1. INTRODUCTION

This document reports on the COLD functional test performed on the SPIRE REDUNDANT instrument during the PFM5 ILT test campaign.

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.
- A particular success criterion (specified in this document) is met.

1.2 REFERENCE DOCUMENTS

Ref	Document	Name	Version/Issue No.
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 2.0
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

1.3 CHANGE RECORD

Document	Change date	Changes
Issue 1.0	27/02/06	Created from Warm Functional Test Procedure
Issue1.1	22/03/06	Some updates following the warm functional report results

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2. FUNCTIONAL TEST CONFIGURATION

2.1 Software Configuration

Write down in the table the current EGSE software configuration for the tests:

EGSE component	Version/Build number	Comment
SCOS2000	**2.3eP5**	
HCSS	**V0.4.1 Build (#1106)**	
QLA	**V3.3**	Release for PFM5 tests
QLA scripts		
Test Control scripts	**See Annexe1**	
CUS Scripts	**See Annexe2**	

2.2 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
Lichfield	EGSE router	Started	✓
Lichfield	EGSE Gateway	Started	✓
Lichfield	Telemetry Ingestion	Started	✓
Lichfield	Packet Display	Started	✓
Lincoln	SCOS2000	Started	✓
Lincoln	EXIF + TOPE	Started	✓
Lincoln	Manual Stack	Started	✓
Gordon	CDMS Simulator	Started	✓
Lincoln	Test Control Server	Started	✓

Note: Despite restarting the CDMS simulator there is still ~ 30 seconds disagreement between the THSK value that SCOS shows and the time reported by QLA (QLA is 31 seconds behind) on its packet receiver window (this time actually agrees with the time that PacketDisplay shows on the time column) ?? two java applications showing 31 seconds delay (= current difference between UTC and TAI). CDMS simulator bus controller and QLA were both restarted, but this did not correct the time lag.

2.3 SPIRE Instrument Configuration

The functional test flow is such that at a given time during the procedure is possible that the instrument configuration does not conform to any nominal configuration as specified in Annexe 1. Nevertheless the configuration prior and after a test is specified for each functional test, and were applicable and the instrument configuration is in accordance to Anexe1, this will be denoted by showing the main configuration in blue bold font and any additional information in black.
The **initial** instrument configuration for these tests should be SPIRE **DRCU_ON** + DC and AC Thermometry ON.
Perform the following actions to ensure that the instrument is in the correct 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 only TM2N is incrementing it means that the critical HK report request has been stopped, go to step5. - If they are not, go to step 2.		✓
2	Check if the DPU is powered ON: - If ON, the DPU power supply LCD will show ~ 28V and 0.40A, go to step 4. - If not ON, refer to RD2, then go to step 3.		
3	In SCOS open **Boot_ROM_Memory_Check display** and check no errors are reported: - If no errors are reported, execute DPU_ON from HCSS Test Procedures. Then repeat step 1. - If the (5,2) contains errors: Check the error code in RD07. Then switch OFF the DPU and repeat step 2		
4	Execute **define_new_HK_report.tcl** HCSS Test procedure. Repeat step 1.		
5	In SCOS open **SCU_PARAMETERS display** - Check SCUP5V/P9V/M9V In SCOS open **BIAS_PARAMETERS display** - Check BIASTEMP, BIASP9V,BIASM9V,BIASP5V **Go to step 6.**	**SCU VOLTAGES LOOK NOMINAL:** **SCUP5 = 5.23V** **SCUP9 = 9.09V** **SCUM9 = -9.10V** **BIAS VOLTAGES LOOK NOMINAL:** **BIASTEMP = 295.9K** **BIASP5V = 5.11V** **BIASP9V = 9.00V** **BIASM9V = -9.06V**	✓
6	In SCOS open **DPU_AND_OBS_PARAMETERS display** - Check MODE HK parameter, it should be DRCU_ON (RAW=0x100)		✓

Table 1. Initial configuration check

3. TEST PROCEDURE

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

3.1 GENERAL PASS/FAIL CRITERIA

The general criteria 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.

Note: If the functional test is declared FAILED refer to section 4.1 for instrument switch OFF.

3.2 GENERAL TEST PROCEDURE LAYOUT

The table below shows the general CFT sequence as it should be performed. In each step of this procedure the operator should refer to the detailed procedure in Section 3.2 .Test Control TCL scripts are available to invoke the correspondent CUS script stored in the HCSS database for each functional test. These CUS scripts will generate the appropriate command sequence for the particular functional test.

Step	Subsystem tested	Test Id	Test Purpose
1	SCU	FUNC-SCU-01	SCU Nominal Science Generation Check
2		FUNC-SCU-03	FPU DC Thermometry Check
3		FUNC-SCU-06	FPU AC Thermometry Check
4		FUNC-SCU-07	Sorption Cooler Check
5		FUNC-PCAL-01	Photometer Calibrator Characterisation
6		FUNC-SCAL-01	Spectrometer Calibrators Characterisation
7	MCU	FUNC-MCU-01	MCU Boot Check
8		FUNC-MCU-02	MCU Nominal Science Generation Check
9	BSMm	FUNC-BSM-01	BSM Switch ON Check
10		FUNC-BSM-03	BSM Open Loop dynamics Check
11		FUNC-BSM-05A	BSM Open Loop chop test
12		BSM-INIT	BSM Initialisation Procedure
13		FUNC-BSM-05B	BSM Close Loop chop test
14		FUNC-BSM-06	BSM Operational Mode Check
15	SMECm	FUNC-SMEC-01	SMECm Switch ON Check
16		FUNC-SMEC-04A	SMEC Open Loop Position Test
17		FUNC-SMEC-09	SMEC Open Loop Scan Test
18		SMEC-INIT*	SMEC Initialisation Procedure
19		FUNC-SMEC-03	SMEC LED Output Characterisation
20		FUNC-SMEC-04B	SMEC Close Loop Position Test

21		**FUNC-SMEC-07**	SMEC Close Loop Scan Test
22		**FUNC-SMEC-06**	SMEC Close Loop Saw Tooth Scan Test
23	**DCU**	**FUNC-DCU-01**	DCU Nominal Science Generation Check
24	**Photometer LIAs**	**FUNC-DCU-04P**	Photometer LIAs Check
25		**FUNC-DCU-05P**	Photometer Manual Offset Setting Check
26		**FUNC-DCU-11P**	Photometer Detectors Switch ON Check
27	**Photometer BDAs**	**FUNC-DCU-013P**	Photometer Detectors Check
28	**Spectrometer LIAs**	**FUNC-DCU-04S**	Spectrometer LIAs Check
29		**FUNC-DCU-05S**	Spectrometer Manual Offset Setting Check
30		**FUNC-DCU-11S**	Spectrometer Detectors Switch ON Check
31	**Spectrometer BDAs**	**FUNC-DCU-013S**	Spectrometer Detectors Check

Table 2. General CFT sequence

***Note 1:** This procedure is not a functional test, is a close loop initialisation procedure required to test the close loop operability of the BSM.

***Note 2:** This procedure is not a functional test, is a close loop initialisation procedure required to test the close loop operability of the SMEC.

3.3 DETAILED TEST PROCEDURE

The following is a detailed (test by test) procedure including the steps required to perform each functional test individually.

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

3.3.1 FUNC-SCU-01

Test Id:	**FUNC-SCU-01**
Test Purpose:	SCU Nominal Science Generation 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 Nominal Science telemetry packets are received on QLA with the following characteristics: **APID** | **Type** | **Subtype** | **SID** | **FrameID** | **Frame length** 0x509 | 21 | 1 | 0xA20 | 0x20 | 0x1E 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.

Test Procedure:

Step#	Action
1	**Write down the initial value of SCUFRAMECNT parameter located in SCU_PARAMETERS display.**
2	**Run QLA script FUNC-SCU-01.py on QLA console.**
3	**Run FUNC-SCU-01 test procedure from the HCSS Test Procedure window on TOPE**
4	**Write down the final 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	No. of frames received	Test Result
FUNC-SCU-01	**SCUFRAMECNT**	**n/ n+ 31**	0/31	31	**Pass**

Start time @: 12:31
End time @: 12:31
OBSID: 0x30012092

Comments:

QLA SCRIPT TO BE RUN.

3.3.2 FUNC-SCU-03

Test Id:	FUNC-SCU-03
Test Purpose:	FPU DC Thermometry Check
Initial Configuration:	DRCU_ON + AC/DC thermometry ON
Final Configuration:	DRCU_ON + AC/DC thermometry ON
Success Criteria:	Test passed if thermometry channels 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**

Test Procedure:

Step#	Action
1	**Write down the current value of SCUTEMPSTAT and the values of the 16 FPU temperatures located in SCU_PARAMETERS display.**
2	**Contingency:** **If test fails:** **1. Execute SCU_OFF procedure.** **2. Execute FUNC-SCU-03 procedure.** **3. Repeat step 1 of the Test Procedure.**

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-SCU-03	**SCUTEMPSTAT**	**0xFFFF/0xFFFF**	**0/0xFFFF**	**N/A**	**Pass**

Start time @: 12:32
End time @: 12:33
OBSID: 0x30012093

Comments: SCUTEMPTAT Value before was 0 because of switch from Prime to Redundant

ALL FPU temperatures except SCALTEMP at ~ 4K. SCALTEMP at ~15K.

3.3.3 FUNC-SCU-06

Test Id:	FUNC-SCU-06
Test Purpose:	FPU AC Thermometry Check
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	At ~ 4K the SUBKTEMP reading should calibration should start being in range. **Open Circuit Criterion:** **RAW reading in the range 0 -100** **Short Circuit Criterion:** **RAW reading of -32768**

Test Procedure:

Step#	Action
1	**Write down the current value of SUBKSTAT located in SCU_PARAMETERS display. And write down the RAW reading of the sensor.**
2	Contingency: If test fails : 1. Send manual command: SEND_DRCU_COMMAND Parameter1 = 0xA0860000 Parameter2 = 0 2. Then repeat steps 1 and 2 of the Test Procedure. **Note:** **If the test fails and the SUBKTEMP channel is switched OFF manually, the expected value before/after execution of FUNC-SCU-06 for SUBKSTAT is 0/1**

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-SCU-06	**SUBKSTAT SUBKTEMP**	**1/1**	0/1	**N/A**	**Pass**

Start time @: 12:37
End time @: 12:38
OBSID: 0x30012094

Comments: SUBKSTAT value before was 0 because of switch from Prime to Redundant

SUBKTEMP before was 32767/55.15K

SUBKTEMP	RAW	CONVERTED
	32645	4.17K

3.3.4 FUNC-SCU-07

Test Id:	FUNC-SCU-07
Test Purpose:	Sorption Cooler 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
1	**Run FUNC-SCU-07 test procedure from the HCSS Test Procedure window on TOPE.**
2	**While the test is running Write down 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	No. of frames received	Test Result
FUNC-SCU-07	**SPHSV** **EVHSV** **SPHTRV**	**0/ ~ 323 mV** **0/ ~ 323 mV** **0/ ~ 8 V**	~0.03/ 324.06 mV ~-0.0/ 324.88mV ~0.0/ 8.85V	**N/A**	**Pass**

Start time @: 12:41
End time @: 12:45
OBSID: 0x30012095
Comments:

FPU temp	Initial value	Increase
PumpHtrTemp	**4.05K**	**Up to ~9.0K**
PumpHsTemp	**4.17K**	**Up to 5.67K**
EvapHsTemp	**4.15K**	**Up to 5.66 K**

3.3.5 FUNC-PCAL-01

Test Id:	FUNC-PCAL-01
Test Purpose:	Photometer Calibrator Characterisation
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	Test passed if : • PCALCURR HK parameter shows the commanded current. • PCALV parameter shows a linear increase proportional to the bias applied. (the proportionality constant in this case should be the PCAL resistor value)

