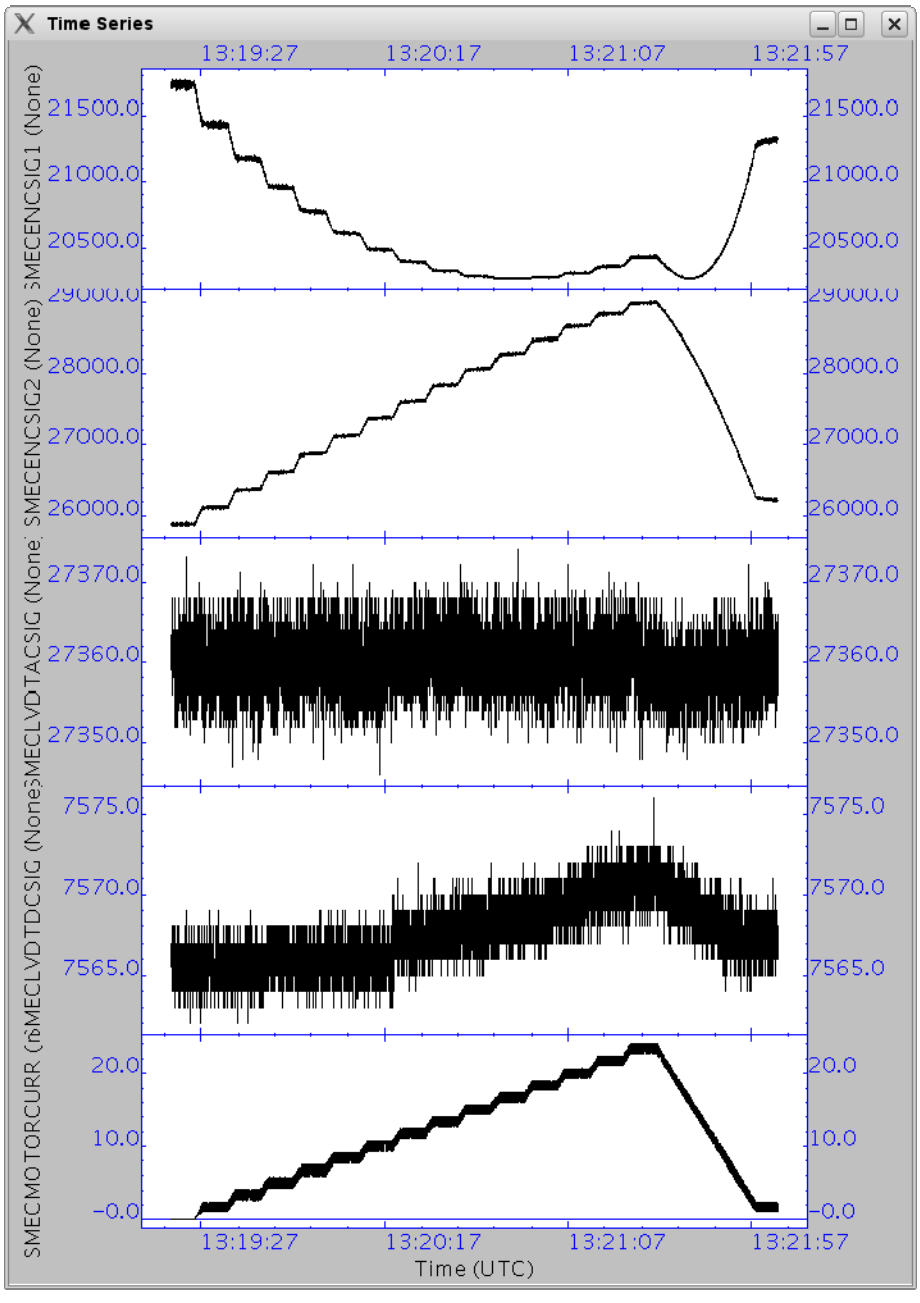
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SMEC-04A					

Start time: 13:18
OBSID: 0xb00002dd

CUS Input Default Parameters:

string smec_temp = "warm"; //(cold/warm) Used to specify the encoder power level
string frametype = "ENG"; // Specifies MCU frame type
double framerate = 64.0; // Specifies the frame rate
int scan_start = 1000 in [0,39900]; // Step look scan starting point (um)
int scan_end = 15000 in [0,39900]; // Step look scan ending point (um)
int scan_step = 1000 in [0,39900]; // Step look scan step size (um)
int scan_fspeed = 500 in [0,2000]; // Scan forward speed (um/s)
int scan_rspeed = 500 in [0,2000]; // Scan fly back speed (um/s)
int ftime = 5; // Time at each target position in seconds

Comments: The LVDT signal did not change and the SMEC encoder signal amplitudes are very small. Is the SMEC really unlatched?



4.35 FUNC-SMEC-09: SMEC Open Loop Scan Check

Test Id:	FUNC-SMEC-09: SMEC Open Loop Scan Check
Test Purpose:	SMEC Open Loop Scan Test.
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ SMEC ON (open loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ SMEC ON (open loop)
Success Criteria:	Test passed if SMECLVDTDCSIG parameter shows a variation according to the different position of the SMEC along the scan.

Test Procedure:

Step#	Action
1	**On QLA bring up a time series display of the following SMEC nominal science parameters:** SMECENCSIG1 SMECENCSIG2 SMECLVDTDCSIG SMECLVDTACSIG SMECMOTORCURR
2	**Run FUNC-SMEC-09 test procedure from the CCS**
3	Contingency: If test fails repeat steps 1.

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-SMEC-09	**All above mentioned in step 2**	**N/A**	**N/A**	**N/A**	**Failed initially but see below**

May need to set the SMEC encoder Sig1 & Sig2 offsets first

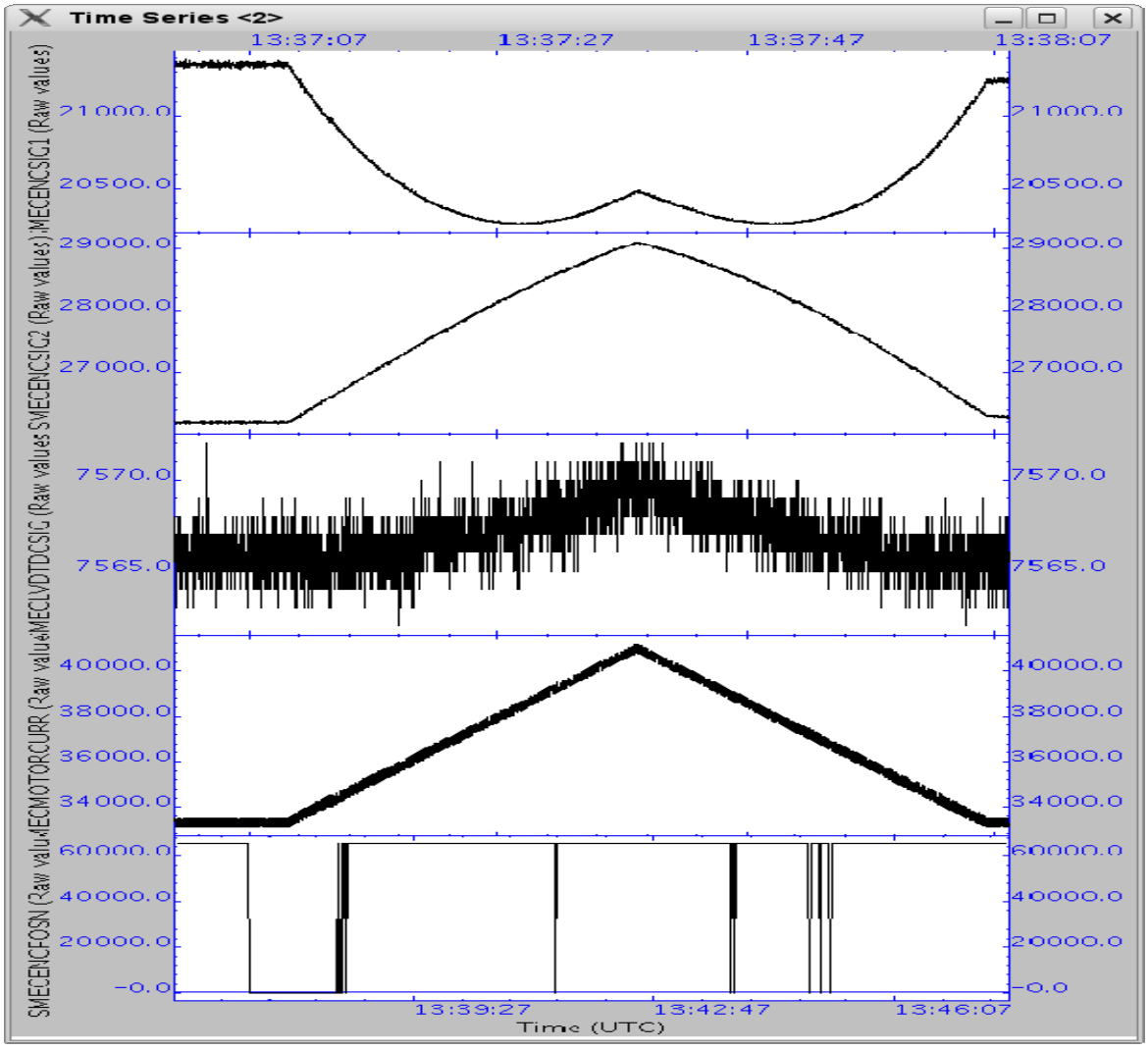
SIG1: 21300
SIG2: 26250

Start time: 13:35
OBSID: 0xb00002de

CUS Input Default Parameters:

string smec_temp = "warm"; //(cold/warm) Used to specify the encoder power level
int scan_start = 1000 in [0,39900]; //Scan starting point (um)
int scan_end = 15000 in [0,39900]; //Scan ending point (um)
int scan_fspeed = 500 in [0,2000]; //Scan forward speed (um/s)
int scan_rspeed = 500 in [0,2000]; //Scan reverse speed (um/s)
int nscans = 2 in [2,65535]; //Number of scans (has to be even)
double framerate = 64.0; // Specifies the frame rate

Comments:
The SMEC LVDT does not change with the SMEC motor current.



Run SMEC-02B to latch the mechanism:

Start time: 13:53
OBSID: 0xb00002df

The SMECMOTORCURR is 0x4DA4 – which corresponds to ~-39.3mA

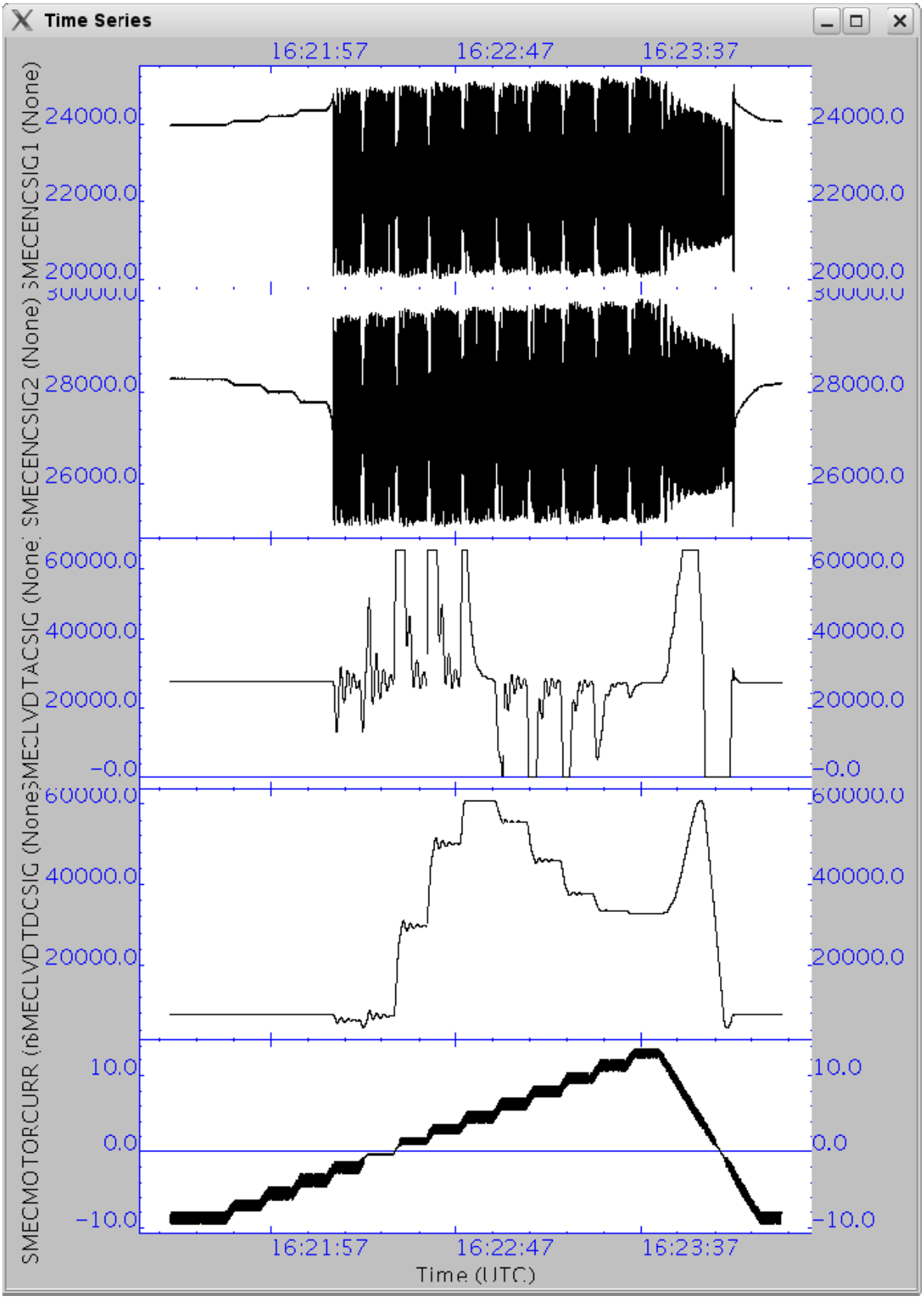
16:12 – After talking to Dominique Pouliquen he suggests the following:

- **Set the FF offset to 0x7000**
  16:17 0x90557000 The SMECMOTORCURR is ~-9.58mA

- **Release the latch manually:**
  16:17 0x90430002

- **Run SMEC-04A:**
  Start time: 16:19
  OBSID: 0xb00002e0

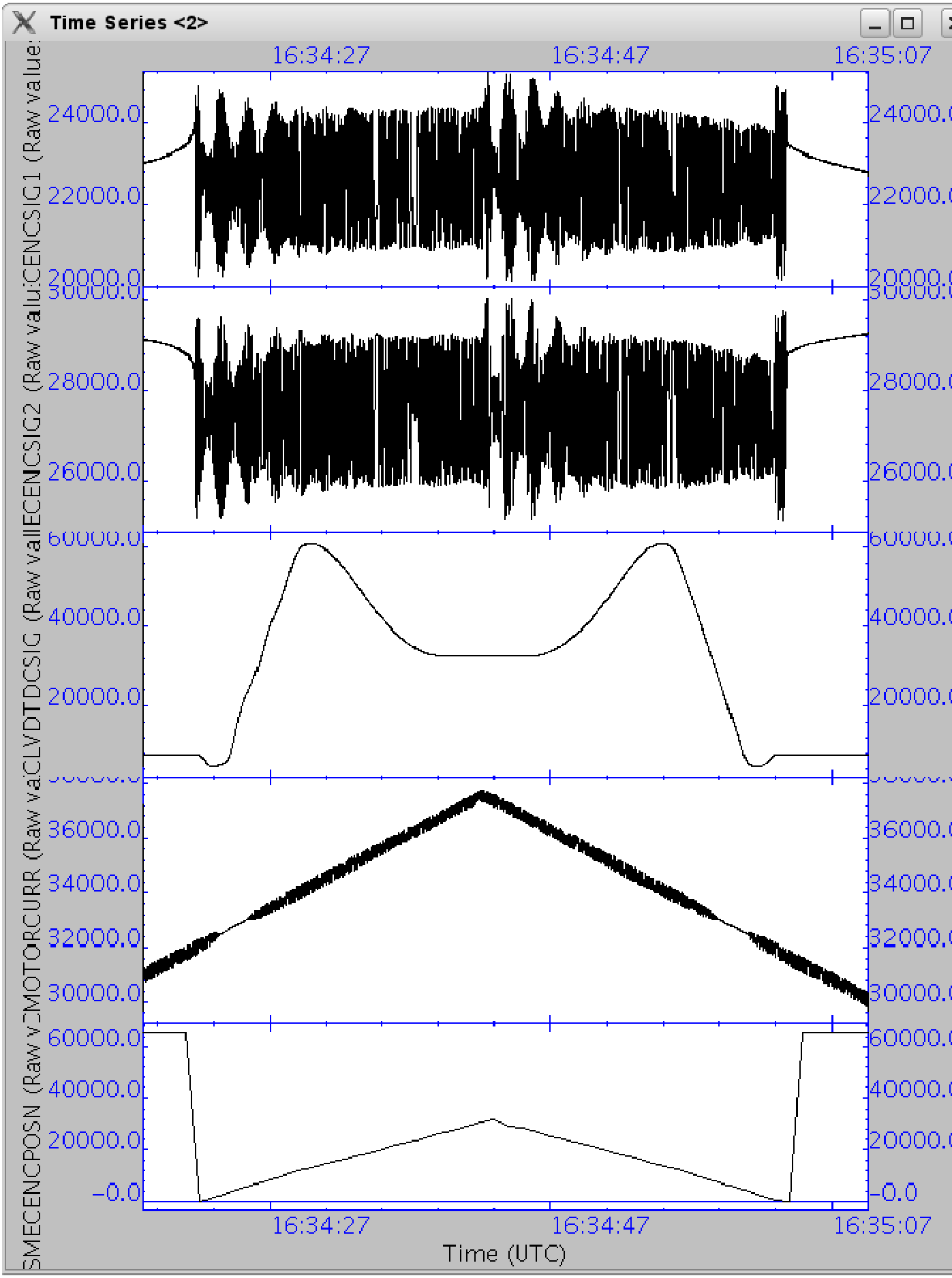
The SMEC moved! See plot below. The LVDTDCSIG plot looks strange compared to last warm ILT.


Time Series
16:21:57
16:22:47
16:23:37
24000.0
22000.0
20000.0
28000.0
26000.0
60000.0
40000.0
20000.0
-0.0
10.0
0.0
-10.0
SMECMOTORCURR (n)MECLVDTDCSIG (None)SMECLVDTACSIG (None) SMECENCSIG2 (None) SMECENCSIG1 (None)
Time (UTC)

16:31 Set the encoder Signal 1 &2 offsets:
0x90585780
0x905a6b6c

FUNC-SMEC-09:
OBSID: 0xb00002e1

The SMEC scanning – but the encoder signal amplitudes not optimum.


Time Series <2>
16:34:27
16:34:47
16:35:07
24000.0
22000.0
20000.0
30000.0
28000.0
26000.0
60000.0
40000.0
20000.0
36000.0
34000.0
32000.0
30000.0
60000.0
40000.0
20000.0
-0.0
SMECENCPOSN (Raw v3MOTORCURR (Raw vaCLVDTDCSIG (Raw vallECENCSIG2 (Raw valuiCENCSIG1 (Raw value:
Time (UTC)

4.36 FUNC-SMEC-07: SMEC Closed Loop Scan Test

Test Id:	FUNC-SMEC-07: SMEC Closed Loop Scan Test
Test Purpose:	SMEC Close Loop Scan Test.
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ SMEC ON (close loop)
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON+MCU ON+ SMEC ON (close loop)
Success Criteria:	Test passed if: SMECENCPOS HK parameter shows identical values as those of the SMECTRAJPOSN HK parameter during the scan.

Test Procedure:

Step#	Action
1	**On QLA bring up a time series display of the following SMEC nominal science parameters:** SMECENCSIG1 SMECENCSIG2 SMECLVDTDCSIG SMECLVDTACSIG SMECMOTORCURR
2	**Run FUNC-SMEC-07 test procedure from the CCS**
3	Contingency: If test fails repeat steps 1.

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-SMEC-07	**All above mentioned in step 1**	**N/A**	**N/A**	**N/A**	**Success**

First run SMEC_INIT:
Start time:
OBSID: 0xb00002e2
CUS Input Default Parameters:

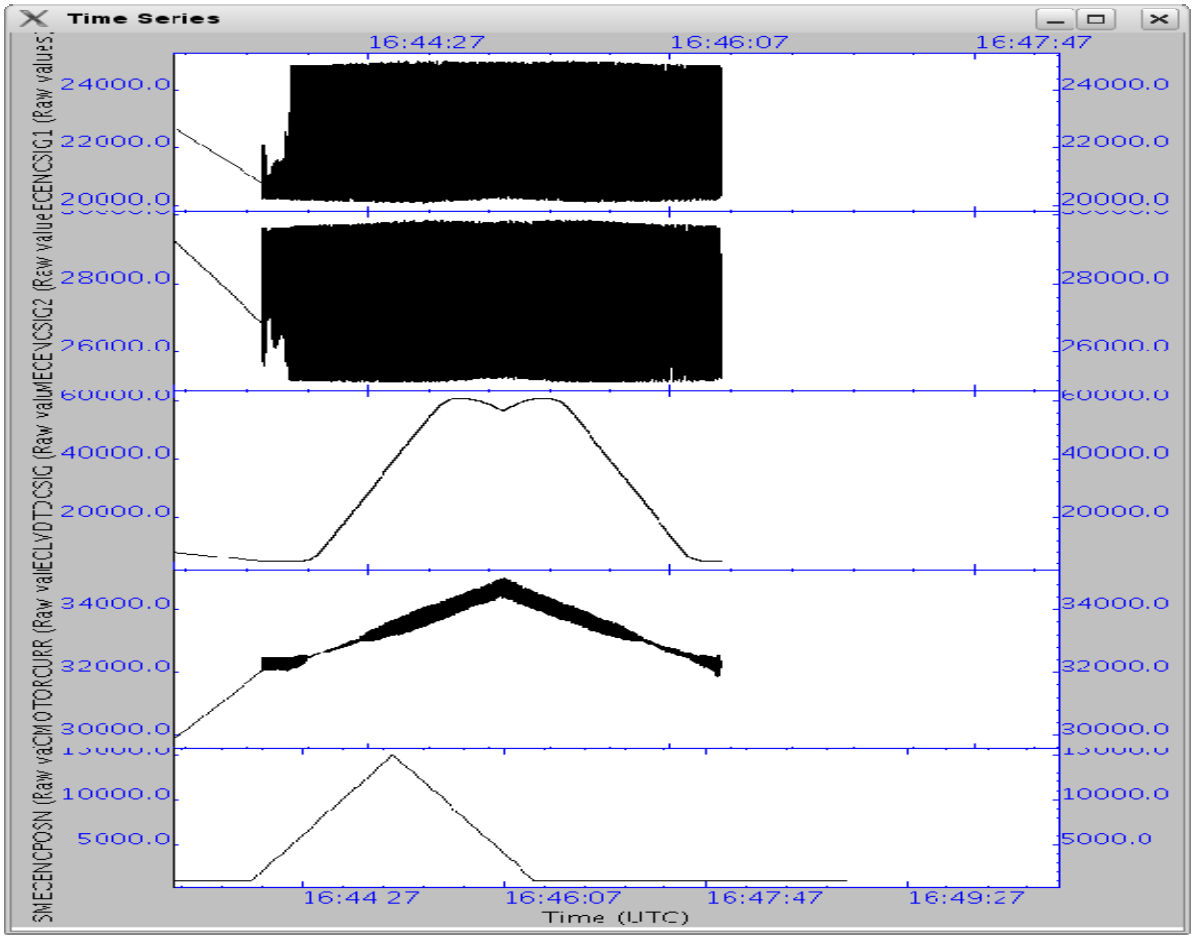
string smec_temp = "warm"; // (cold/warm) Used to specify the PID values

Comments: SMECLOOPMODE should change from 6 to 1.

SMEC_07:
Start time: 16:42
OBSID: 0xb00002e3
CUS Input Default Parameters:

string smec_temp = "warm"; //(cold/warm) Used to specify the encoder power level
int scan_start = 1000 in [0,39900]; //Scan starting point (um)
int scan_end = 15000 in [0,39900]; //Scan ending point (um)
int scan_fspeed = 200 in [0,2000]; //Scan forward speed (um/s)
int scan_rspeed = 200 in [0,2000]; //Scan reverse speed (um/s)
int nscans = 2 in [2,65535]; //Number of scans (has to be even)
double framerate = 64.0; // Specifies the frame rate

Comments: The SMEC remained in closed loop. The encoder signal amplitudes ~2000.



4.37 FUNC-SMEC-02B: SMEC Close Launch Latch

Test Id:	FUNC-SMEC-02B: SMEC Close Launch Latch
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON +MCU ON + SMEC ON SMEC Unlatched
Final Configuration:	**DRCU_ON +** AC/DC thermometry ON +MCU ON + SMEC ON SMEC Latched
Success Criteria:	Test passed if : Prior to un-latching the resistance across pins 7 and 8 of the launch latch is ~ 368 Ohms. After un-latching the resistance is 483 Ohms. **Note:** These resistance values were recorded for the CQM SMEC model, for the flight SMEC, these values are expected to vary.

Step#	Action	Comments
1	Measure the resistance across pins 7 and 8 of the launch latch.	This step is not applicable anymore
2	Run FUNC-SMEC-02B test procedure from the CCS	
3	Measure the resistance across pins 7 and 8 of the launch latch.	
4	Contingency: If test fails repeat steps 1.	

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SMEC-02B				**N/A**	

Start time: 16:51
OBSID: 0xb00002e4

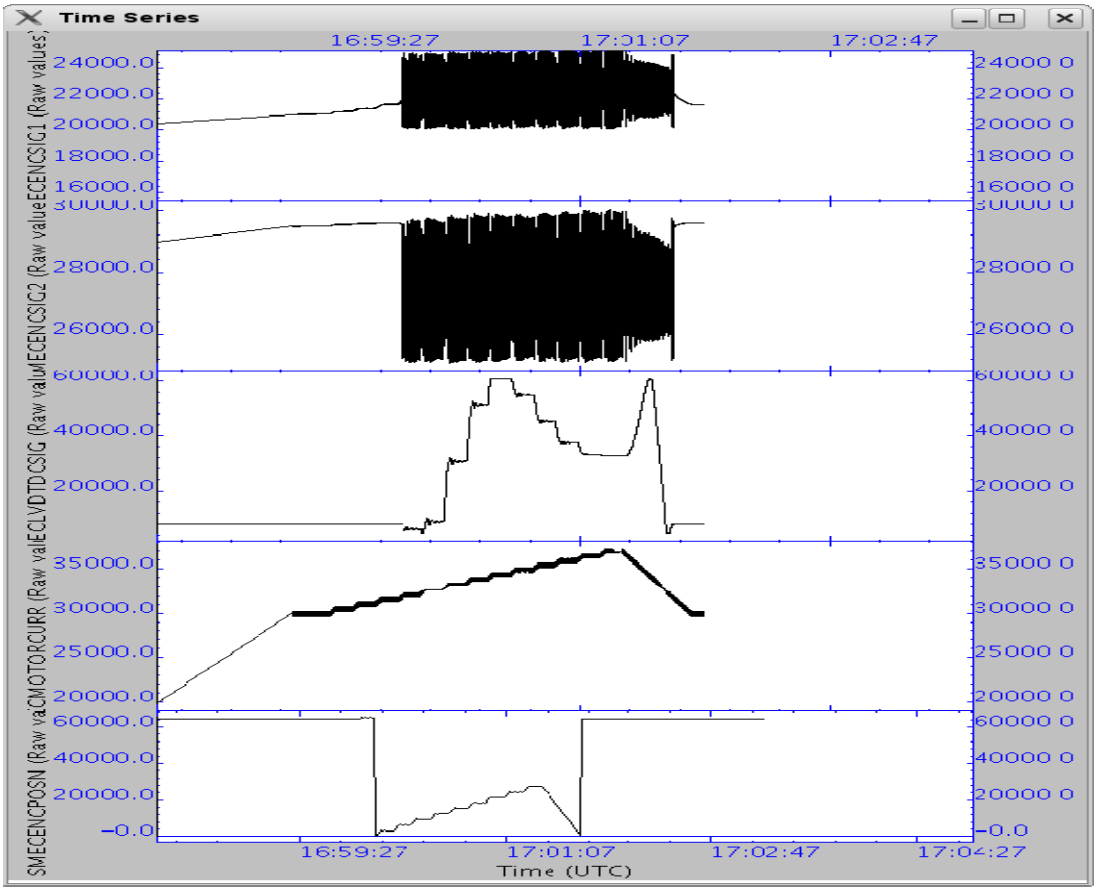
CUS Input Default Parameters:
string ltch = "latch"; // Command SMEC to unlatch

Comments:
After engaging the SMEC latch an attempt is made to perform SMEC scans to see if the SMEC is truly latched.