Test Procedure

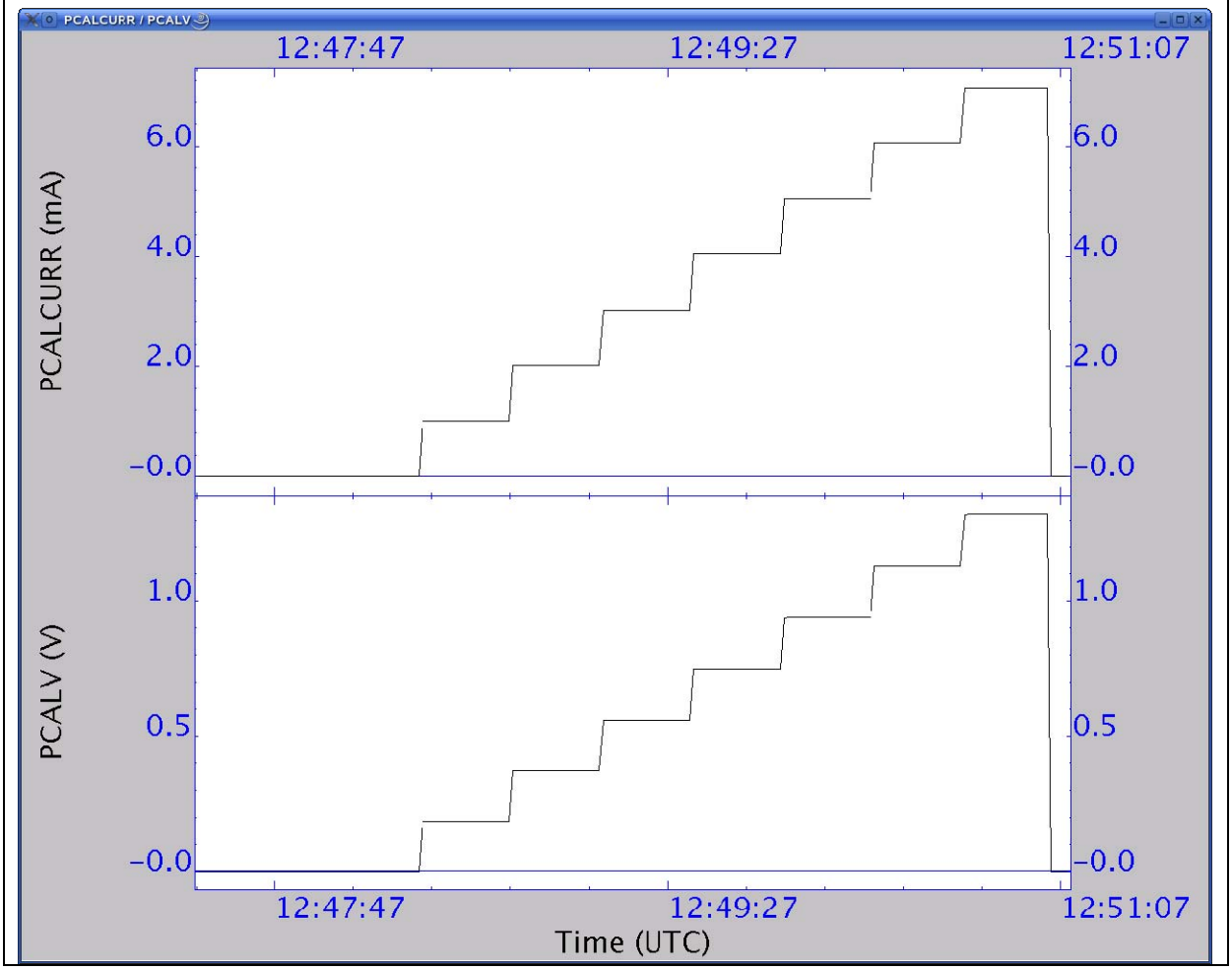
Step#	Action
1	**Run QLA script FUNC-PCAL-01.py on QLA console.**
2	**Run FUNC-PCAL-01 test procedure from the HCSS Test Procedure window on TOPE**
3	Contingency: If test fails repeat steps 1 and 2.

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/During test	Actual Value Before/After	No. of frames received	Test Result
FUNC-PCAL-01	**PCALCURR PCALV**	**0/1,2.5,4.0,5.5,7mA**	**0/1,2.5,4.0,5.5,7 mA**	**N/A**	**Pass**

Start time @: 12:48
End time @: 12:52
OBSID: 0x30012096

Comments:



3.3.6 FUNC-SCAL-01

Test Id:	FUNC-PCAL-01
Test Purpose:	Spectrometer Calibrator Characterisation
Initial Configuration:	**DRCU_ON** + AC/DC thermometry ON
Final Configuration:	**DRCU_ON** + AC/DC thermometry ON
Success Criteria:	Test passed if : • SCAL4CURR HK parameter shows the commanded current sequence (1,2,3,4,5,5.5mA) • SCAL2CURR HK parameter shows the commanded current sequence(1,2,3,4,5,5.5mA) • SCA2LV parameter shows a linear increase proportional to the bias applied. (the proportionality constant in this case should be the SCAL2V resistor value) • SCAL4V parameter shows a linear increase proportional to the bias applied. (the proportionality constant in this case should be the SCAL4V resistor value) • SCAL2TEMP and SCAL4TEMP values follow the increased bias settings

Test Procedure

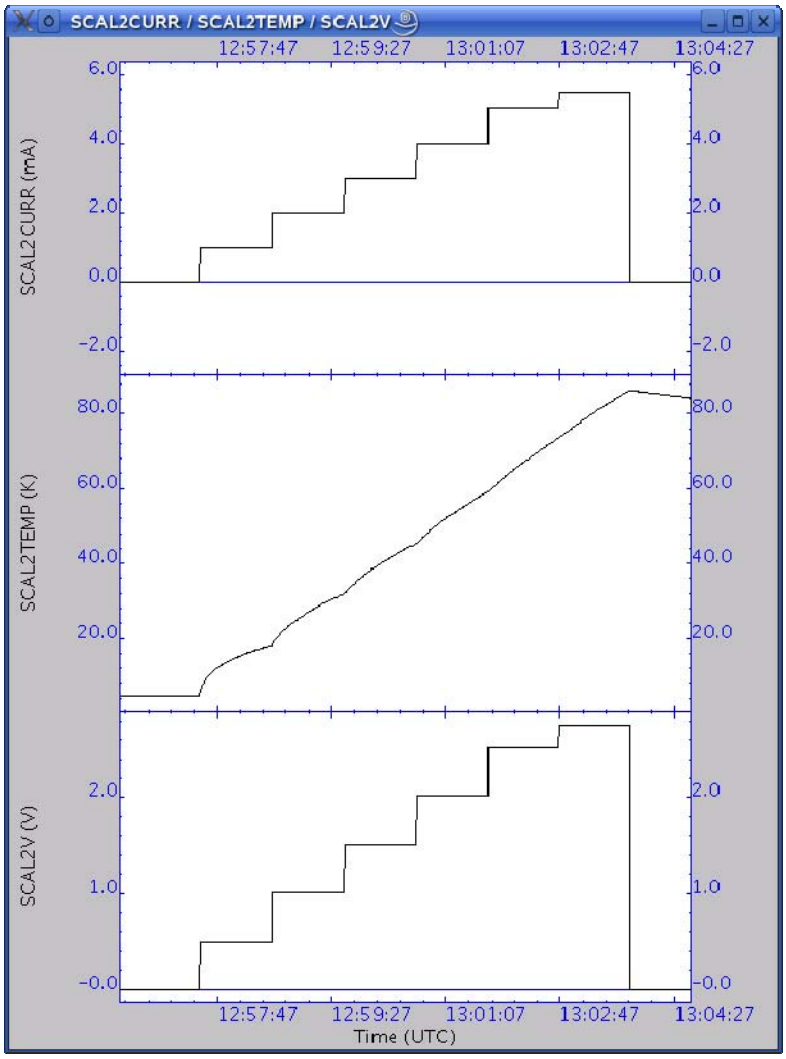
Step#	Action
1	**Run QLA script FUNC-SCAL-01.py on QLA console.**
2	**Run FUNC-SCAL-01 test procedure from the HCSS Test Procedure window on TOPE**
3	Contingency: If test fails repeat steps 1 and 2.

Test Log:

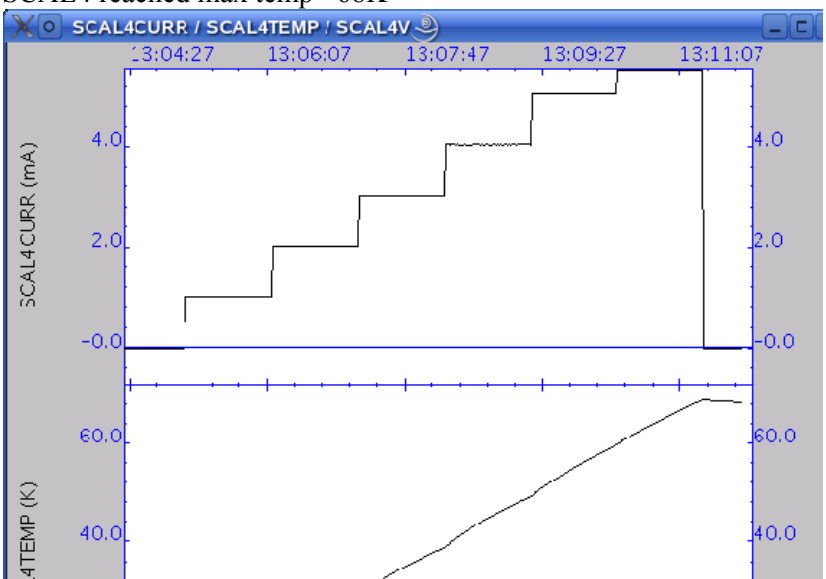
Test Id	Key Parameter(s)	Expected Value Before/During test	Actual Value Before/After	No. of frames received	Test Result
FUNC-SCAL-01	**SCAL2CURR** **SCAL4CURR** **SCAL2V** **SCAL4V** **SCAL2TEMP** **SCAL4TEMP**		See QLA plots below	**N/A**	**Pass**

Start time @: 12:57
End time @: 13:13
OBSID: 0x30012098
Comments:

SCAL2 reached max temp ~82K



SCAL4 reached max temp ~68K



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

3.3.7 FUNC-MCU-01

Test Id:	FUNC-MCU-01
Test Purpose:	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 Board Temperature Reading shows ambient temperature.

Test Procedure:

Step#	Action
1	**Run** FUNC-MCU-01 **test procedure from the HCSS Test Procedure window on TOPE**
2	**When procedure is finished Write down 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	No. of frames received	Test Result
FUNC-MCU-01	**MCUP5V** **MCUP15V** **MCUP14V** **MCUM14V** **MCUM15V** **MCUMACTEMP** **MCUBSMSTEMP** **MCUSMECTEMP**	**N/A/ ~ 5V** **N/A / ~15V** **N/A / ~ 14V** **N/A / ~ -14V** **N/A / ~ -15V** **N/A / ~ 300K** **N/A / ~ 300K** **N/A / ~ 300K**	5.0 V 15.5 V 14.13V -14.49 V -15.61 V 290.5 K 294.7 K 294 .5K	**N/A**	**Pass**

Start time @: 13:15
End time @: 13:17
OBSID: 0x30012099

Comments:

QLA SCRIPT TO BE RUN LATER.

3.3.8 FUNC-MCU-02

Test Id:	FUNC-MCU-02
Test Purpose:	MCU Nominal Science 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.	**0x509**	**21**	**3**	**0x814**	**0x14**	**0x15**
BSM	**0x509**	**21**	**1**	**0x612**	**0x12**	**0xD**
SMEC	**0x509**	**21**	**1**	**0x410**	**0x10**	**0xC**
BSM +SMEC						

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

Test Procedure:

Step#	Action
1	**Write down 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 HCSS Test Procedure window on TOPE**
4	**When test is finished Write down 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	No. of frames received	Test Result
FUNC-MCU-02	**MCUFRAMECNT**	**0/ ~ 6600**	0 / 6563	6563	**Pass**

Start time @: 13:17
End time @: 13:20
OBSID: 0x3001209A

Comments: QLA SCRIPT TO BE RUN

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

3.3.9 FUNC-BSM-01

Test Id:	FUNC-BSM-01
Test Purpose:	BSM Switch ON 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. CHOPSENSIG HK parameter changes 3. JIGGSENSPWR HK parameter goes from 0 to 1 4. JIGGSENSSIG HK parameter changes

Test Procedure

Step#	Action
1	**Run FUNC-BSM-01 test procedure from the HCSS Test Procedure window on TOPE**
2	**When the test is finished record all the Key parameters noted bellow**
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	No. of frames received	Test Result
FUNC-BSM-01	**CHOPSENSPWR** **CHOPLOOPMODE** **CHOPSENSSIG** **JIGGSENSPWR** **JIGGLOOPMODE** **JIGGSENSSIG**	**0/1** **3/3** **?/0x8E5A** **0/1** **3/3** **?/ 0x9164**	0 / 1 3 / 3 0x7FF4 / 0x9FCC 0 / 1 3 / 3 0x7FFC / 0x8D72	**N/A**	**Pass**

Start time @: 13:25
End time @: 13:26
OBSID: 0x3001209B

Comments:

3.3.10 FUNC-BSM-03

Test Id:	FUNC-BSM-03
Test Purpose:	BSM Open Loop dynamics 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 choppos2 > choppos1 ➔ chopsenssig2 > chopsenssig1) for each jiggle position.