16:57 Change the FF offset to 0x7000 manually 0x90557000

SMEC-04A:
OBSID: 0xb00002e5

The SMEC moved!!!!!!

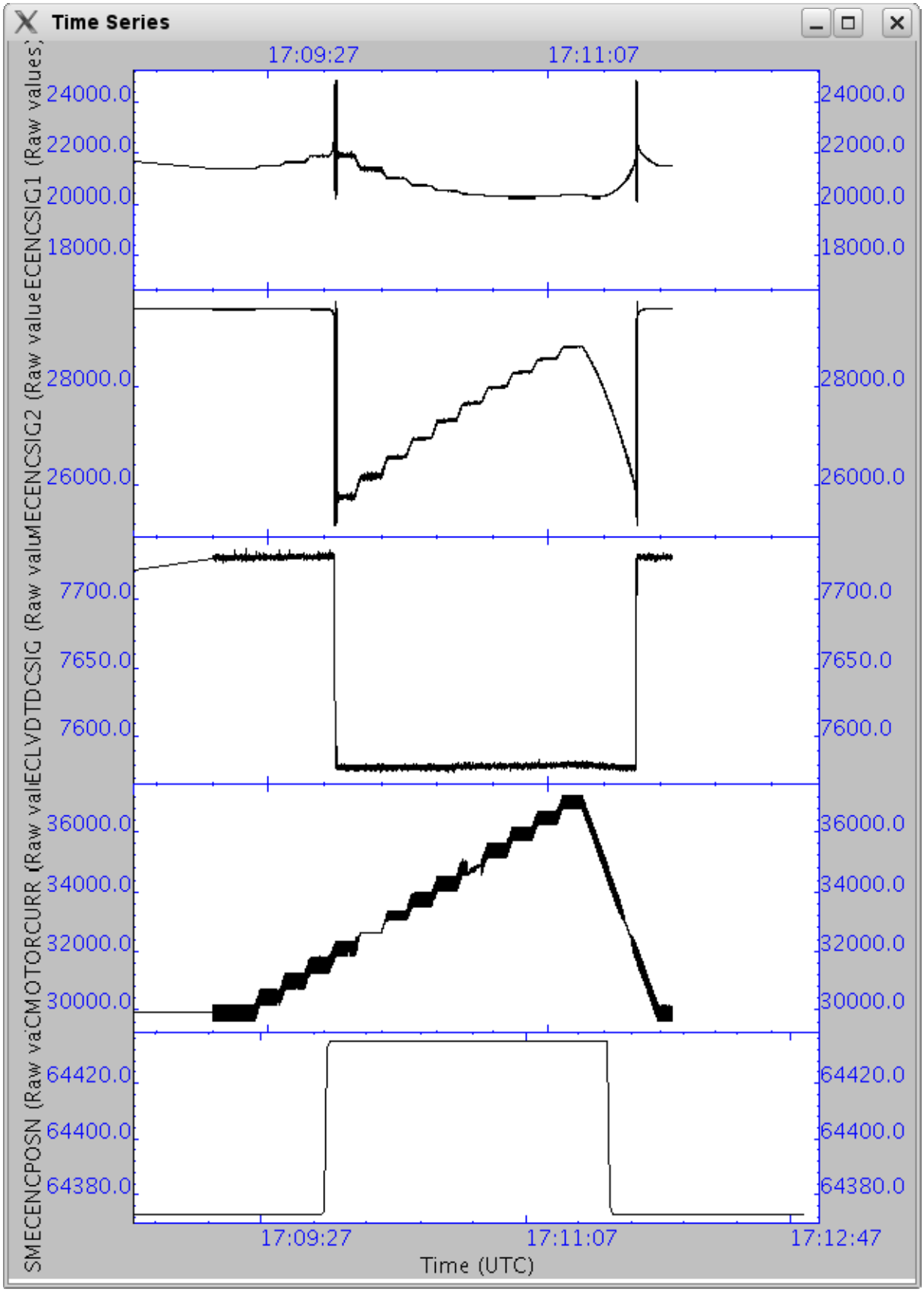


It is not latched

17:07 Set the FF offset to 0 manually 0x90550000
Latch the SMEC manually 0x90430001
Set the FF offset to 0x7000 0x90557000

SMEC-04A:
OBSID: 0xb00002e6
Start time: 17:08

Now the SMEC appears to be latched (Confirmed by Dominique Pouliquen after test).


Time Series
17:09:27
17:11:07
24000.0
22000.0
20000.0
18000.0
28000.0
26000.0
7700.0
7650.0
7600.0
36000.0
34000.0
32000.0
30000.0
64420.0
64400.0
64380.0
SMECENCPOSN (Raw valCMOTORCURR (Raw valECLVDTDCSIG (Raw valuMECENCSIG2 (Raw valueECENCSIG1 (Raw values)
17:09:27
17:11:07
17:12:47
Time (UTC)

SMEC_OFF:
OBSID: 0xb00002e7
Start time: 17:15

MCU_OFF:
OBSID: 0xb00002e8
Start time: 17:17

SCU_OFF:
OBSID: 0xb00002e9
Start time: 17:19

DRCU_OFF & DPU_OFF

5. ANNEXE 1 (DCU TEST PATTERN DATA)

DCU Photometer Full Array Test Pattern

```
DCU Test Pattern @ Tue Oct 23 11:15:32 UTC 2007
 ..compared with data from DCU Test Pattern @ Wed Mar 14 16:40:00 GMT 2007, OBSID=0x300125CC
```

Name	New Value[0]	New Value[20]	Comp Value[0]		Comp Value[20]	
PHOTFTSTOBSID	0xB00002CF	0xB00002CF	0x300125CC		0x300125CC	
PHOTFTSTBBID	0x88070001	0x88070001	0x88070001	--> OK	0x88070001	--> OK
PHOTFTSTBLKLEN	294.0	294.0	294.0	--> OK	294.0	--> OK
PHOTFTSTFRAMEID	9.0	9.0	9.0	--> OK	9.0	--> OK
PHOTFTST001	6583.0	6583.0	6583.0	--> OK	6583.0	--> OK
PHOTFTST002	43658.0	43658.0	43658.0	--> OK	43658.0	--> OK
PHOTFTST003	31282.0	31282.0	31282.0	--> OK	31282.0	--> OK
PHOTFTST004	11751.0	11751.0	11751.0	--> OK	11751.0	--> OK
PHOTFTST005	57605.0	57605.0	57605.0	--> OK	57605.0	--> OK
PHOTFTST006	49072.0	49072.0	49072.0	--> OK	49072.0	--> OK
PHOTFTST007	62379.0	62379.0	62379.0	--> OK	62379.0	--> OK
PHOTFTST008	64232.0	64232.0	64232.0	--> OK	64232.0	--> OK
PHOTFTST009	59411.0	59411.0	59411.0	--> OK	59411.0	--> OK
PHOTFTST010	30336.0	30336.0	30336.0	--> OK	30336.0	--> OK
PHOTFTST011	12708.0	12708.0	12708.0	--> OK	12708.0	--> OK
PHOTFTST012	46417.0	46417.0	46417.0	--> OK	46417.0	--> OK
PHOTFTST013	23180.0	23180.0	23180.0	--> OK	23180.0	--> OK
PHOTFTST014	36145.0	36145.0	36145.0	--> OK	36145.0	--> OK
PHOTFTST015	53988.0	53988.0	53988.0	--> OK	53988.0	--> OK
PHOTFTST016	33600.0	33600.0	33600.0	--> OK	33600.0	--> OK
PHOTFTST017	23231.0	23231.0	23231.0	--> OK	23231.0	--> OK
PHOTFTST018	30274.0	30274.0	30274.0	--> OK	30274.0	--> OK
PHOTFTST019	6511.0	6511.0	6511.0	--> OK	6511.0	--> OK
PHOTFTST020	8525.0	8525.0	8525.0	--> OK	8525.0	--> OK
PHOTFTST021	18259.0	18259.0	18259.0	--> OK	18259.0	--> OK
PHOTFTST022	51785.0	51785.0	51785.0	--> OK	51785.0	--> OK
PHOTFTST023	15948.0	15948.0	15948.0	--> OK	15948.0	--> OK
PHOTFTST024	22314.0	22314.0	22314.0	--> OK	22314.0	--> OK
PHOTFTST025	57134.0	57134.0	57134.0	--> OK	57134.0	--> OK
PHOTFTST026	47888.0	47888.0	47888.0	--> OK	47888.0	--> OK
PHOTFTST027	65530.0	65530.0	65530.0	--> OK	65530.0	--> OK
PHOTFTST028	21501.0	21501.0	21501.0	--> OK	21501.0	--> OK
PHOTFTST029	27118.0	27118.0	27118.0	--> OK	27118.0	--> OK
PHOTFTST030	50068.0	50068.0	50068.0	--> OK	50068.0	--> OK
PHOTFTST031	20490.0	20490.0	20490.0	--> OK	20490.0	--> OK
PHOTFTST032	26130.0	26130.0	26130.0	--> OK	26130.0	--> OK
PHOTFTST033	50919.0	50919.0	50919.0	--> OK	50919.0	--> OK
PHOTFTST034	16297.0	16297.0	16297.0	--> OK	16297.0	--> OK
PHOTFTST035	13170.0	13170.0	13170.0	--> OK	13170.0	--> OK
PHOTFTST036	48409.0	48409.0	48409.0	--> OK	48409.0	--> OK
PHOTFTST037	32768.0	32768.0	32768.0	--> OK	32768.0	--> OK
PHOTFTST038	53942.0	53942.0	53942.0	--> OK	53942.0	--> OK
PHOTFTST039	8756.0	8756.0	8756.0	--> OK	8756.0	--> OK
PHOTFTST040	11023.0	11023.0	11023.0	--> OK	11023.0	--> OK
PHOTFTST041	53978.0	53978.0	53978.0	--> OK	53978.0	--> OK
PHOTFTST042	25474.0	25474.0	25474.0	--> OK	25474.0	--> OK
PHOTFTST043	6027.0	6027.0	6027.0	--> OK	6027.0	--> OK
PHOTFTST044	17966.0	17966.0	17966.0	--> OK	17966.0	--> OK
PHOTFTST045	57084.0	57084.0	57084.0	--> OK	57084.0	--> OK
PHOTFTST046	27297.0	27297.0	27297.0	--> OK	27297.0	--> OK
PHOTFTST047	18407.0	18407.0	18407.0	--> OK	18407.0	--> OK
PHOTFTST048	55003.0	55003.0	55003.0	--> OK	55003.0	--> OK
PHOTFTST049	30471.0	30471.0	30471.0	--> OK	30471.0	--> OK
PHOTFTST050	779.0	779.0	779.0	--> OK	779.0	--> OK
PHOTFTST051	20944.0	20944.0	20944.0	--> OK	20944.0	--> OK
PHOTFTST052	40139.0	40139.0	40139.0	--> OK	40139.0	--> OK
PHOTFTST053	60700.0	60700.0	60700.0	--> OK	60700.0	--> OK
PHOTFTST054	62268.0	62268.0	62268.0	--> OK	62268.0	--> OK
PHOTFTST055	23214.0	23214.0	23214.0	--> OK	23214.0	--> OK
PHOTFTST056	8339.0	8339.0	8339.0	--> OK	8339.0	--> OK
PHOTFTST057	24553.0	24553.0	24553.0	--> OK	24553.0	--> OK
PHOTFTST058	16566.0	16566.0	16566.0	--> OK	16566.0	--> OK
PHOTFTST059	7195.0	7195.0	7195.0	--> OK	7195.0	--> OK
PHOTFTST060	47643.0	47643.0	47643.0	--> OK	47643.0	--> OK
PHOTFTST061	53034.0	53034.0	53034.0	--> OK	53034.0	--> OK
PHOTFTST062	37609.0	37609.0	37609.0	--> OK	37609.0	--> OK
PHOTFTST063	164.0	164.0	164.0	--> OK	164.0	--> OK
PHOTFTST064	61230.0	61230.0	61230.0	--> OK	61230.0	--> OK
PHOTFTST065	34962.0	34962.0	34962.0	--> OK	34962.0	--> OK
PHOTFTST066	10260.0	10260.0	10260.0	--> OK	10260.0	--> OK
PHOTFTST067	51202.0	51202.0	51202.0	--> OK	51202.0	--> OK
PHOTFTST068	64935.0	64935.0	64935.0	--> OK	64935.0	--> OK