Test Procedure

Step#	Action
1	**On QLA open up 2 time series display with the following HK parameters in each display:** **Display 1:** *HK* : CHOPPOSN *BSM Nominal Science*: BSMCHOPMOTORCURR BSMCHOPSENSSIG BSMCHOPMOTORVOLT **Display2:** *HK* : JIGGPOSN *BSM Nominal Science*: BSMJIGGMOTORCURR BSMJIGGSENSSIG BSMJIGGMOTORVOLT
2	**Run FUNC-BSM-03 test procedure from the HCSS Test Procedure window on TOPE**
3	Contingency: If test fails repeat step 2.

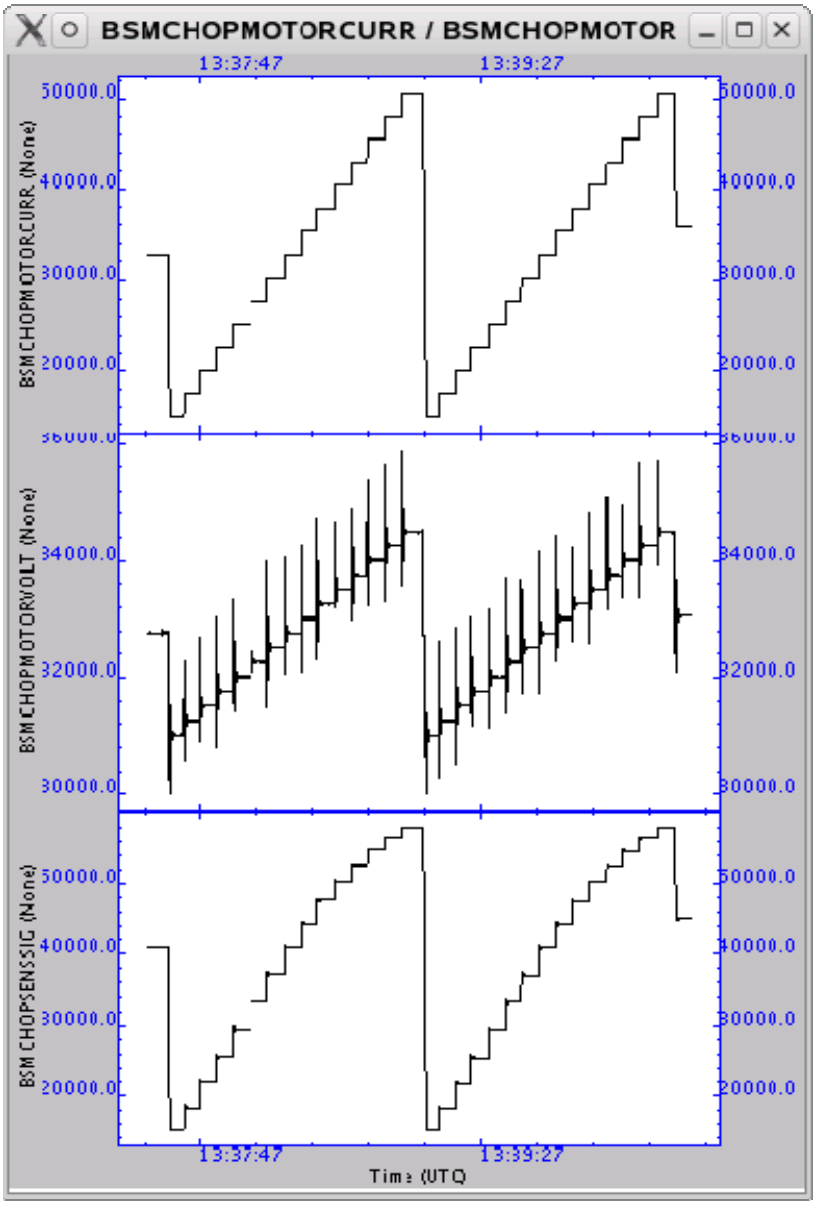
Test Log:

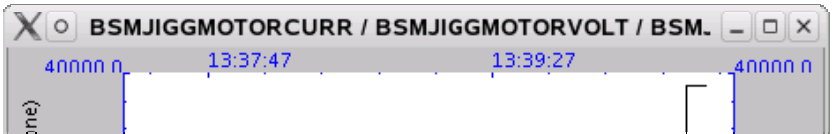
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-BSM-03				**N/A**	**Pass**

Start time @: 13:37
End time @: 13:42
OBSID: 0x3001209C

Comments:

Jiggle start = 0x7000
Jiggle end = 0x9000,
Jiggle step = 0x2000
Chop start = 0x1000
Chop end = 0xf000
Chop step = 0x1000.





3.3.11 FUNC-BSM-05A

Test Id:	FUNC-BSM-05A
Test Purpose:	BSM Open Loop chop test (Degraded 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 effectiveness of the dumping of the natural oscillations of the BSM in chop axis via motor bemf, through the use of the commendable motor resistance value.** **As it is now is just a check of the default motor resistance value.** **NO adjusting of this value should be attempted during this test.** **The success criteria are therefore not applicable.**

Test Procedure

Step#	Action
1	**On QLA open up a time series display of HK parameters:** BSMCHOPSENSSIG BSMCHOPMOTORCURR BSMCHOPMOTORVOLT
2	**Run FUNC-BSM-05A test procedure from the HCSS Test Procedure window on TOPE**
3	Contingency: None contemplated.

Test Log:

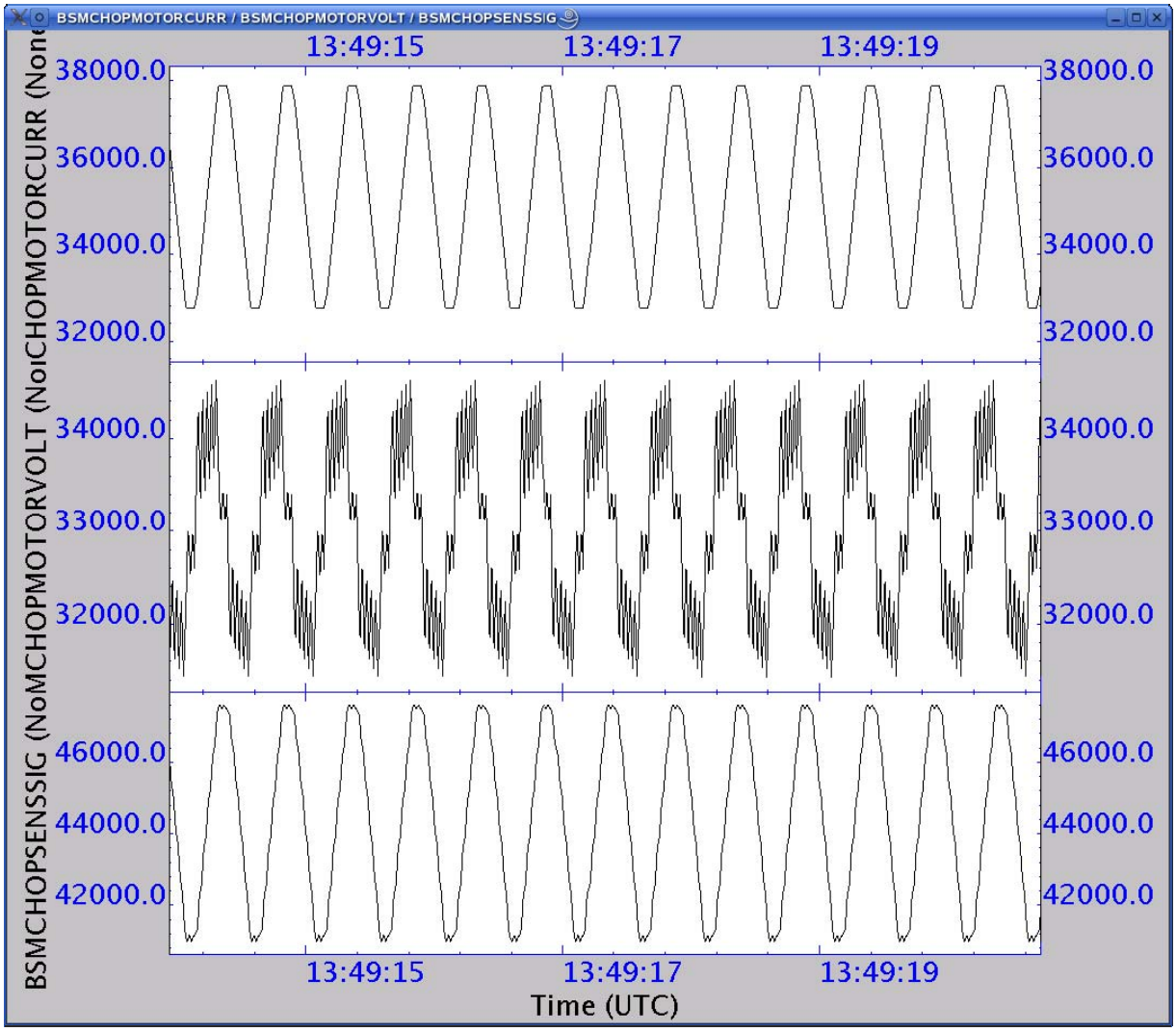
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-BSM-05A	**BSMCHOPSENSSIG** **BSMCHOPMOTORCURR** **BSMCHOPMOTORVOLT**	**?/?** **?/?** **?/?**		**N/A**	**Pass**

Start time @: 13:48
End time @: 13:51
OBSID: 0x3001209D

Comments:

TOPE script parameters

On source chop pos 0xA000;
On source jiggle pos 0x8000;
Off source chop pos 0x8000;
Off source jiggle pos 0x8000;
Chop cycles 50;
Chop cycle period 0.5 s;
Data type 0;
DCU samples 4;
DCU delay 34959;
BSM samples 31.