PHOTFTST069	61109.0	61109.0	61109.0	--> OK	61109.0	--> OK
PHOTFTST070	19438.0	19438.0	19438.0	--> OK	19438.0	--> OK
PHOTFTST071	23583.0	23583.0	23583.0	--> OK	23583.0	--> OK
PHOTFTST072	37954.0	37954.0	37954.0	--> OK	37954.0	--> OK
PHOTFTST073	60837.0	60837.0	60837.0	--> OK	60837.0	--> OK
PHOTFTST074	62495.0	62495.0	62495.0	--> OK	62495.0	--> OK
PHOTFTST075	11713.0	11713.0	11713.0	--> OK	11713.0	--> OK
PHOTFTST076	8569.0	8569.0	8569.0	--> OK	8569.0	--> OK
PHOTFTST077	8988.0	8988.0	8988.0	--> OK	8988.0	--> OK
PHOTFTST078	56539.0	56539.0	56539.0	--> OK	56539.0	--> OK
PHOTFTST079	55979.0	55979.0	55979.0	--> OK	55979.0	--> OK
PHOTFTST080	49916.0	49916.0	49916.0	--> OK	49916.0	--> OK
PHOTFTST081	26072.0	26072.0	26072.0	--> OK	26072.0	--> OK
PHOTFTST082	14603.0	14603.0	14603.0	--> OK	14603.0	--> OK
PHOTFTST083	648.0	648.0	648.0	--> OK	648.0	--> OK
PHOTFTST084	49411.0	49411.0	49411.0	--> OK	49411.0	--> OK
PHOTFTST085	27115.0	27115.0	27115.0	--> OK	27115.0	--> OK
PHOTFTST086	62285.0	62285.0	62285.0	--> OK	62285.0	--> OK
PHOTFTST087	1475.0	1475.0	1475.0	--> OK	1475.0	--> OK
PHOTFTST088	26739.0	26739.0	26739.0	--> OK	26739.0	--> OK
PHOTFTST089	17700.0	17700.0	17700.0	--> OK	17700.0	--> OK
PHOTFTST090	7670.0	7670.0	7670.0	--> OK	7670.0	--> OK
PHOTFTST091	45570.0	45570.0	45570.0	--> OK	45570.0	--> OK
PHOTFTST092	36446.0	36446.0	36446.0	--> OK	36446.0	--> OK
PHOTFTST093	32851.0	32851.0	32851.0	--> OK	32851.0	--> OK
PHOTFTST094	76.0	76.0	76.0	--> OK	76.0	--> OK
PHOTFTST095	59353.0	59353.0	59353.0	--> OK	59353.0	--> OK
PHOTFTST096	14681.0	14681.0	14681.0	--> OK	14681.0	--> OK
PHOTFTST097	45993.0	45993.0	45993.0	--> OK	45993.0	--> OK
PHOTFTST098	3039.0	3039.0	3039.0	--> OK	3039.0	--> OK
PHOTFTST099	21485.0	21485.0	21485.0	--> OK	21485.0	--> OK
PHOTFTST100	58423.0	58423.0	58423.0	--> OK	58423.0	--> OK
PHOTFTST101	49530.0	49530.0	49530.0	--> OK	49530.0	--> OK
PHOTFTST102	59672.0	59672.0	59672.0	--> OK	59672.0	--> OK
PHOTFTST103	39150.0	39150.0	39150.0	--> OK	39150.0	--> OK
PHOTFTST104	61616.0	61616.0	61616.0	--> OK	61616.0	--> OK
PHOTFTST105	6295.0	6295.0	6295.0	--> OK	6295.0	--> OK
PHOTFTST106	30262.0	30262.0	30262.0	--> OK	30262.0	--> OK
PHOTFTST107	20736.0	20736.0	20736.0	--> OK	20736.0	--> OK
PHOTFTST108	15460.0	15460.0	15460.0	--> OK	15460.0	--> OK
PHOTFTST109	62270.0	62270.0	62270.0	--> OK	62270.0	--> OK
PHOTFTST110	42095.0	42095.0	42095.0	--> OK	42095.0	--> OK
PHOTFTST111	43075.0	43075.0	43075.0	--> OK	43075.0	--> OK
PHOTFTST112	61472.0	61472.0	61472.0	--> OK	61472.0	--> OK
PHOTFTST113	25519.0	25519.0	25519.0	--> OK	25519.0	--> OK
PHOTFTST114	423.0	423.0	423.0	--> OK	423.0	--> OK
PHOTFTST115	13689.0	13689.0	13689.0	--> OK	13689.0	--> OK
PHOTFTST116	57692.0	57692.0	57692.0	--> OK	57692.0	--> OK
PHOTFTST117	35227.0	35227.0	35227.0	--> OK	35227.0	--> OK
PHOTFTST118	40405.0	40405.0	40405.0	--> OK	40405.0	--> OK
PHOTFTST119	33222.0	33222.0	33222.0	--> OK	33222.0	--> OK
PHOTFTST120	25871.0	25871.0	25871.0	--> OK	25871.0	--> OK
PHOTFTST121	35174.0	35174.0	35174.0	--> OK	35174.0	--> OK
PHOTFTST122	49587.0	49587.0	49587.0	--> OK	49587.0	--> OK
PHOTFTST123	60595.0	60595.0	60595.0	--> OK	60595.0	--> OK
PHOTFTST124	58121.0	58121.0	58121.0	--> OK	58121.0	--> OK
PHOTFTST125	39089.0	39089.0	39089.0	--> OK	39089.0	--> OK
PHOTFTST126	40086.0	40086.0	40086.0	--> OK	40086.0	--> OK
PHOTFTST127	61336.0	61336.0	61336.0	--> OK	61336.0	--> OK
PHOTFTST128	36067.0	36067.0	36067.0	--> OK	36067.0	--> OK
PHOTFTST129	15197.0	15197.0	15197.0	--> OK	15197.0	--> OK
PHOTFTST130	54572.0	54572.0	54572.0	--> OK	54572.0	--> OK
PHOTFTST131	3320.0	3320.0	3320.0	--> OK	3320.0	--> OK
PHOTFTST132	23946.0	23946.0	23946.0	--> OK	23946.0	--> OK
PHOTFTST133	62588.0	62588.0	62588.0	--> OK	62588.0	--> OK
PHOTFTST134	33562.0	33562.0	33562.0	--> OK	33562.0	--> OK
PHOTFTST135	58279.0	58279.0	58279.0	--> OK	58279.0	--> OK
PHOTFTST136	63609.0	63609.0	63609.0	--> OK	63609.0	--> OK
PHOTFTST137	13326.0	13326.0	13326.0	--> OK	13326.0	--> OK
PHOTFTST138	31406.0	31406.0	31406.0	--> OK	31406.0	--> OK
PHOTFTST139	30437.0	30437.0	30437.0	--> OK	30437.0	--> OK
PHOTFTST140	50814.0	50814.0	50814.0	--> OK	50814.0	--> OK
PHOTFTST141	61182.0	61182.0	61182.0	--> OK	61182.0	--> OK
PHOTFTST142	16832.0	16832.0	16832.0	--> OK	16832.0	--> OK
PHOTFTST143	47199.0	47199.0	47199.0	--> OK	47199.0	--> OK
PHOTFTST144	269.0	269.0	269.0	--> OK	269.0	--> OK
PHOTFTST145	4261.0	4261.0	4261.0	--> OK	4261.0	--> OK
PHOTFTST146	62990.0	62990.0	62990.0	--> OK	62990.0	--> OK
PHOTFTST147	43420.0	43420.0	43420.0	--> OK	43420.0	--> OK
PHOTFTST148	14880.0	14880.0	14880.0	--> OK	14880.0	--> OK
PHOTFTST149	50504.0	50504.0	50504.0	--> OK	50504.0	--> OK
PHOTFTST150	22549.0	22549.0	22549.0	--> OK	22549.0	--> OK
PHOTFTST151	44210.0	44210.0	44210.0	--> OK	44210.0	--> OK
PHOTFTST152	64905.0	64905.0	64905.0	--> OK	64905.0	--> OK
PHOTFTST153	61431.0	61431.0	61431.0	--> OK	61431.0	--> OK
PHOTFTST154	62465.0	62465.0	62465.0	--> OK	62465.0	--> OK

PHOTFTST155	61851.0	61851.0	61851.0	--> OK	61851.0	--> OK
PHOTFTST156	39333.0	39333.0	39333.0	--> OK	39333.0	--> OK
PHOTFTST157	45823.0	45823.0	45823.0	--> OK	45823.0	--> OK
PHOTFTST158	53816.0	53816.0	53816.0	--> OK	53816.0	--> OK
PHOTFTST159	60710.0	60710.0	60710.0	--> OK	60710.0	--> OK
PHOTFTST160	34378.0	34378.0	34378.0	--> OK	34378.0	--> OK
PHOTFTST161	25724.0	25724.0	25724.0	--> OK	25724.0	--> OK
PHOTFTST162	60897.0	60897.0	60897.0	--> OK	60897.0	--> OK
PHOTFTST163	12140.0	12140.0	12140.0	--> OK	12140.0	--> OK
PHOTFTST164	14299.0	14299.0	14299.0	--> OK	14299.0	--> OK
PHOTFTST165	6883.0	6883.0	6883.0	--> OK	6883.0	--> OK
PHOTFTST166	20030.0	20030.0	20030.0	--> OK	20030.0	--> OK
PHOTFTST167	4598.0	4598.0	4598.0	--> OK	4598.0	--> OK
PHOTFTST168	7984.0	7984.0	7984.0	--> OK	7984.0	--> OK
PHOTFTST169	17054.0	17054.0	17054.0	--> OK	17054.0	--> OK
PHOTFTST170	22076.0	22076.0	22076.0	--> OK	22076.0	--> OK
PHOTFTST171	49498.0	49498.0	49498.0	--> OK	49498.0	--> OK
PHOTFTST172	3680.0	3680.0	3680.0	--> OK	3680.0	--> OK
PHOTFTST173	40243.0	40243.0	40243.0	--> OK	40243.0	--> OK
PHOTFTST174	40825.0	40825.0	40825.0	--> OK	40825.0	--> OK
PHOTFTST175	58735.0	58735.0	58735.0	--> OK	58735.0	--> OK
PHOTFTST176	6296.0	6296.0	6296.0	--> OK	6296.0	--> OK
PHOTFTST177	44890.0	44890.0	44890.0	--> OK	44890.0	--> OK
PHOTFTST178	11975.0	11975.0	11975.0	--> OK	11975.0	--> OK
PHOTFTST179	42645.0	42645.0	42645.0	--> OK	42645.0	--> OK
PHOTFTST180	51549.0	51549.0	51549.0	--> OK	51549.0	--> OK
PHOTFTST181	7571.0	7571.0	7571.0	--> OK	7571.0	--> OK
PHOTFTST182	14165.0	14165.0	14165.0	--> OK	14165.0	--> OK
PHOTFTST183	54769.0	54769.0	54769.0	--> OK	54769.0	--> OK
PHOTFTST184	58235.0	58235.0	58235.0	--> OK	58235.0	--> OK
PHOTFTST185	13602.0	13602.0	13602.0	--> OK	13602.0	--> OK
PHOTFTST186	6350.0	6350.0	6350.0	--> OK	6350.0	--> OK
PHOTFTST187	28469.0	28469.0	28469.0	--> OK	28469.0	--> OK
PHOTFTST188	16254.0	16254.0	16254.0	--> OK	16254.0	--> OK
PHOTFTST189	18355.0	18355.0	18355.0	--> OK	18355.0	--> OK
PHOTFTST190	32290.0	32290.0	32290.0	--> OK	32290.0	--> OK
PHOTFTST191	10077.0	10077.0	10077.0	--> OK	10077.0	--> OK
PHOTFTST192	22612.0	22612.0	22612.0	--> OK	22612.0	--> OK
PHOTFTST193	62886.0	62886.0	62886.0	--> OK	62886.0	--> OK
PHOTFTST194	31171.0	31171.0	31171.0	--> OK	31171.0	--> OK
PHOTFTST195	30969.0	30969.0	30969.0	--> OK	30969.0	--> OK
PHOTFTST196	52642.0	52642.0	52642.0	--> OK	52642.0	--> OK
PHOTFTST197	20461.0	20461.0	20461.0	--> OK	20461.0	--> OK
PHOTFTST198	26959.0	26959.0	26959.0	--> OK	26959.0	--> OK
PHOTFTST199	58181.0	58181.0	58181.0	--> OK	58181.0	--> OK
PHOTFTST200	1736.0	1736.0	1736.0	--> OK	1736.0	--> OK
PHOTFTST201	42447.0	42447.0	42447.0	--> OK	42447.0	--> OK
PHOTFTST202	55791.0	55791.0	55791.0	--> OK	55791.0	--> OK
PHOTFTST203	52325.0	52325.0	52325.0	--> OK	52325.0	--> OK
PHOTFTST204	16702.0	16702.0	16702.0	--> OK	16702.0	--> OK
PHOTFTST205	34421.0	34421.0	34421.0	--> OK	34421.0	--> OK
PHOTFTST206	41152.0	41152.0	41152.0	--> OK	41152.0	--> OK
PHOTFTST207	40213.0	40213.0	40213.0	--> OK	40213.0	--> OK
PHOTFTST208	42863.0	42863.0	42863.0	--> OK	42863.0	--> OK
PHOTFTST209	33552.0	33552.0	33552.0	--> OK	33552.0	--> OK
PHOTFTST210	27975.0	27975.0	27975.0	--> OK	27975.0	--> OK
PHOTFTST211	21482.0	21482.0	21482.0	--> OK	21482.0	--> OK
PHOTFTST212	40500.0	40500.0	40500.0	--> OK	40500.0	--> OK
PHOTFTST213	7267.0	7267.0	7267.0	--> OK	7267.0	--> OK
PHOTFTST214	19270.0	19270.0	19270.0	--> OK	19270.0	--> OK
PHOTFTST215	57569.0	57569.0	57569.0	--> OK	57569.0	--> OK
PHOTFTST216	42411.0	42411.0	42411.0	--> OK	42411.0	--> OK
PHOTFTST217	54772.0	54772.0	54772.0	--> OK	54772.0	--> OK
PHOTFTST218	54178.0	54178.0	54178.0	--> OK	54178.0	--> OK
PHOTFTST219	24811.0	24811.0	24811.0	--> OK	24811.0	--> OK
PHOTFTST220	5807.0	5807.0	5807.0	--> OK	5807.0	--> OK
PHOTFTST221	23635.0	23635.0	23635.0	--> OK	23635.0	--> OK
PHOTFTST222	58479.0	58479.0	58479.0	--> OK	58479.0	--> OK
PHOTFTST223	54524.0	54524.0	54524.0	--> OK	54524.0	--> OK
PHOTFTST224	49934.0	49934.0	49934.0	--> OK	49934.0	--> OK
PHOTFTST225	55320.0	55320.0	55320.0	--> OK	55320.0	--> OK
PHOTFTST226	54244.0	54244.0	54244.0	--> OK	54244.0	--> OK
PHOTFTST227	43319.0	43319.0	43319.0	--> OK	43319.0	--> OK
PHOTFTST228	33893.0	33893.0	33893.0	--> OK	33893.0	--> OK
PHOTFTST229	14361.0	14361.0	14361.0	--> OK	14361.0	--> OK
PHOTFTST230	49700.0	49700.0	49700.0	--> OK	49700.0	--> OK
PHOTFTST231	26066.0	26066.0	26066.0	--> OK	26066.0	--> OK
PHOTFTST232	22713.0	22713.0	22713.0	--> OK	22713.0	--> OK
PHOTFTST233	43291.0	43291.0	43291.0	--> OK	43291.0	--> OK
PHOTFTST234	56769.0	56769.0	56769.0	--> OK	56769.0	--> OK
PHOTFTST235	3878.0	3878.0	3878.0	--> OK	3878.0	--> OK
PHOTFTST236	17774.0	17774.0	17774.0	--> OK	17774.0	--> OK
PHOTFTST237	9052.0	9052.0	9052.0	--> OK	9052.0	--> OK
PHOTFTST238	4650.0	4650.0	4650.0	--> OK	4650.0	--> OK
PHOTFTST239	53520.0	53520.0	53520.0	--> OK	53520.0	--> OK
PHOTFTST240	7534.0	7534.0	7534.0	--> OK	7534.0	--> OK