3.3.12 FUNC-BSM-05B

Step#	Action	Comments
0	Execute BSM_INIT from HCSS Test Procedures	OBSID: 0x3001209E CHOPPOSN: 0x9300 CHOPMOTORCURR: 0x7710 (should be 0x8000) JIGGPOSN: 0x9A60 JIGGMOTORCURR: 0x9AD0 (should be 0x8000)

Test Id:	**FUNC-BSM-05B**
Test Purpose:	BSM Close 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:** **Currently this test does not differ at ALL from the next one.** **In any case the success/fail criteria are NOT applicable for this test.**

Test Procedure

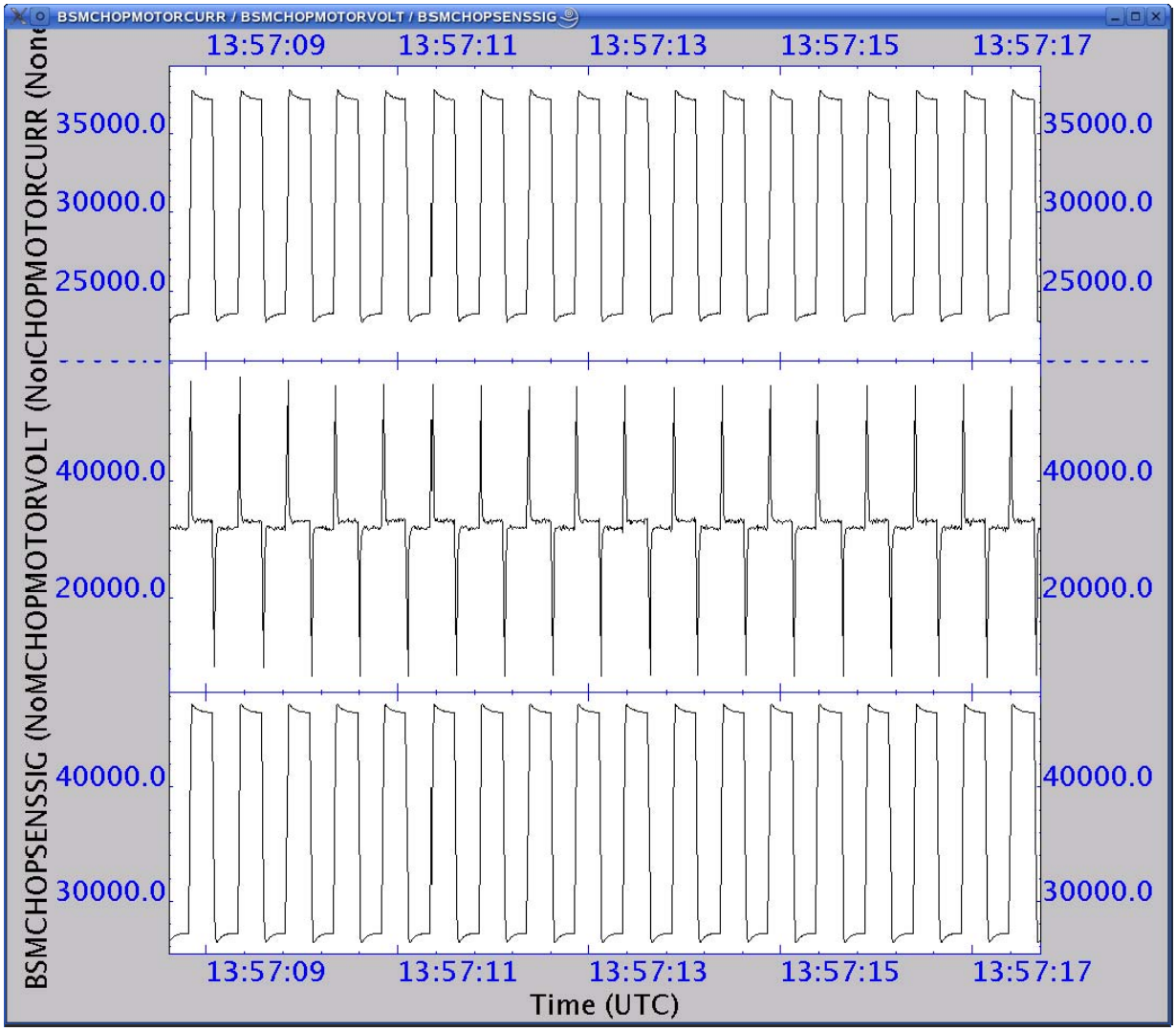
Step#	Action
1	**On QLA open up a time series display of HK parameters:** BSMCHOPSENSSIG BSMCHOPMOTORCURR BSMCHOPMOTORVOLT
2	**Run FUNC-BSM-05B test procedure from the HCSS Test Procedure window on TOPE**
3	Contingency: None contemplated.

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-BSM-06	**BSMCHOPSENSSIG** **BSMCHOPMOTORCURR** **BSMCHOPMOTORVOLT**	**?/?** **?/?** **?/?**		**N/A**	**N/A**

Start time: 13:57
End time: 13:59
OBSID: 3001209F

On source chop pos 0xb600;
On source jiggle pos 0x9a60;
Off source chop pos 0x6a28;
Off source jiggle pos 0x9a60;
Chop cycles 50;
Chop cycle period 0.5 s;
Data type 0;
DCU samples 4;
DCU delay 34959;
BSM samples 31.


BSMCHOPMOTORCURR / BSMCHOPMOTORVOLT / BSMCHOPSENSSIG
13:57:09
13:57:11
13:57:13
13:57:15
13:57:17
35000.0
30000.0
25000.0
40000.0
20000.0
40000.0
30000.0
BSMCHOPSENSSIG (NoMCHOPMOTORVOLT (NoiCHOPMOTORCURR (Non
Time (UTC)

3.3.13 FUNC-BSM-06

Test Id:	FUNC-BSM-06
Test Purpose:	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 effectiveness 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
1	**On QLA open up a time series display of HK parameters:** BSMCHOPSENSSIG BSMCHOPMOTORCURR BSMCHOPMOTORVOLT
2	**Run FUNC-BSM-06 test procedure from the HCSS Test Procedure window on TOPE**
3	Contingency: None contemplated.

Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-BSM-06	**BSMCHOPSENSSIG** **BSMCHOPMOTORCURR** **BSMCHOPMOTORVOLT**	**?/?** **?/?** **?/?**		**N/A**	**N/A**

Start time @: 14:05
End time @: 14:07
OBSID: 300120A0

Comments: NEED TO CHECK DIFF BETWEEN 5B AND 06.

On source chop pos 0xb600;
On source jiggle pos 0x9a60;
Off source chop pos 0x6a28;
Off source jiggle pos 0x9a60;
Chop cycles 50;
Chop cycle period 0.5 s;
Data type 0;
DCU samples 4;
DCU delay 34959;
BSM samples 31.

QLA PLOT LOOKS IDENTICAL TO 5B.

Step#	Action	Comments
4	Execute BSM_OFF from HCSS Test Procedures	Start time: 14:08 End time: 13:39 OBSID: 300120A1 **CHOPSENSPWR & JIGGSENPWR are in hard limit.** Because the mode is set to PHOTSTBY by the BSM_INIT procedure, switching off the BSM leaves CHOPSENSPWR and JIGGSENSPWR in hard limits. Manually set the MODE to REDY to clear the hard limits. SET_OBS_MODE (0x200)

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

3.3.14 FUNC-SMEC-01

Test Id:	**FUNC-SMEC-01**
Test Purpose:	SMEC Switch ON Check.. Encoder and LVDT alive 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 4. 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
1	On QLA bring up a display of the following HK parameters: SMECENCPWR SMECENCSIG1 SMECENCSIG2 SMECLVDTDCSIG SMECLVDTACSIG	
2	Run FUNC-SMEC-01 test procedure from the HCSS Test Procedure window on TOPE	
	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-01	**SMECENCPWR** **SMECLVDTPWR** **SMECENCSIG1** **SMECENCSIG2**			**N/A**	**Pass**

Start time @: 14:15
End time @: 14:16
OBSID: 0x300120A2
Comments: Used "cold" in Test Procedure Parameter box. Note that box says that "cold" should be used for T<4K and "warm" should be used for T>4K. Temperature of SMEC was 4-5 K. The Test Procedure Parameter box should be revised to clarify that 4-5 K is "cold".

3.3.15 FUNC-SMEC-03

Test Id:	FUNC-SMEC-03
Test Purpose:	SMEC LED Output Characterisation
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
1	**On QLA bring up a time series display of the following Nominal HK parameters:** **SMECENCSIGAMP1** **SMECENCSIGAMP2**
2	**Run FUNC-SMEC-03 test procedure from the HCSS Test Procedure window on TOPE**
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	No. of frames received	Test Result
FUNC-SMEC-03	**SMECENCPWR** **SMECENCSIG1AMP** **SMECENCSIG2AMP**				**Unclear**

Start time @: 14:25
End time @: 14:26
OBSID: 0x300120A3

Comments:

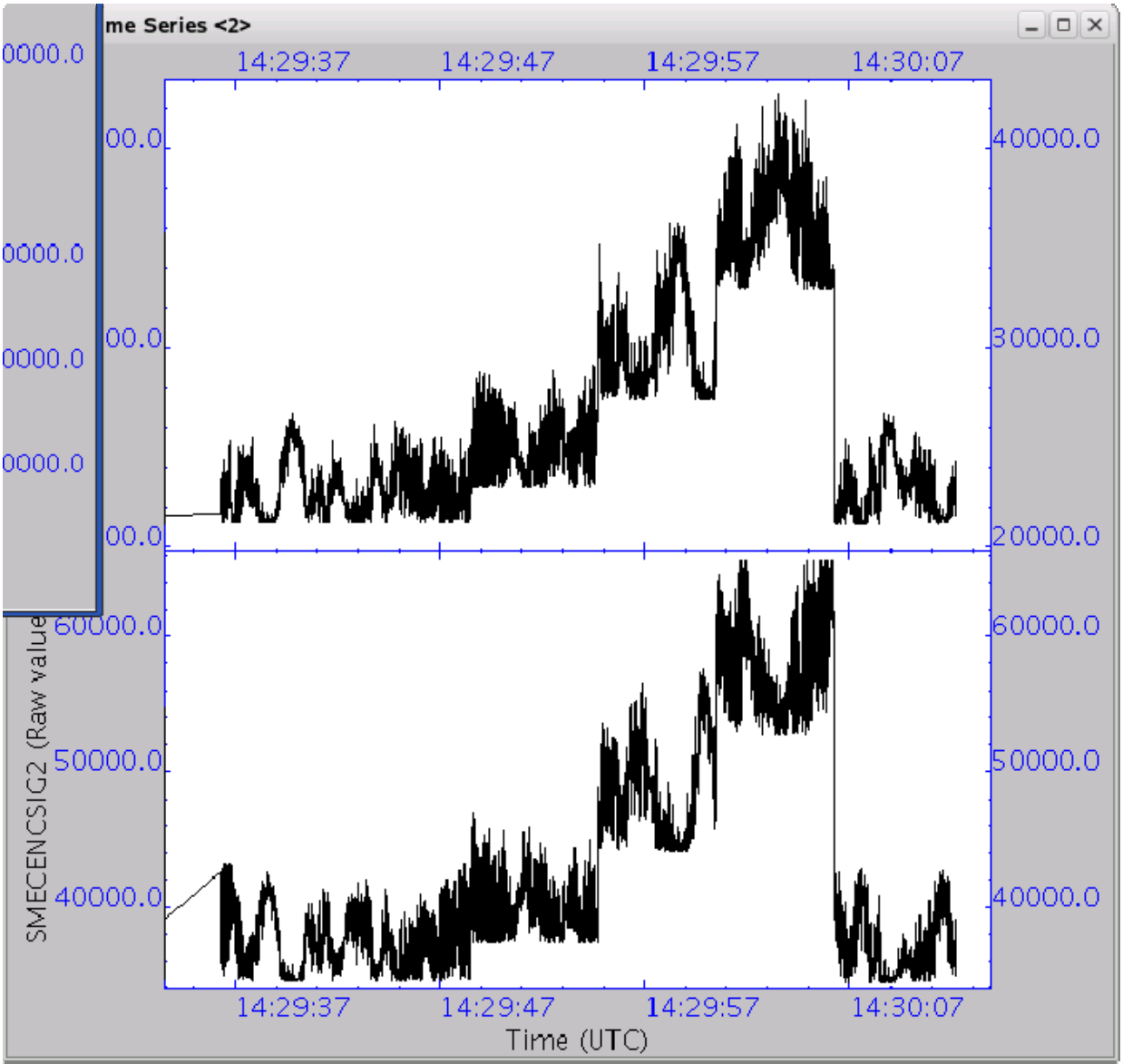
TOPE script input parameters:

Starting level = 1
Ending level = 3
Step = 1
Time at each = 5 sec

Encoder signals 1 & 2 did not saturate.

14:29-14:31 Ran the test again, but this time went up to LED level 4.
OBSID: 0x300120A4

Only just started to saturate at level 4.



Note:
The encoder signals 1/ 2 amplitudes are zero, showing that the encoder has not start counting. Will manually change the offsets to try to get it counting.
SEND_DRCU_COMMAND(0x90587530,0)
SEND_DRCU_COMMAND(0x905Ac350,0)

3.3.16 FUNC-SMEC-04A

Test Id:	FUNC-SMEC-04A
Test Purpose:	SMEC Open Loop Position Test. SMEC displacement 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 SMECLVDTDCSIG parameter shows a variation according to the different positions set.

Test Procedure:

Step#	Action
1	**On QLA bring up a time series display of the following MCU Engineering block parameters:** MCUENGSMECENCSIG1 MCUENGSMECENCSIG2 MCUENGSMECLVDTDCSIG MCUENGSMECLVDTACSIG MCUENGSMECMOTORCURR
2	**Run FUNC-SMEC-04a test procedure from the HCSS Test Procedure window on TOPE**
3	Contingency: If test fails repeat steps 1.

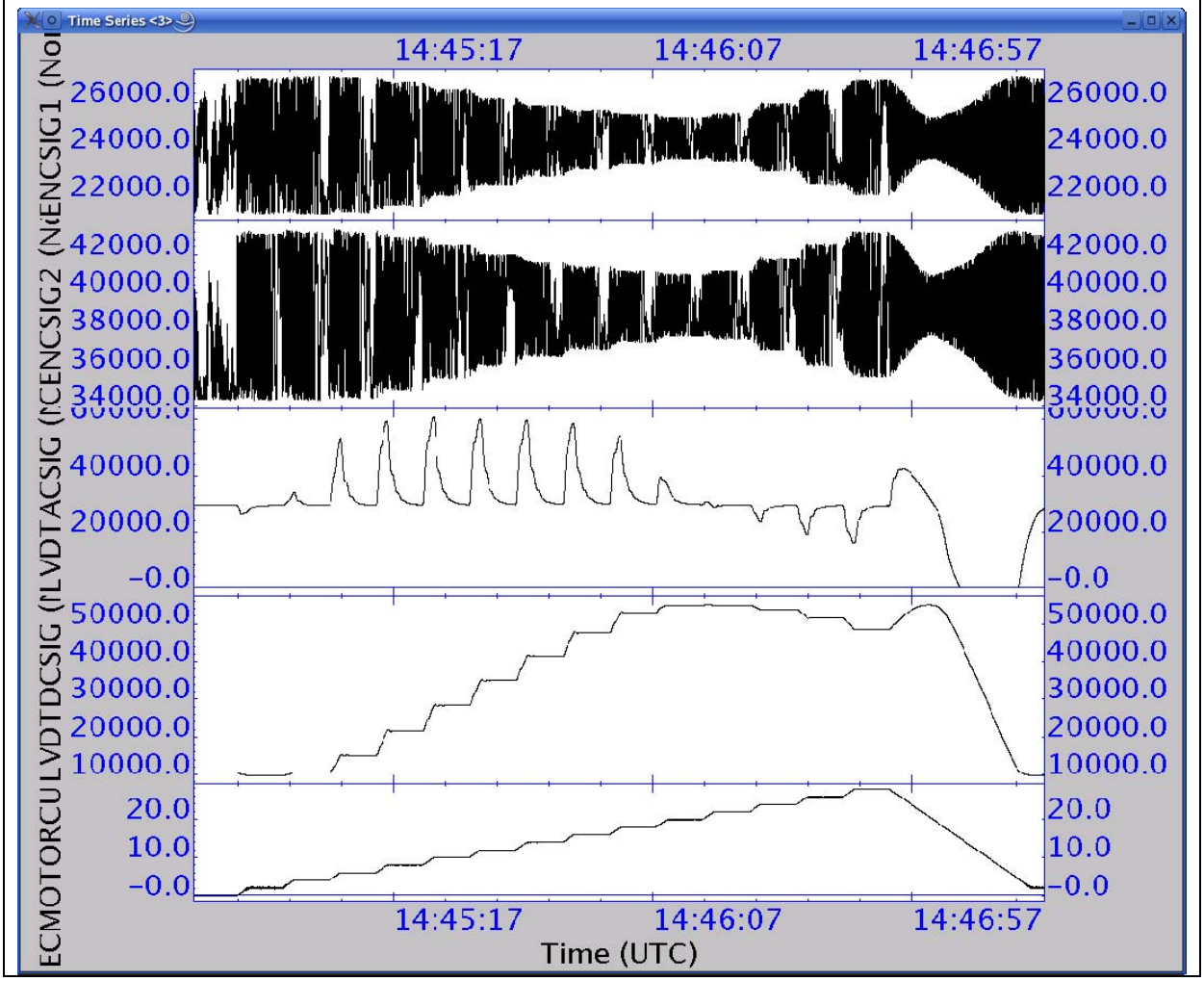
Test Log:

Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-SMEC-04a	**All above mentioned in step 2**	**N/A**	**N/A**	**N/A**	**Pass**

Start time @: 14:44
End time @: 14:48
OBSID: 0x300120A5

Comments:

Start point = 1 mm
End point = 15 mm
Step size = 1 mm,
Forward speed = 0.5 mm/s
Reverse speed = 1 mm/s,
Time at each position 5 s.



3.3.17 FUNC-SMEC-09

Test Id:	FUNC-SMEC-09
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 HCSS Test Procedure window on TOPE**
3	Contingency: If test fails repeat steps 1.

Test Log:

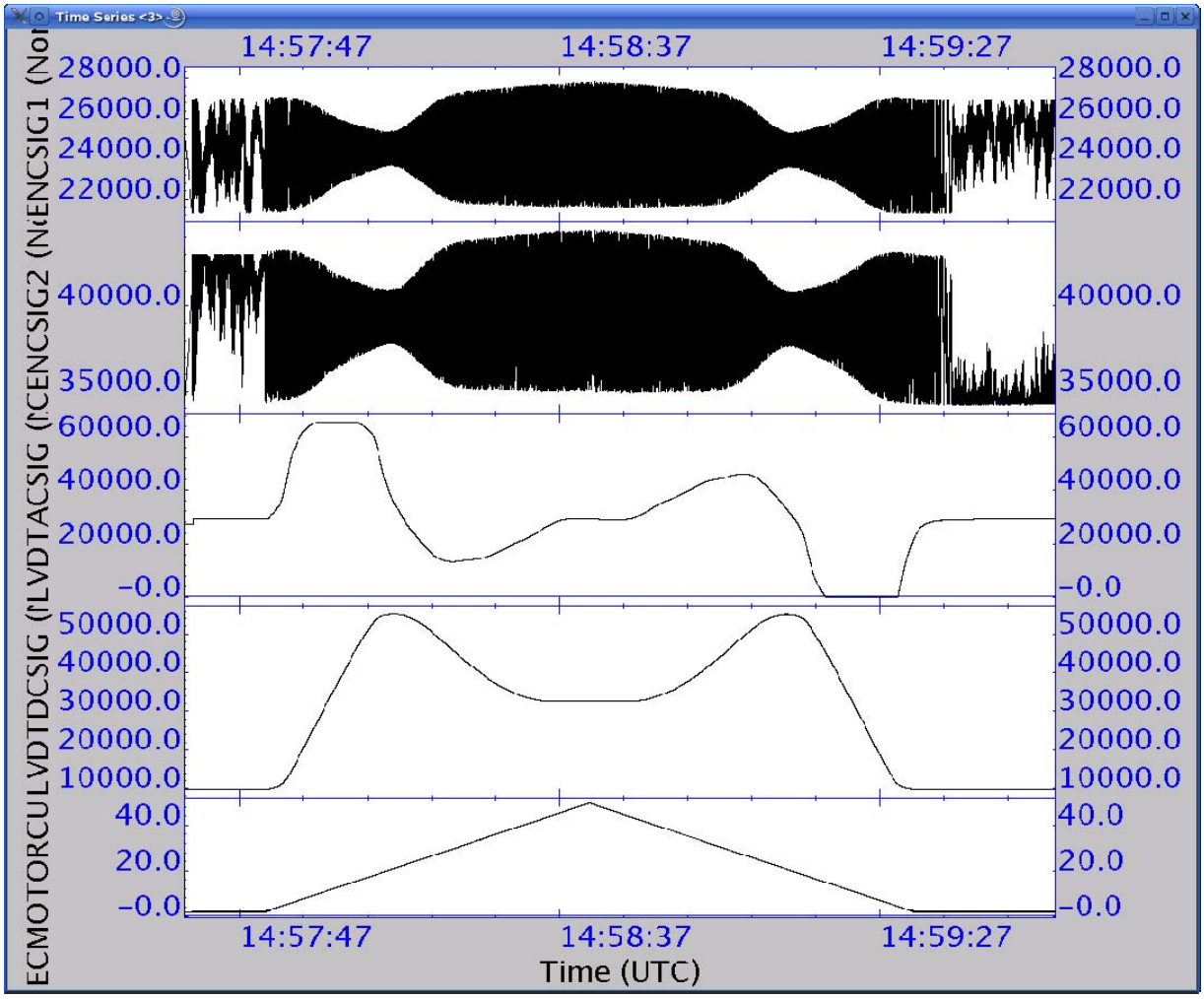
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-SMEC-09	**All above mentioned in step 2**	**N/A**	**N/A**	**N/A**	**Pass**

Start time @: 14:58
End time @: 15:44
OBSID: 0x300120A6

Note:
The encoder signals 1/ 2 amplitudes are zero, showing that the encoder has not started counting. Will manually change the 1 & 2 offsets to 24000 and 38000 try to get it counting.

Note:
Sent these commands before carrying out SMEC-09
SEND_DRCU_COMMAND(0x90585DC0,0)
SEND_DRCU_COMMAND(0x905A9470,0)
The amplitude of signals 1 and 2 switched to different from zero, encoder counting

Comments: Start point 1 mm, end point 25 mm, forward speed 0.5 mm/s, reverse speed 0.5 mm/s, two scans.



Step#	Action	Comments
0	Execute SMEC_INIT from HCSS Test Procedures	15:09 MSTK command to set the LED level to 3: 0x90400003 SMEC_INIT (Start time: 15:10; End time: 15:12; OBSID: 0x300120A7) Success!

3.3.18 FUNC-SMEC-04B

Test Id:	FUNC-SMEC-04B
Test Purpose:	SMEC Close Loop Position Test. SMEC close loop operation 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 : SMECENCPOS HK parameter shows identical values as those of the SMECTRAJPOSN HK parameter for the different commanded SMEC positions.(1mm to 25mm in steps of 1mm)

Test Procedure:

Step#	Action
1	**On QLA bring up 2 time series displays:** **Display 1 of the following MCU Engineering block parameters:** MCUENGSMECENCSIG1 MCUENGSMECENCSIG2 MCUENGSMECLVDTDCSIG MCUENGSMECLVDTACSIG MCUENGSMECMOTORCURR **Display 1 of the following SMEC HK parameters:** SMECENCPOSN SMECTRAJPOSN
2	**Run FUNC-SMEC-04B test procedure from the HCSS Test Procedure window on TOPE**
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-04B	**All above mentioned in step 1**	**N/A**	**N/A**	**N/A**	

Start time @: 15:14
End time @: 15:17
OBSID: 0x300120A8
Comments:

Start point = 1 mm
End point = 15 mm
Step size = 1 mm,
Forward speed = 0.5 mm/s
Reverse speed = 1 mm/s, time at each position 5 s.

Went into open loop straight away.

15:23 SMEC_OFF

OBSID: 0x300120A9

15:25 SMEC_ON
OBSID: 0x300120AA

Set the encoder LED level to 3
0x90400003

FUNC-SMEC-04A
OBSID: 0x300120AB

Start point = 1 mm
End point = 5 mm
Step size = 1 mm,
Forward speed = 0.5 mm/s
Reverse speed = 1 mm/s,
Time at each position 5 s.

Encoder counting.

Encoder signal 1: 32000
Encoder signal 2: 52000
SEND_DRCU_COMMAND(0x90587D00,0)
SEND_DRCU_COMMAND(0x905ACB20,0)

SMEC_INIT
OBSID: 0x300120AC

FUNC_SMEC_04B
OBSID: 0x300120AD

Success

3.3.19 FUNC-SMEC-07

Test Id:	FUNC-SMEC-07
Test Purpose:	SMEC Close 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: 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 HCSS Test Procedure window on TOPE**
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**	

Start time @: 15:40
End time @: 15:4
OBSID: 0x300120AE
Comments:

Start point = 1 mm
End point = 25 mm
Forward speed = 0.5 mm/s,
Reverse speed = 0.5 mm/s
2 scans.