PHOTFTST241	39702.0	39702.0	39702.0	--> OK	39702.0	--> OK
PHOTFTST242	53314.0	53314.0	53314.0	--> OK	53314.0	--> OK
PHOTFTST243	21275.0	21275.0	21275.0	--> OK	21275.0	--> OK
PHOTFTST244	31886.0	31886.0	31886.0	--> OK	31886.0	--> OK
PHOTFTST245	17396.0	17396.0	17396.0	--> OK	17396.0	--> OK
PHOTFTST246	9667.0	9667.0	9667.0	--> OK	9667.0	--> OK
PHOTFTST247	19008.0	19008.0	19008.0	--> OK	19008.0	--> OK
PHOTFTST248	56499.0	56499.0	56499.0	--> OK	56499.0	--> OK
PHOTFTST249	4661.0	4661.0	4661.0	--> OK	4661.0	--> OK
PHOTFTST250	61401.0	61401.0	61401.0	--> OK	61401.0	--> OK
PHOTFTST251	57818.0	57818.0	57818.0	--> OK	57818.0	--> OK
PHOTFTST252	20084.0	20084.0	20084.0	--> OK	20084.0	--> OK
PHOTFTST253	5075.0	5075.0	5075.0	--> OK	5075.0	--> OK
PHOTFTST254	48920.0	48920.0	48920.0	--> OK	48920.0	--> OK
PHOTFTST255	20309.0	20309.0	20309.0	--> OK	20309.0	--> OK
PHOTFTST256	51969.0	51969.0	51969.0	--> OK	51969.0	--> OK
PHOTFTST257	20797.0	20797.0	20797.0	--> OK	20797.0	--> OK
PHOTFTST258	13073.0	13073.0	13073.0	--> OK	13073.0	--> OK
PHOTFTST259	33415.0	33415.0	33415.0	--> OK	33415.0	--> OK
PHOTFTST260	17118.0	17118.0	17118.0	--> OK	17118.0	--> OK
PHOTFTST261	46469.0	46469.0	46469.0	--> OK	46469.0	--> OK
PHOTFTST262	51937.0	51937.0	51937.0	--> OK	51937.0	--> OK
PHOTFTST263	33458.0	33458.0	33458.0	--> OK	33458.0	--> OK
PHOTFTST264	26307.0	26307.0	26307.0	--> OK	26307.0	--> OK
PHOTFTST265	59263.0	59263.0	59263.0	--> OK	59263.0	--> OK
PHOTFTST266	40109.0	40109.0	40109.0	--> OK	40109.0	--> OK
PHOTFTST267	45776.0	45776.0	45776.0	--> OK	45776.0	--> OK
PHOTFTST268	25643.0	25643.0	25643.0	--> OK	25643.0	--> OK
PHOTFTST269	5793.0	5793.0	5793.0	--> OK	5793.0	--> OK
PHOTFTST270	64288.0	64288.0	64288.0	--> OK	64288.0	--> OK
PHOTFTST271	24157.0	24157.0	24157.0	--> OK	24157.0	--> OK
PHOTFTST272	26592.0	26592.0	26592.0	--> OK	26592.0	--> OK
PHOTFTST273	31527.0	31527.0	31527.0	--> OK	31527.0	--> OK
PHOTFTST274	54598.0	54598.0	54598.0	--> OK	54598.0	--> OK
PHOTFTST275	39117.0	39117.0	39117.0	--> OK	39117.0	--> OK
PHOTFTST276	63615.0	63615.0	63615.0	--> OK	63615.0	--> OK
PHOTFTST277	53746.0	53746.0	53746.0	--> OK	53746.0	--> OK
PHOTFTST278	58335.0	58335.0	58335.0	--> OK	58335.0	--> OK
PHOTFTST279	16933.0	16933.0	16933.0	--> OK	16933.0	--> OK
PHOTFTST280	7109.0	7109.0	7109.0	--> OK	7109.0	--> OK
PHOTFTST281	16101.0	16101.0	16101.0	--> OK	16101.0	--> OK
PHOTFTST282	41909.0	41909.0	41909.0	--> OK	41909.0	--> OK
PHOTFTST283	43695.0	43695.0	43695.0	--> OK	43695.0	--> OK
PHOTFTST284	36126.0	36126.0	36126.0	--> OK	36126.0	--> OK
PHOTFTST285	32243.0	32243.0	32243.0	--> OK	32243.0	--> OK
PHOTFTST286	30919.0	30919.0	30919.0	--> OK	30919.0	--> OK
PHOTFTST287	28974.0	28974.0	28974.0	--> OK	28974.0	--> OK
PHOTFTST288	62188.0	62188.0	62188.0	--> OK	62188.0	--> OK
PHOTFTSTADCFLGS	0.0	0.0	0.0	--> OK	0.0	--> OK
PHOTFTSTFRAMETIME	8439844.0	8847519.0	1.0253174E7	<--BAD	1.0589166E7	<--BAD
PHOTFTSTCHECKWORD	12473.0	63493.0	35831.0		27474.0	

Note that the frame values indicated “BAD” are actually expected to be different from test to test, i.e. frame time, check word and observation identifier, etc.

DCU Spectrometer Full Array Test Pattern

DCU Test Pattern @ Tue Oct 23 11:15:57 UTC 2007
..compared with data from DCU Test Pattern @ Wed Mar 14 16:40:34 GMT 2007, OBSID=0x300125CC

Name	New Value[0]	New Value[20]	Comp Value[0]	Comp Value[20]
SPECFTSTOBSID	0xB00002CF	0x0	0x300125CC	0x0
SPECFTSTBBID	0x88080001	0x0	0x88080001 --> OK	0x0 --> OK
SPECFTSTBLKLEN	78.0	78.0	78.0 --> OK	78.0 --> OK
SPECFTSTFRAMEID	13.0	13.0	13.0 --> OK	13.0 --> OK
SPECFTST001	6583.0	6583.0	6583.0 --> OK	6583.0 --> OK
SPECFTST002	23180.0	23180.0	23180.0 --> OK	23180.0 --> OK
SPECFTST003	31282.0	31282.0	31282.0 --> OK	31282.0 --> OK
SPECFTST004	53988.0	53988.0	53988.0 --> OK	53988.0 --> OK
SPECFTST005	57605.0	57605.0	57605.0 --> OK	57605.0 --> OK
SPECFTST006	43658.0	43658.0	43658.0 --> OK	43658.0 --> OK
SPECFTST007	62379.0	62379.0	62379.0 --> OK	62379.0 --> OK
SPECFTST008	11751.0	11751.0	11751.0 --> OK	11751.0 --> OK
SPECFTST009	59411.0	59411.0	59411.0 --> OK	59411.0 --> OK
SPECFTST010	49072.0	49072.0	49072.0 --> OK	49072.0 --> OK
SPECFTST011	12708.0	12708.0	12708.0 --> OK	12708.0 --> OK
SPECFTST012	64232.0	64232.0	64232.0 --> OK	64232.0 --> OK
SPECFTST013	30471.0	30471.0	30471.0 --> OK	30471.0 --> OK
SPECFTST014	53034.0	53034.0	53034.0 --> OK	53034.0 --> OK
SPECFTST015	20944.0	20944.0	20944.0 --> OK	20944.0 --> OK
SPECFTST016	164.0	164.0	164.0 --> OK	164.0 --> OK
SPECFTST017	60700.0	60700.0	60700.0 --> OK	60700.0 --> OK
SPECFTST018	779.0	779.0	779.0 --> OK	779.0 --> OK
SPECFTST019	23214.0	23214.0	23214.0 --> OK	23214.0 --> OK
SPECFTST020	40139.0	40139.0	40139.0 --> OK	40139.0 --> OK
SPECFTST021	24553.0	24553.0	24553.0 --> OK	24553.0 --> OK
SPECFTST022	62268.0	62268.0	62268.0 --> OK	62268.0 --> OK
SPECFTST023	7195.0	7195.0	7195.0 --> OK	7195.0 --> OK
SPECFTST024	8339.0	8339.0	8339.0 --> OK	8339.0 --> OK
SPECFTST025	45993.0	45993.0	45993.0 --> OK	45993.0 --> OK
SPECFTST026	62270.0	62270.0	62270.0 --> OK	62270.0 --> OK
SPECFTST027	21485.0	21485.0	21485.0 --> OK	21485.0 --> OK
SPECFTST028	43075.0	43075.0	43075.0 --> OK	43075.0 --> OK
SPECFTST029	49530.0	49530.0	49530.0 --> OK	49530.0 --> OK
SPECFTST030	3039.0	3039.0	3039.0 --> OK	3039.0 --> OK
SPECFTST031	39150.0	39150.0	39150.0 --> OK	39150.0 --> OK
SPECFTST032	58423.0	58423.0	58423.0 --> OK	58423.0 --> OK
SPECFTST033	6295.0	6295.0	6295.0 --> OK	6295.0 --> OK
SPECFTST034	59672.0	59672.0	59672.0 --> OK	59672.0 --> OK
SPECFTST035	20736.0	20736.0	20736.0 --> OK	20736.0 --> OK
SPECFTST036	61616.0	61616.0	61616.0 --> OK	61616.0 --> OK
SPECFTST037	4261.0	4261.0	4261.0 --> OK	4261.0 --> OK
SPECFTST038	45823.0	45823.0	45823.0 --> OK	45823.0 --> OK
SPECFTST039	43420.0	43420.0	43420.0 --> OK	43420.0 --> OK
SPECFTST040	60710.0	60710.0	60710.0 --> OK	60710.0 --> OK
SPECFTST041	50504.0	50504.0	50504.0 --> OK	50504.0 --> OK
SPECFTST042	62990.0	62990.0	62990.0 --> OK	62990.0 --> OK
SPECFTST043	44210.0	44210.0	44210.0 --> OK	44210.0 --> OK
SPECFTST044	14880.0	14880.0	14880.0 --> OK	14880.0 --> OK
SPECFTST045	61431.0	61431.0	61431.0 --> OK	61431.0 --> OK
SPECFTST046	22549.0	22549.0	22549.0 --> OK	22549.0 --> OK
SPECFTST047	61851.0	61851.0	61851.0 --> OK	61851.0 --> OK
SPECFTST048	64905.0	64905.0	64905.0 --> OK	64905.0 --> OK
SPECFTST049	62886.0	62886.0	62886.0 --> OK	62886.0 --> OK
SPECFTST050	34421.0	34421.0	34421.0 --> OK	34421.0 --> OK
SPECFTST051	30969.0	30969.0	30969.0 --> OK	30969.0 --> OK
SPECFTST052	40213.0	40213.0	40213.0 --> OK	40213.0 --> OK
SPECFTST053	20461.0	20461.0	20461.0 --> OK	20461.0 --> OK
SPECFTST054	31171.0	31171.0	31171.0 --> OK	31171.0 --> OK
SPECFTST055	58181.0	58181.0	58181.0 --> OK	58181.0 --> OK
SPECFTST056	52642.0	52642.0	52642.0 --> OK	52642.0 --> OK
SPECFTST057	42447.0	42447.0	42447.0 --> OK	42447.0 --> OK
SPECFTST058	26959.0	26959.0	26959.0 --> OK	26959.0 --> OK
SPECFTST059	52325.0	52325.0	52325.0 --> OK	52325.0 --> OK
SPECFTST060	1736.0	1736.0	1736.0 --> OK	1736.0 --> OK
SPECFTST061	39702.0	39702.0	39702.0 --> OK	39702.0 --> OK
SPECFTST062	5075.0	5075.0	5075.0 --> OK	5075.0 --> OK
SPECFTST063	21275.0	21275.0	21275.0 --> OK	21275.0 --> OK
SPECFTST064	20309.0	20309.0	20309.0 --> OK	20309.0 --> OK
SPECFTST065	17396.0	17396.0	17396.0 --> OK	17396.0 --> OK
SPECFTST066	53314.0	53314.0	53314.0 --> OK	53314.0 --> OK
SPECFTST067	19008.0	19008.0	19008.0 --> OK	19008.0 --> OK
SPECFTST068	31886.0	31886.0	31886.0 --> OK	31886.0 --> OK

SPECFTST069	4661.0	4661.0	4661.0	--> OK	4661.0	--> OK	
SPECFTST070	9667.0	9667.0	9667.0	--> OK	9667.0	--> OK	
SPECFTST071	57818.0	57818.0	57818.0	--> OK	57818.0	--> OK	
SPECFTST072	56499.0	56499.0	56499.0	--> OK	56499.0	--> OK	
SPECFTSTADCFLGS	0.0	0.0	0.0	--> OK	0.0	--> OK	
SPECFTSTFRAMETIME	1.7812933E7	1.7891012E7	2.2126281E7		2.2204359E7		
SPECFTSTCHECKWORD	26935.0	23081.0	14949.0		27496.0		

6. ANNEXE 2 (RESULTS OF LOAD CURVES)

The following graphs (1-12) show the response of the 288 Photometer detectors to the input voltage during the Load Curve (FUNC-DCU-13). The graph (13) shows the response of the 3 PTC channels to the input voltage during the Load Curve. The graphs (14-16) show the spectrometer 78 detectors output voltage during the load curve performed on the spectrometer side. These plots are for OBSIDs B0000217 for photometer and B000021C for spectrometer. For all the photometer load curves the first anomalous point has been removed from the plots.