SUCCESS??

Try full range scans:

Start point = 1 mm
End point = 39.5 mm
Forward speed = 0.5 mm/s,
Reverse speed = 0.5 mm/s
2 scans.

SUCCESS AGAIN??

3.3.20 FUNC-SMEC-06

Test Id:	FUNC-SMEC-06
Test Purpose:	SMEC Close Loop Saw Tooth 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: If SMEC can perform a saw tooth 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-06 test procedure from the HCSS Test Procedure window on TOPE**
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-06	**All above mentioned in step 1**	**N/A**	**N/A**	**N/A**	

Start time @:
End time @:
OBSID:
Comments:

NOT RUN

Step#	Action	Comments
4	Execute SMEC_OFF from HCSS Test	Done at 15:49

	Procedures	**OBSID: 0x300120B0**

Step#	Action	Comments
0	Open DCU PARAMETERS SCOS Alpha Numeric Display	It wasn't easy but we managed

3.3.21 FUNC-DCU-01

Test Id:	**FUNC-DCU-01**
Test Purpose:	DCU Nominal Science 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 DCU produces each type of DCU nominal science frame:

APID	Type	S.type	SID	Frame ID	Frame type	No. Of frames	No. 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**

Test Procedure:

Step#	Action
1	Write down the current value of DCUFRAMECNT located d in DCU PARAMETERS AND
2	Run FUNC-DCU-01 test procedure from the HCSS Test Procedure window on TOPE
3	Write down 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	No. of frames received	Test Result

FUNC-DCU-01	**DCUFRAMECNT**	**0/700**	1396 / 2096	700	**Pass**

Start time @: 15:53
End time @: 15:56
OBSID: 0x300120B1
Comments:

QLA wrote file QLA-DCU-01_300120B1.txt

3.3.22 FUNC-DCU-04P

Test Id:	FUNC-DCU-04P
Test Purpose:	Photometer LIA Integrity 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
1	On QLA bring up a time series display of the HK parameters (converted): PLIAP5V PLIAP9V PLIAM9V LIAP1/2/3/4/5/6/7/8/9TEMP
2	Run FUNC-DCU-04P test procedure from the HCSS Test Procedure window on TOPE
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	No. of frames received	Test Result
FUNC-DCU-04P	**SCUDCDCSTAT** **PLIAP5V** **PLIAP9V** **PLIAM9V** **LIA1/2/3/4/5/6/7/9TEMP**	**4/5** **0/~ +5V** **0/~+9V** **0/~-9V** **N/A/ [290-300]K**	4 / 5 ~ 0.0/ 5.18 ~ 0.0 / 11.54 ~ 0.0 / -11.53 Going up		**Pass**

Start time @: 16:01
End time @: 16:01
OBSID: 0x300120B2

Saved screenshot in /home/qla/Images/PFM5

3.3.23 FUNC-DCU-11P

Test Id:	FUNC-DCU-11P
Test Purpose:	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 correct: 1. PSWJFETVSS1/2/3/4/5/6 (RAW: 0x4C CONVERTED ~ -1.5V). 2. PMLWJFETVSS1/2/3/4 (RAW: 0x4C CONVERTED ~ -1.5V). 3. PSWJFETSTAT = 0x3F 4. PMLWJFETSTAT = 0x3F

Test Procedure:

Step#	Action
1	**Run FUNC-DCU-11P test procedure from the HCSS Test Procedure window on TOPE**
2	**After the test Write down 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	No. of frames received	Test Result
FUNC-DCU-11P	**PSWJFETSTAT** **PMLWJFETSTAT** **PSWJFET1V** **PSWJFET2V** **PSWJFET3V** **PSWJFET4V** **PSWJFET5V** **PSWJFET6V** **PMWJFET1V** **PMWJFET2V** **PMWJFET3V** **PMWJFET4V** **PLWJFET1V** **PLWJFET2V**	**0/0x3f** **0/0x7f**	0 / 0x3f 0 / 0x7f 0 / -1.71 – 0x57 0 / -1.61 – 0x52 0 / -1.39 – 0x47 0 / -1.61 – 0x52 0 / -1.80 – 0x5C 0 / -1.61 – 0x52 0 / -1.71 – 0x57 0 / -1.61 – 0x52 0 / -1.61 – 0x52 0 / -1.90 – 0x61 0 / -1.61 – 0x52 0 / -1.39 – 0x47	**N/A**	**Pass**

Start time @: 16:06
End time @: 16:07
OBSID: 0x300120B3
Comments: PSW G8 and C12. PSW A10, PMW C8 and T2 are black.

3.3.24 FUNC-DCU-13P

Test Id:	FUNC-DCU-13P
Test Purpose:	Photometer Detectors 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
1	**On QLA bring up a time series display of a couple of pixels on each of the photometer BDAs**
2	**Run FUNC-DCU-13P test procedure from the HCSS Test Procedure window on TOPE**
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	No. of frames received	Test Result
FUNC-DCU-13P				**N/A**	**Pass**

Ran PROC-STOP-DCU-DATA as data still running after DCU-11
Start time @: 16:15
End time @: 16:27
OBSID: 0x300120B4

See Annexe 2 for load curve plots for each pixel.

Step#	Action	Comments
1	From TOPE HCSS Test Procedures run **PDET-OFF**	**16:29, OBSID 0x300120B5**

3.3.25 FUNC-DCU-04S

Test Id:	FUNC-DCU-04S
Test Purpose:	Spectrometer LIAs Integrity 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
1	**On QLA bring up a time series display of the HK parameters:** SLIAP5V SLIAP9V SLIAM9V LIAS1/2/3TEMP
2	Run FUNC-DCU-04S test procedure from the HCSS Test Procedure window on TOPE
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	No. of frames received	Test Result
FUNC-DCU-04S	**SCUDCDCSTAT** **SLIAP5V** **SLIAP9V** **SLIAM9V** **LIA1/2/3TEMP**	**4/6** **0/~ +5V** **0/~+9V** **0/~-9V** **N/A/ [290-300]K**	4 / 6 0.08 / 5.23 0.0 / 11.57 0.0 / -11.56 ~298K		**Pass**

Start time @: 16:31
End time @: 16:
OBSID: 0x300120B6
Snapshot taken by QLA and saved in /home/qla/Images/PFM5

3.3.26 FUNC-DCU-11S

Test Id:	FUNC-DCU-11S
Test Purpose:	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
1	**Run FUNC-DCU-11S test procedure from the HCSS Test Procedure window on TOPE**
2	**After the test Write down 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	No. of frames received	Test Result
FUNC-DCU-11S	**SSWJFETSTAT** **SLWJFETSTAT** **SSWJFET1V** **SSWJFET2V** **SLWJFET1V**	**0/7** **0/7**	0 / 7 (SPECJFETSTAT) 0 / -2.10 – 6B 0 / -1.61 – 52 0 / -1.71 – 57	**N/A**	**Pass**

Start time @: 16:34
End time @: 16:35
OBSID: 0x300120B7
Comments: SSW D5 is yellow, SLW C2 and B3 are red, DP2 is black.

3.3.27 FUNC-DCU-13S

Test Id:	FUNC-DCU-13S
Test Purpose:	Spectrometer detectors 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	On QLA bring up a time series display of a couple of pixels on each of the spectrometer BDAs	
2	Run FUNC-DCU-13S test procedure from the HCSS Test Procedure window on TOPE	
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	No. of frames received	Test Result
FUNC-DCU-13S				**N/A**	**Pass**

Stopped data and reset to nominal bias
ILT-PERF-DNS-S with default input values
Started at 19:51, OBSID 0x30001110E
Finished at 19:52

DCU-13S
Start time @: 16:38
End time @: 16:49
OBSID: 0x300120B8
Comments: Looks OK on QLA, snapshot taken

See Annexe 2 for load curve plots for each pixel.

3.3.28 FUNC-DCU-14-S

Test Id:	
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 don't show excess noise.

Test Procedure:

Step#	Action	Comments
1	**Run ILT-PERF-DNA-S test procedure from the HCSS Test Procedure window on TOPE**	
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
ILT_PERF_DNA_S				**N/A**	

Start time @: 17:07
End time @: 17:13
OBSID: 0x300120B9
Comments:

Detectors settings:
Bias frequency: 160.09 Hz
Sampling frequency: 80.04 Hz
SSW phase: 180.71 deg
SLW phase: 179.29 deg
SSW bias : ~ 31mV
SLW bias : ~ 31mV
Duration of test: 5 minutes

Step#	Action	Comments
1	From TOPE HCSS Test Procedures run **SDET-OFF**	**17:15, OBSID 0x300120BA**

4. END TEST SEQUENCE

4.1 NORMAL END TEST SEQUENCE

The following table shows the necessary steps to be followed to end the warm functional test sequence.

Step#	Action	HK parameters	Expected Value	Comments	Check
1	Check BSM is OFF	CHOPSENSPWR JIGGSENSPWR	0 0		
2	Check SMEC is OFF	SMECENCPWR	0		
3	Run MCU-OFF from the HCSS Test Procedure window on TOPE	SCUDCDCSTAT	0		
4	Check Instrument Configuration	MODE	0x100/ DRCU_ON		
5*	Run SCU_OFF from the HCSS Test Procedure window on TOPE	SCUDCDCSTAT SUBKSTAT	0 0		
6*	Run DRCU_OFF from the HCSS Test Procedure window on TOPE	MODE	0/ DPU_ON		

* These two steps should ONLY be executed if the functional test takes place BEFORE the instrument is placed in the test cryostat. If the instrument is already in the cryostat and the cryo-harness are connected this steps should NOT be executed.

FINAL INSTRUMENT CONFIGURATION IN THE CASE STEPS 1 to 4 are executed is DRCU_ON
FINAL INSTRUMENT CONFIGURATION IN THE CASE STEPS 1 to 6 are executed is DPU_ON

4.2 END TEST SEQUENCE WHEN THE FUNCTIONAL TEST HAS FAILED

The following table shows the necessary steps to be followed to end the warm functional test sequence when this has been declared failed.

Step#	Action	HK parameters	Expected Value	Comments	Check
1	Check BSM is OFF	CHOPSENSPWR JIGGSENSPWR	0 0		
2	Check SMEC is OFF	SMECENCPWR	0		

5. ANNEXE1 (INSTRUMENT NOMINAL CONFIGURATION/MODES)

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 300120B4 for phot and 300120B8 for spec.