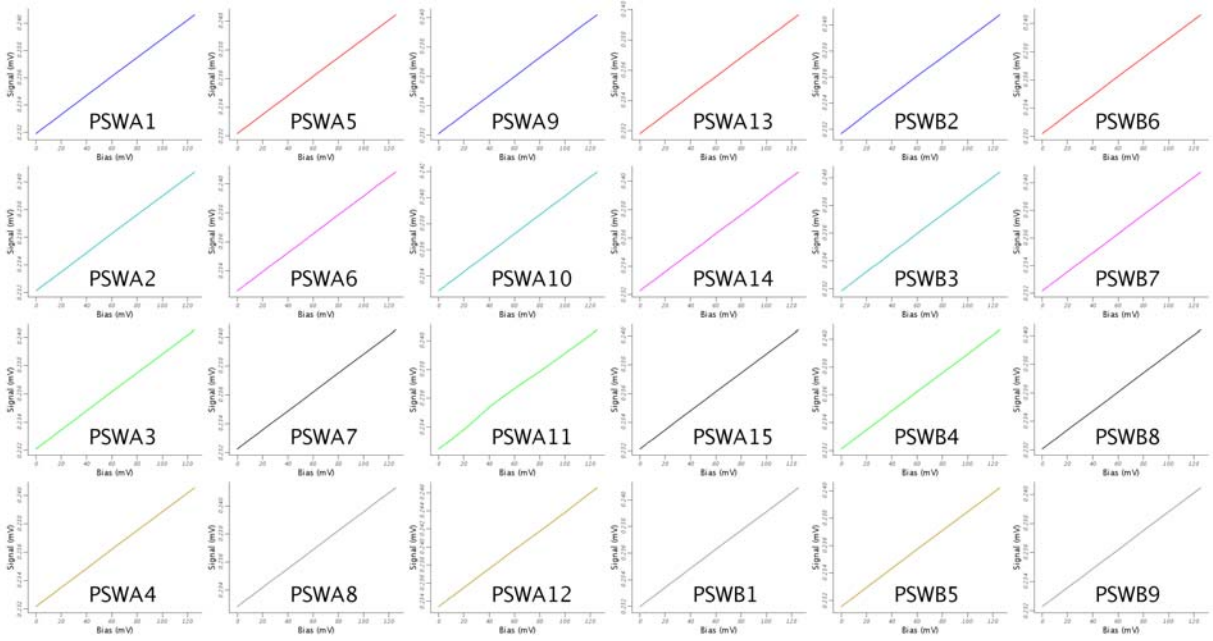


Figure 1. PSW Detectors (1)

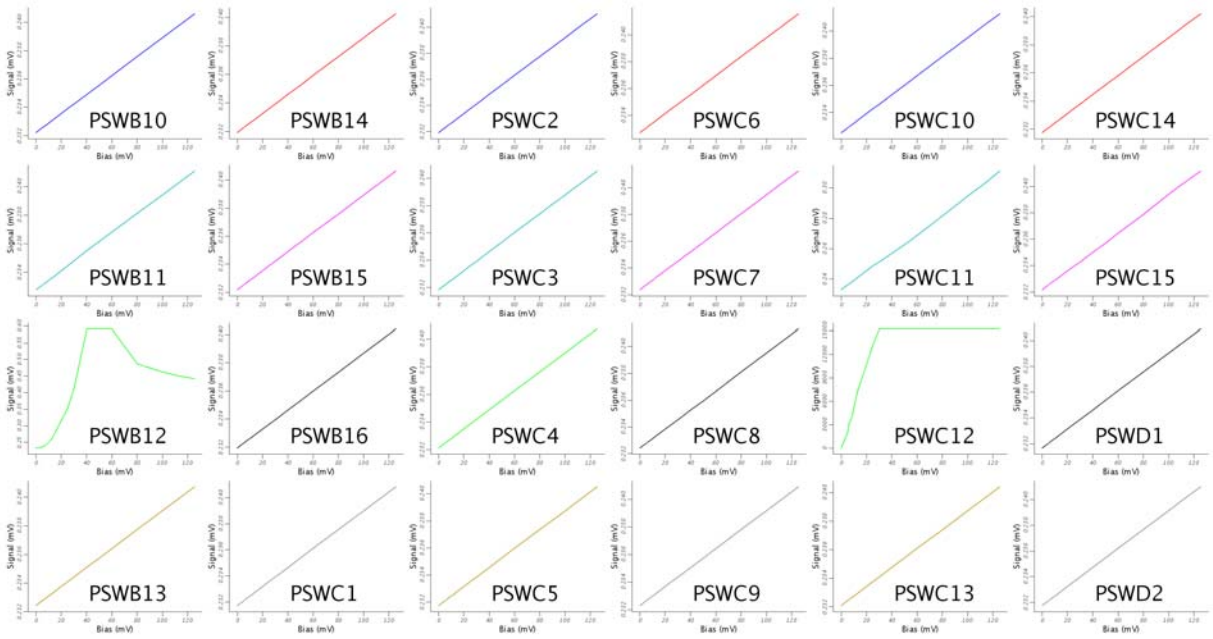


Figure 2. PSW Detectors (2)

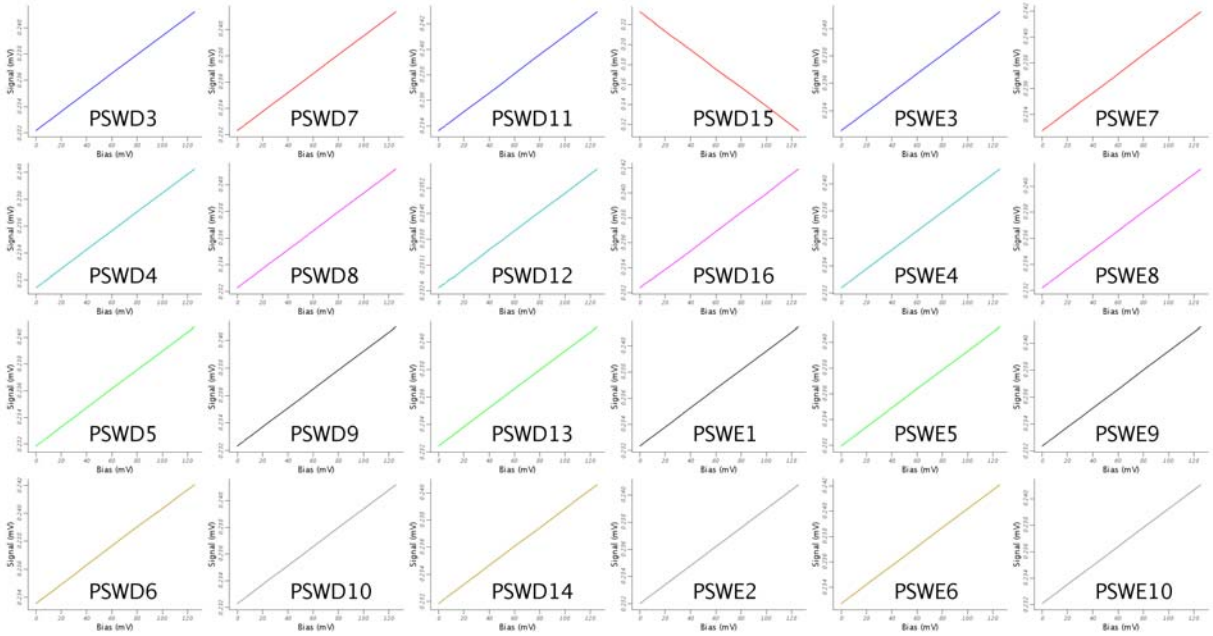


Figure 3. PSW Detectors (3)

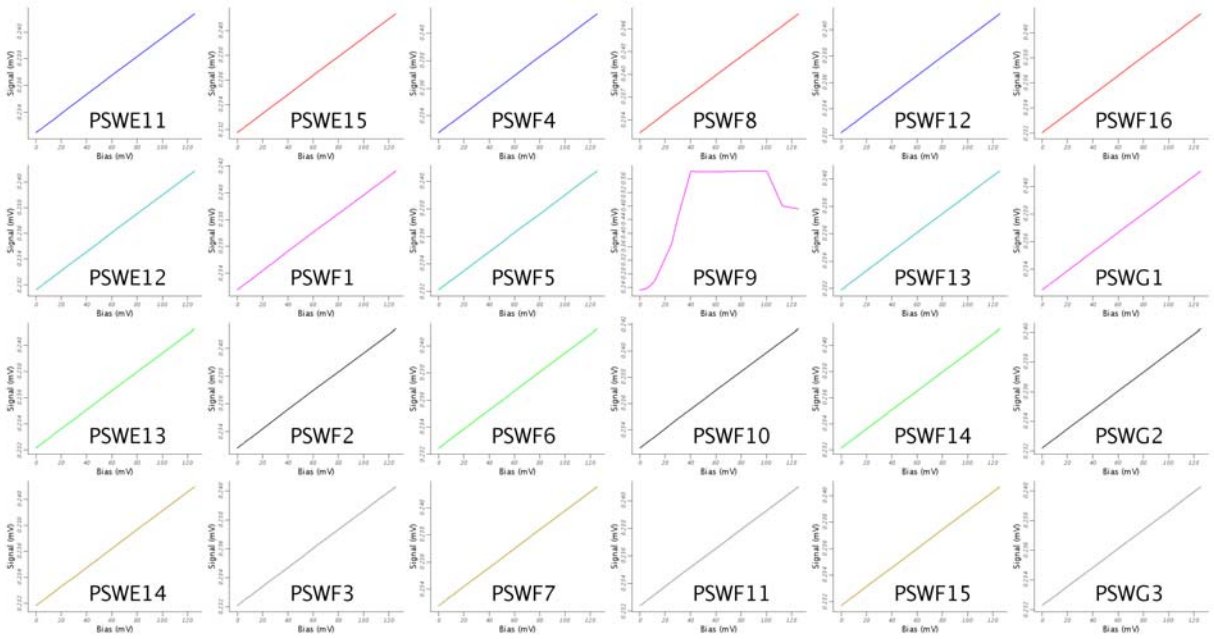


Figure 4. PSW Detectors (4)

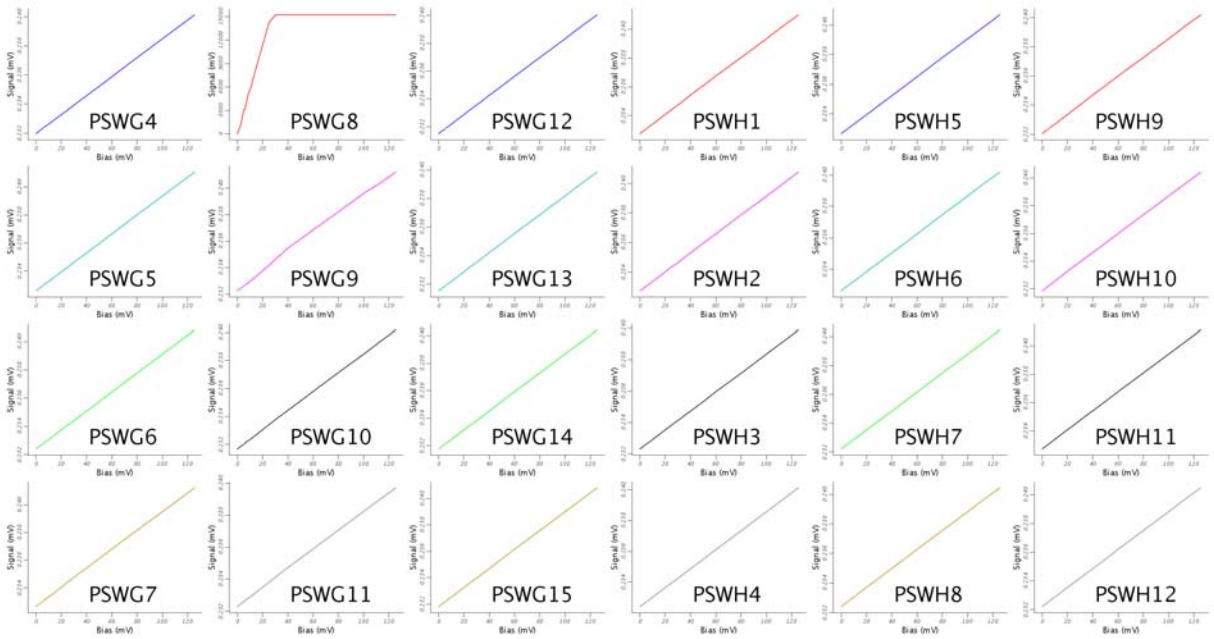


Figure 5. PSW Detectors (5)

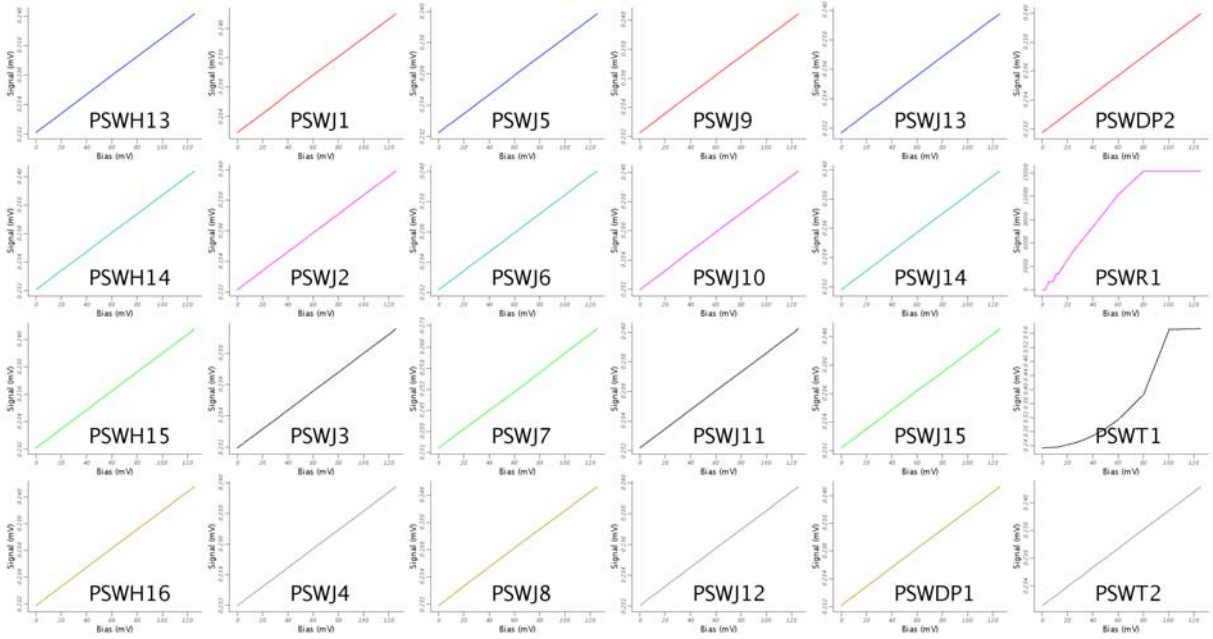


Figure 6. PSW Detectors (6)

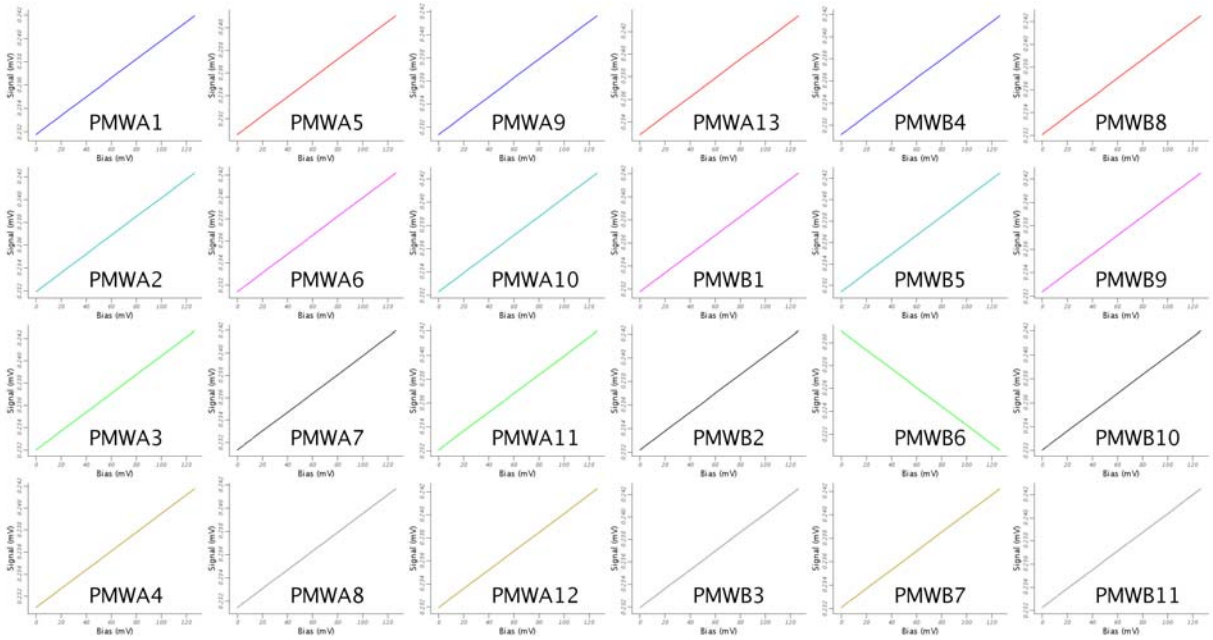


Figure 7. PMW Detectors (1)

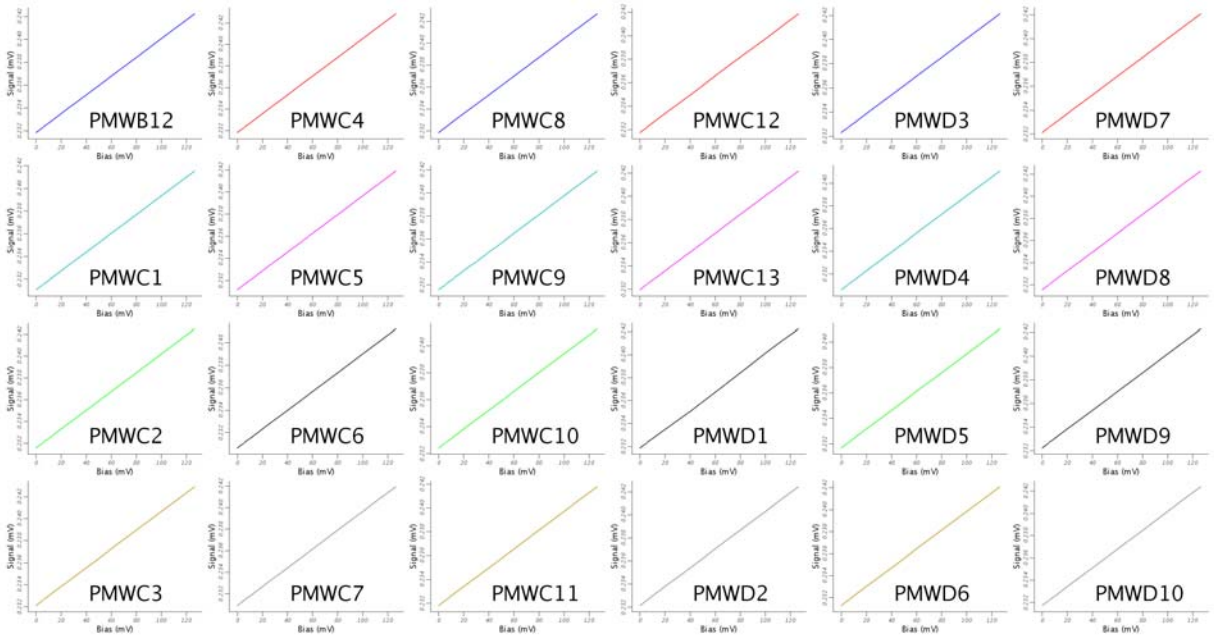


Figure 8. PMW Detectors (2)

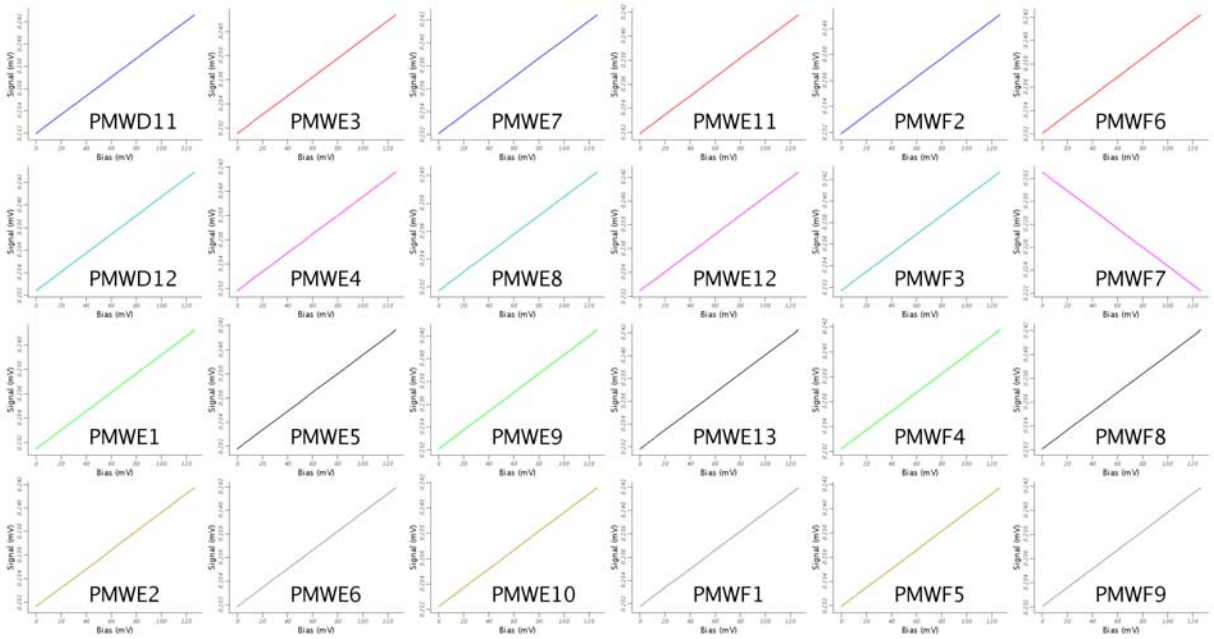


Figure 9. PMW Detectors (3)

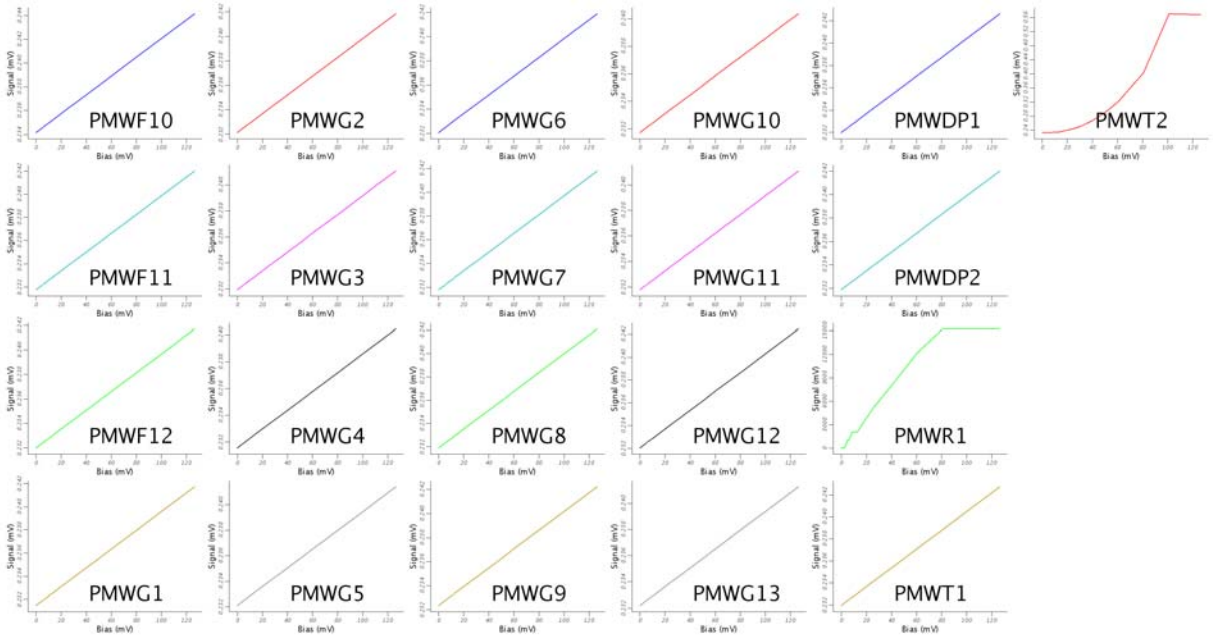


Figure 10. PMW Detectors (4)

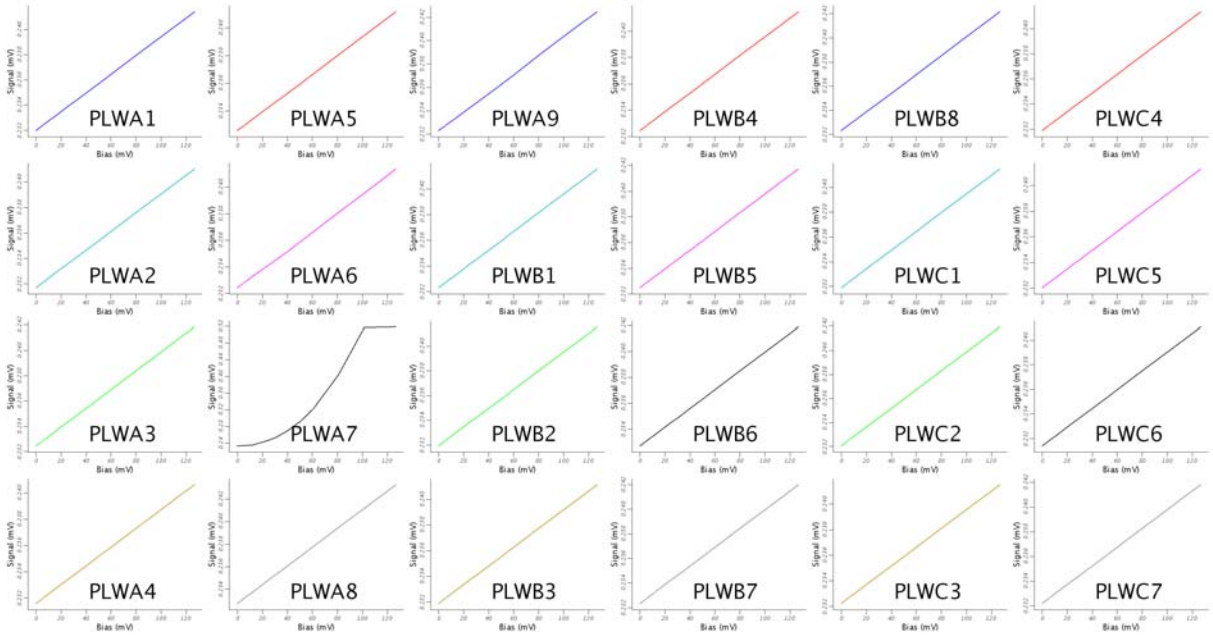


Figure 11. PLW Detectors (1)