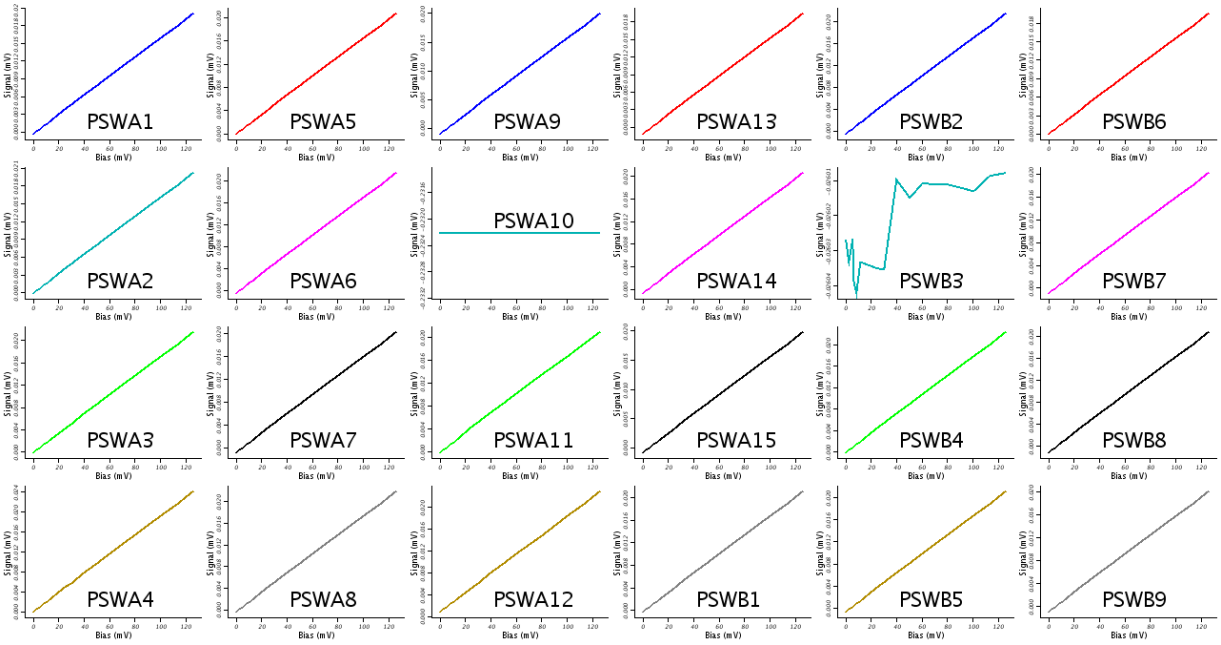


Figure 1. PSW Detectors (1)

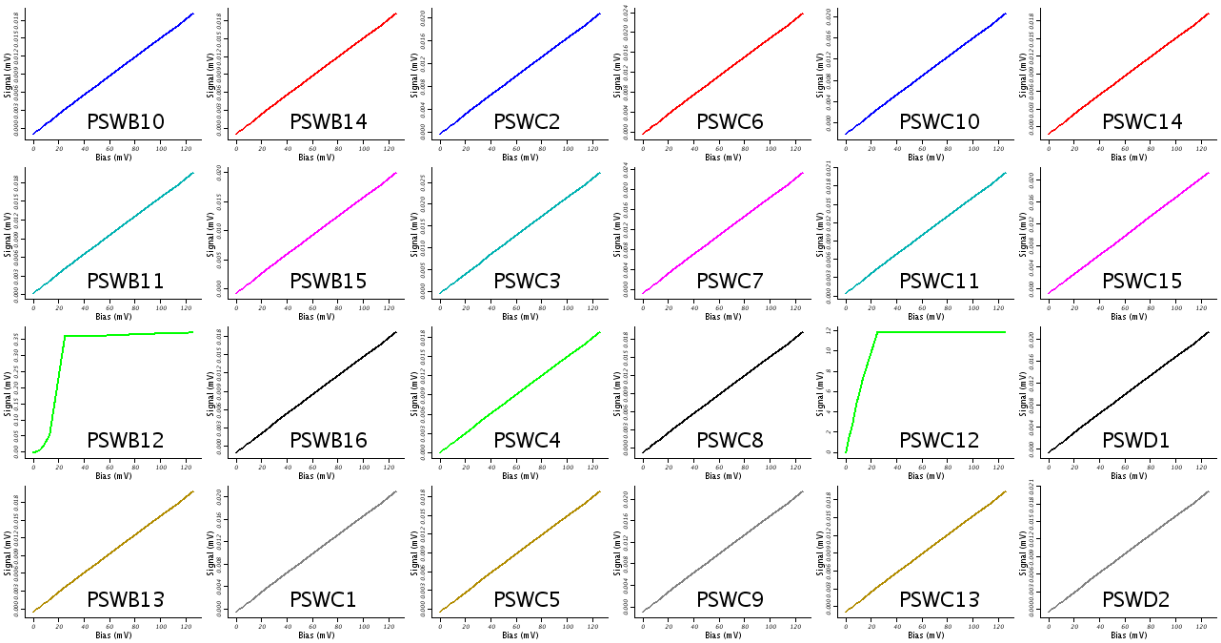


Figure 2. PSW Detectors (2)

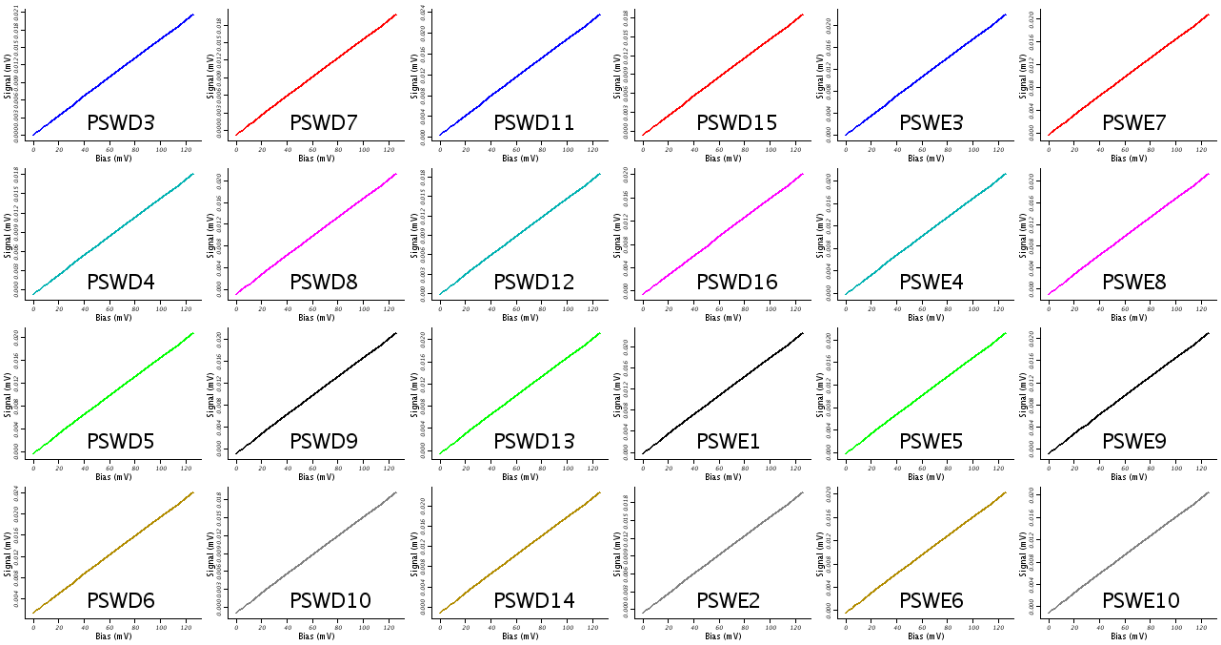


Figure 3. PSW Detectors (3)

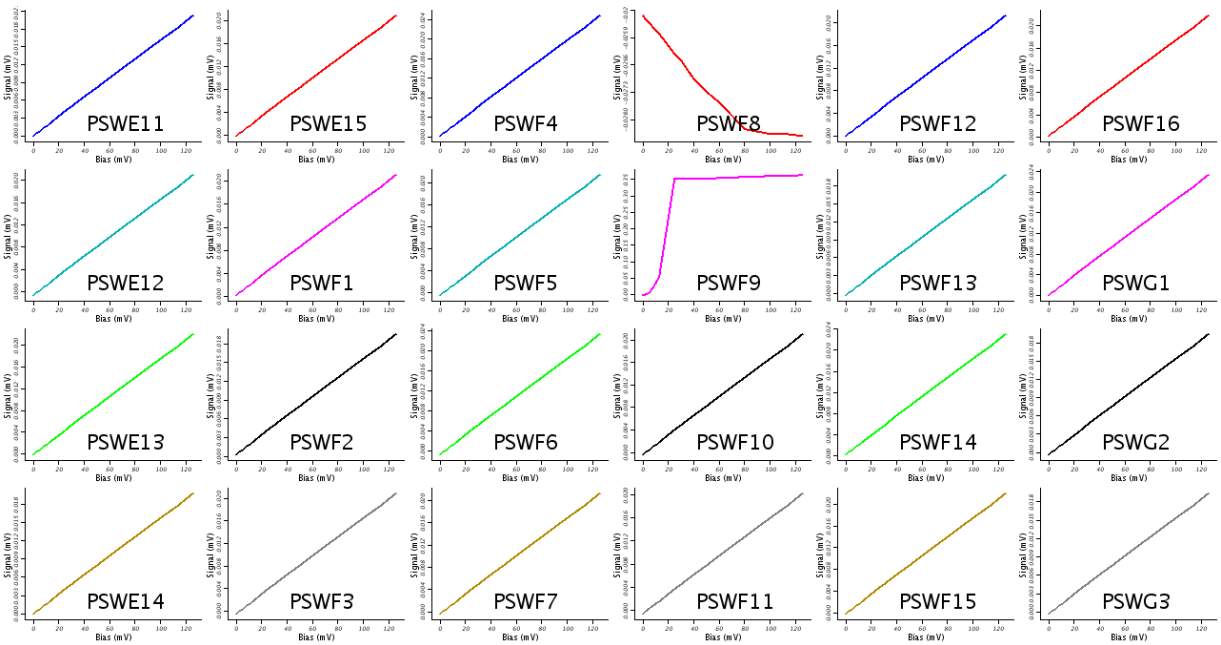


Figure 4. PSW Detectors (4)

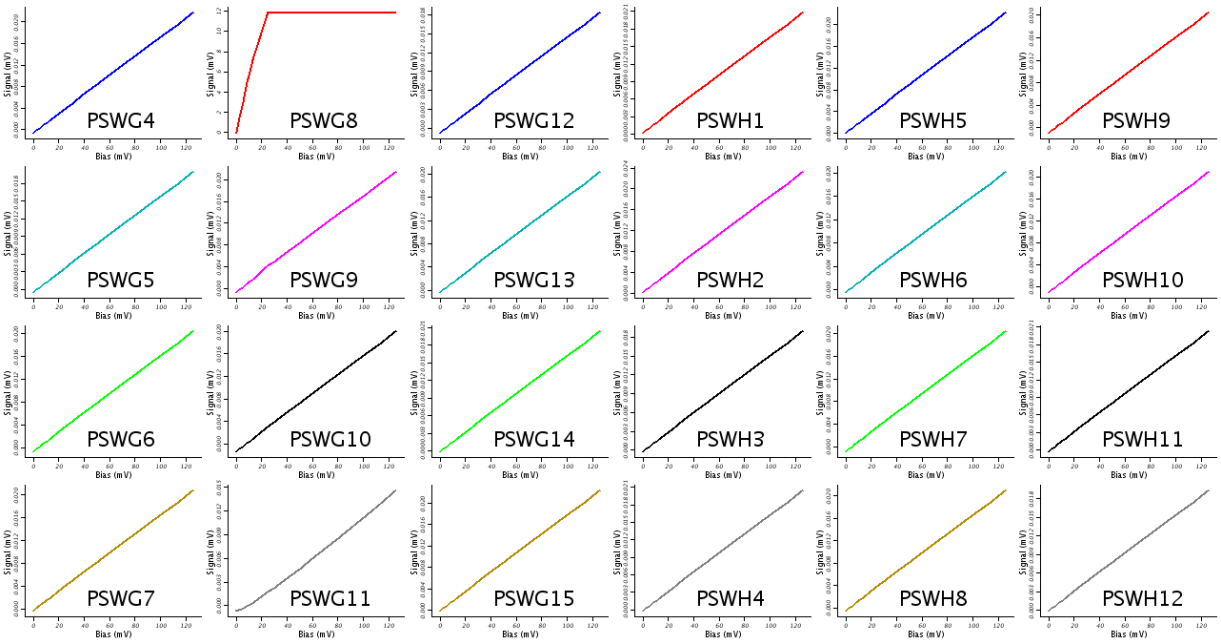


Figure 5. PSW Detectors (5)