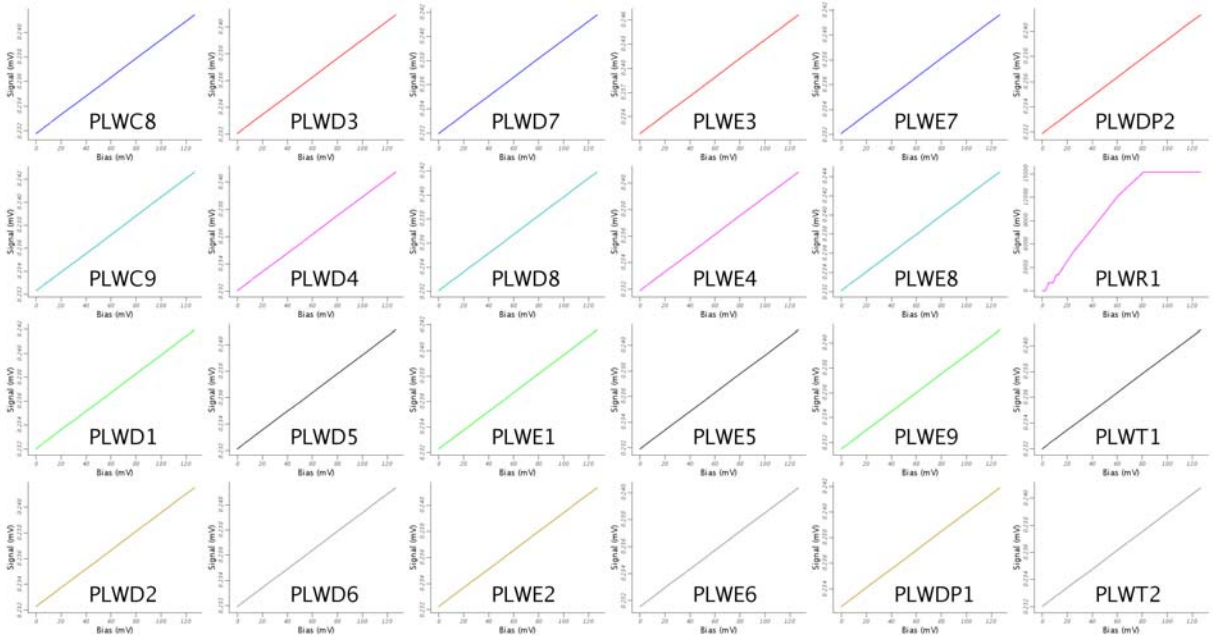
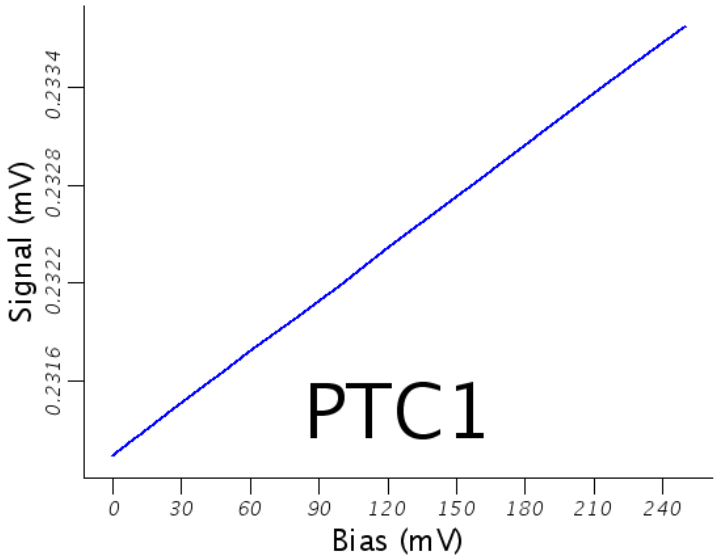
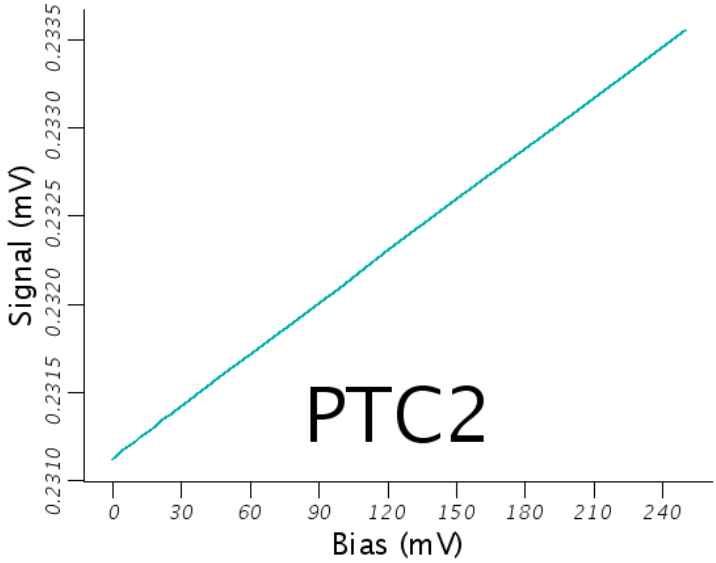


Figure 12. PLW Detectors (2)


PTC1
Signal (mV)
0.2316
0.2322
0.2328
0.2334
0
30
60
90
120
150
180
210
240
Bias (mV)


PTC2
Signal (mV)
0.2310
0.2315
0.2320
0.2325
0.2330
0.2335
0
30
60
90
120
150
180
210
240
Bias (mV)

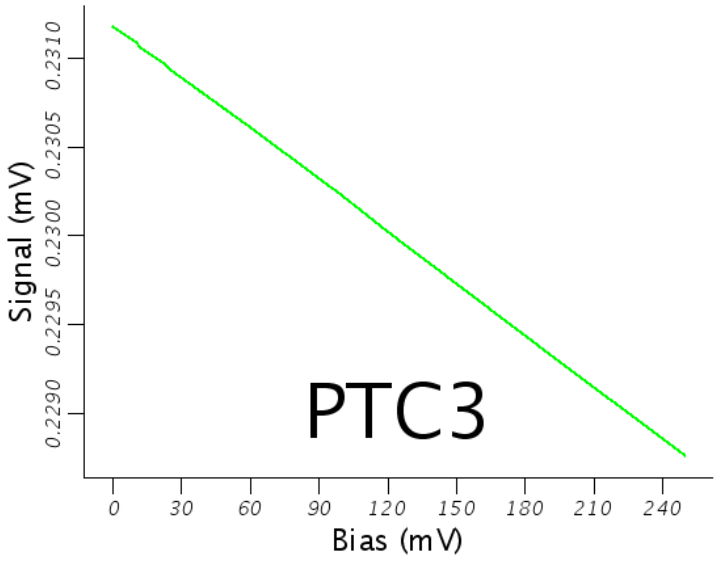

PTC3
Signal (mV)
0.2290
0.2295
0.2300
0.2305
0.2310
0
30
60
90
120
150
180
210
240
Bias (mV)

Figure 13. PTC Detectors (1)

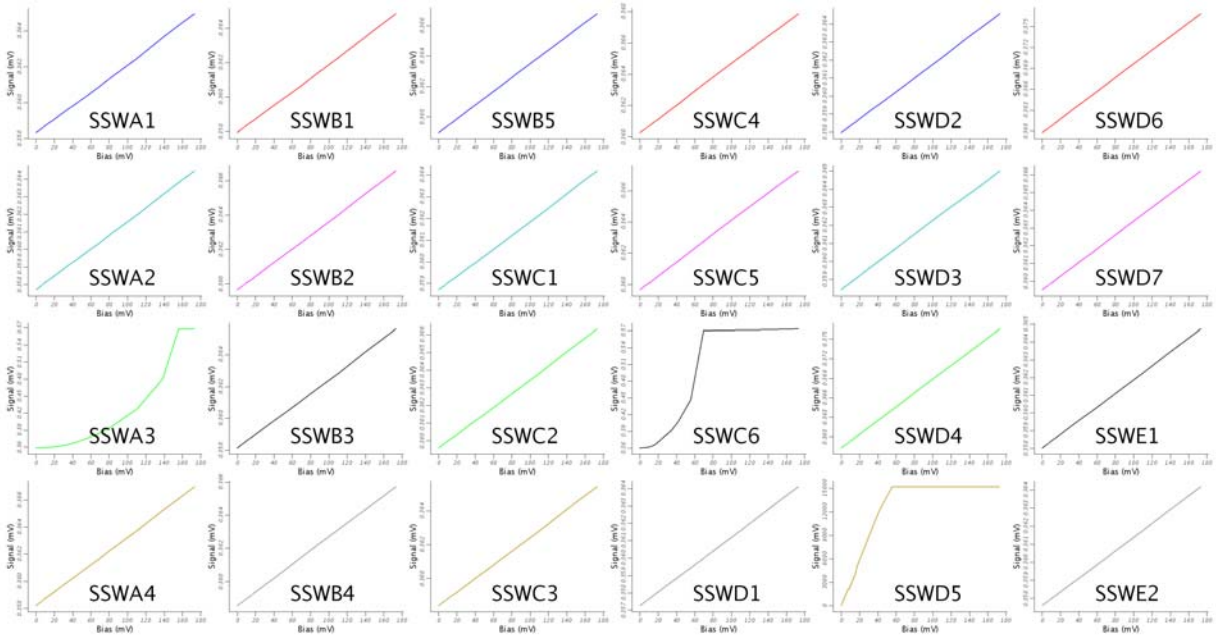


Figure 14. SSW Detectors (1)

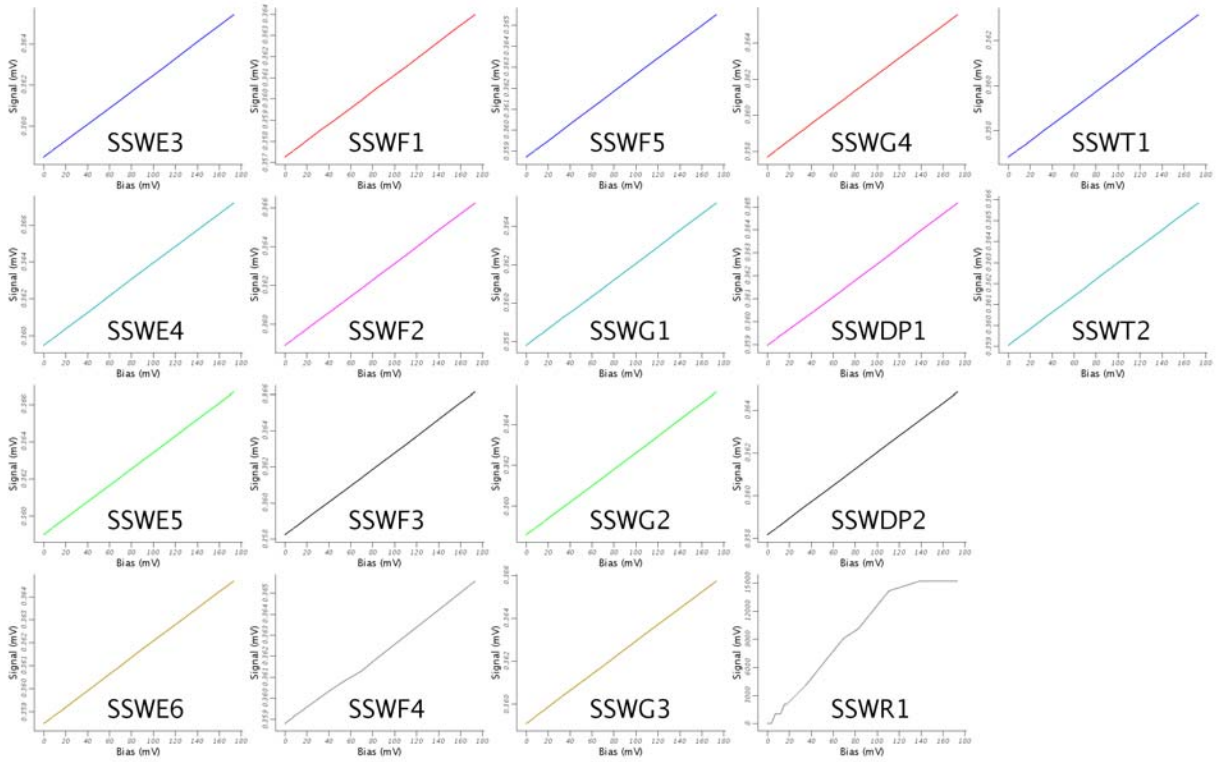


Figure 15. SSW Detectors (2)

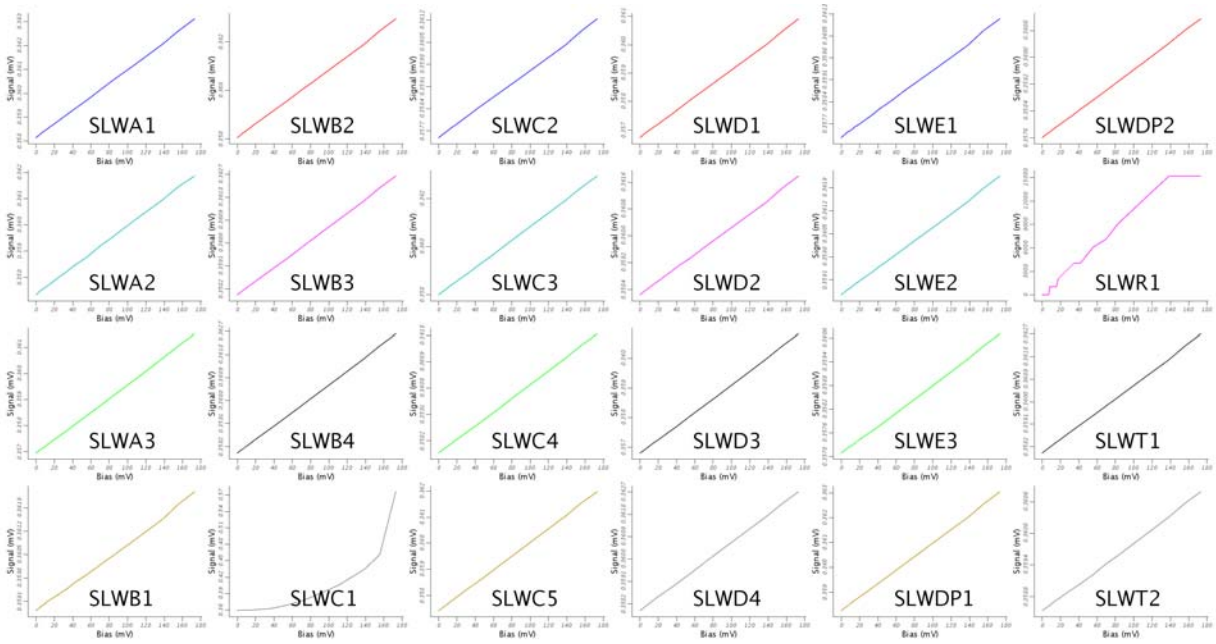


Figure 16. SLW Detectors (1)