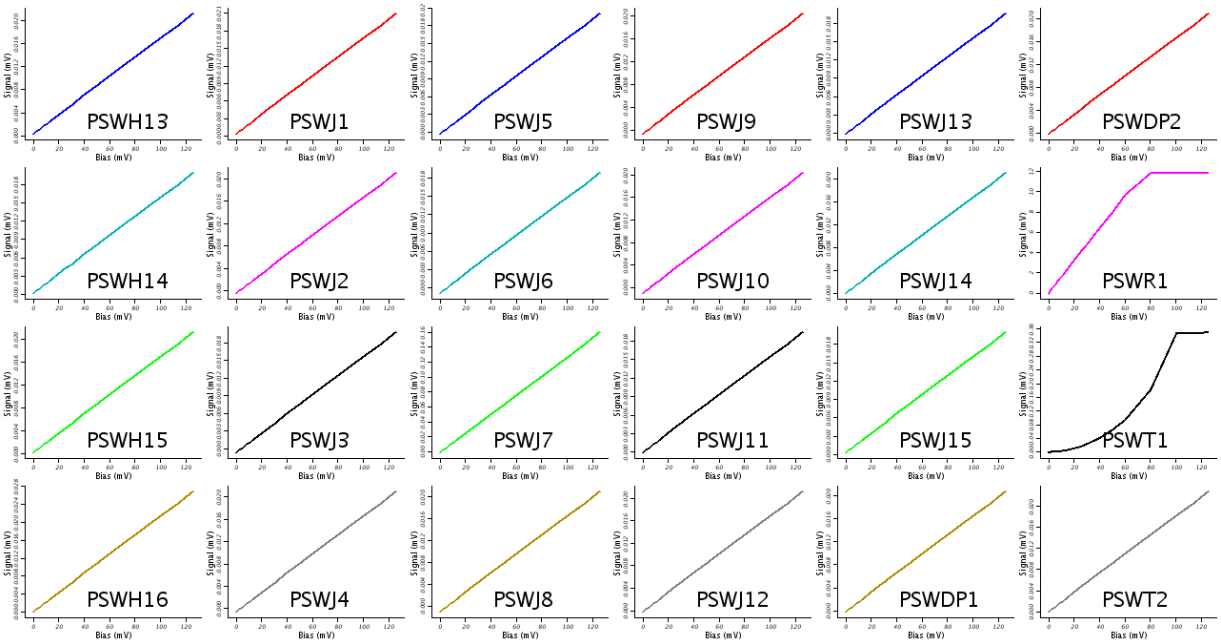


Figure 6. PSW Detectors (6)

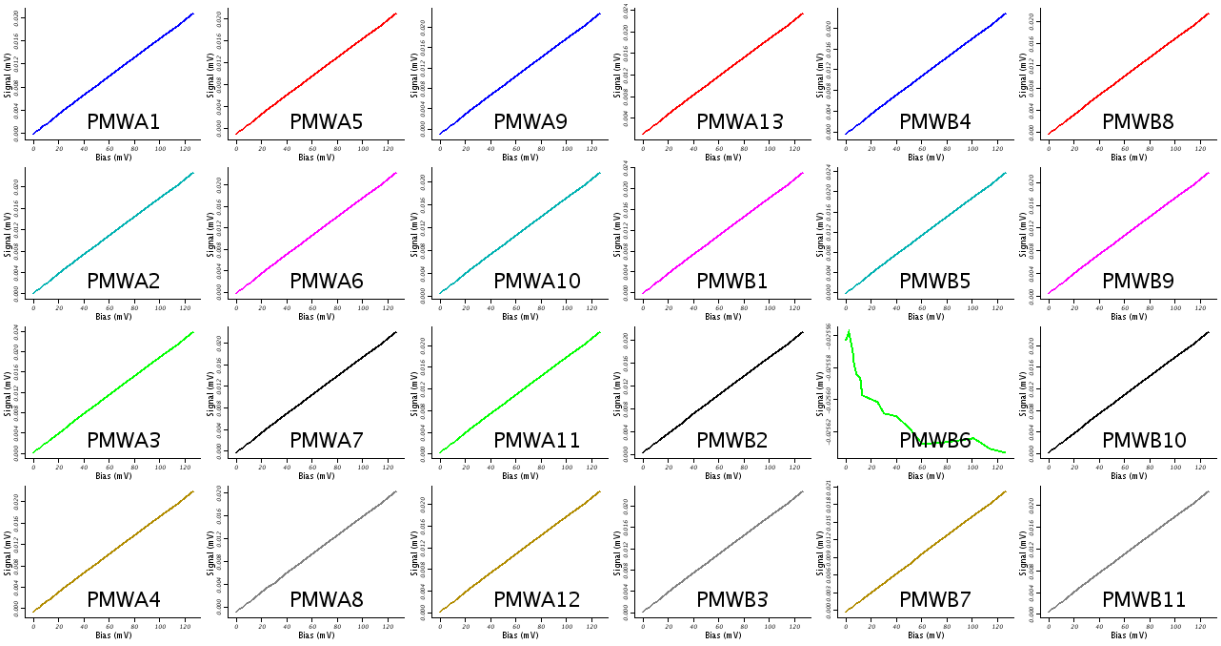


Figure 7. PMW Detectors (1)

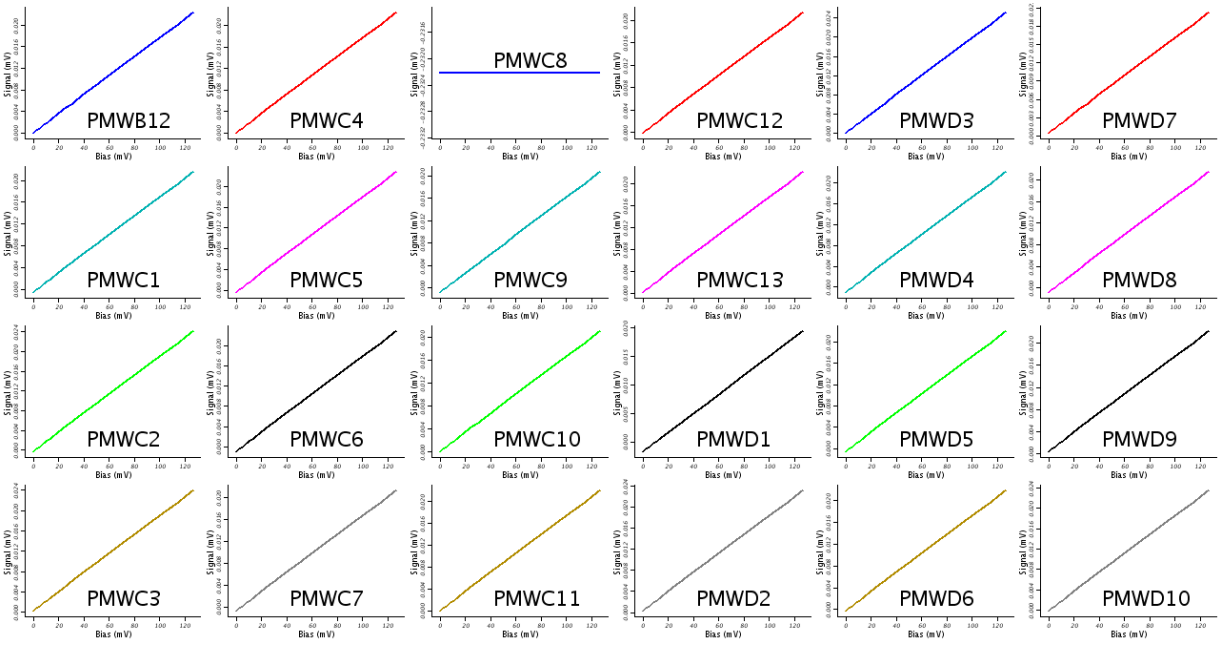


Figure 8. PMW Detectors (2)

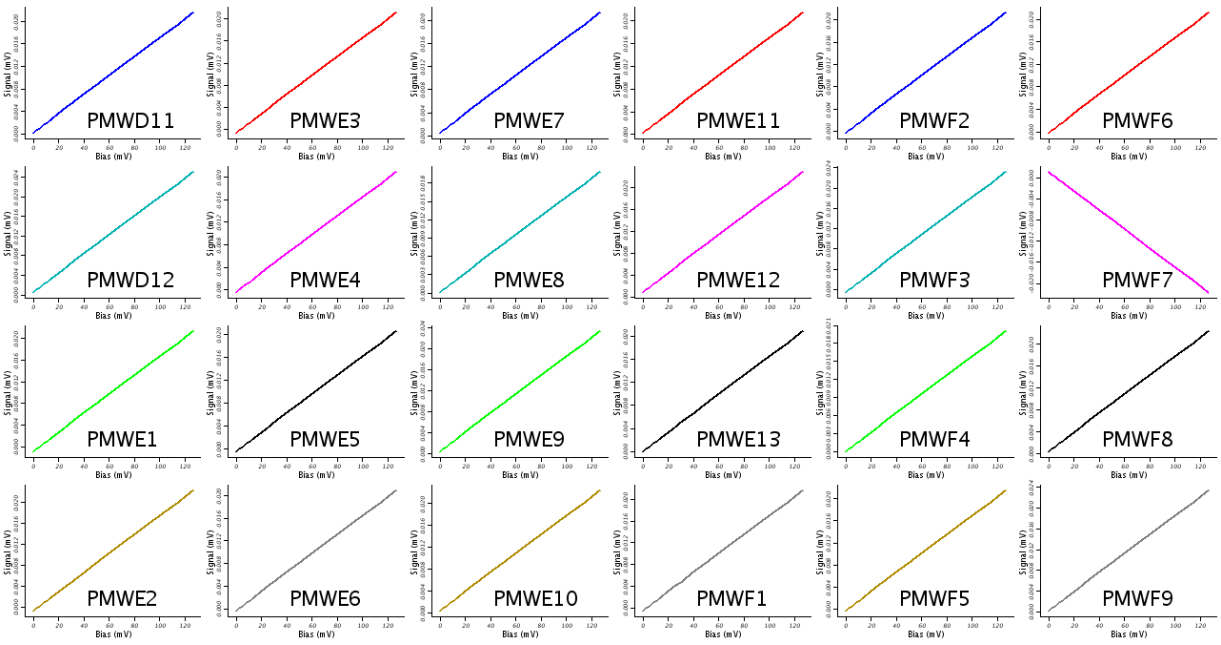


Figure 9. PMW Detectors (3)

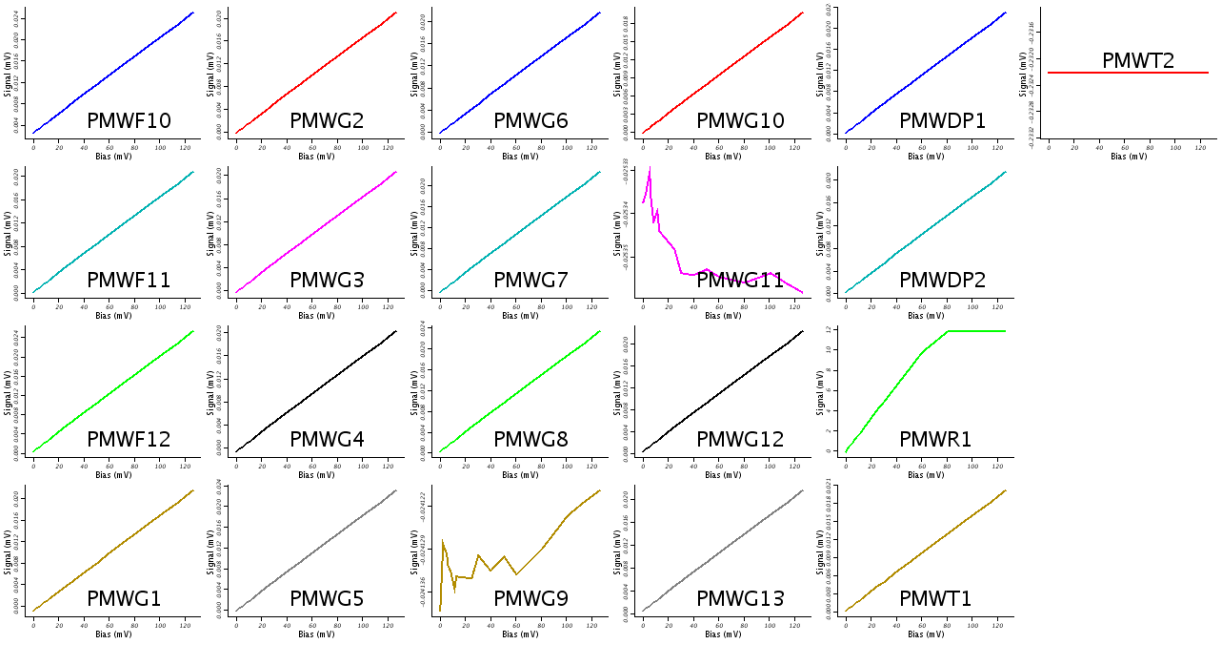


Figure 10. PMW Detectors (4)

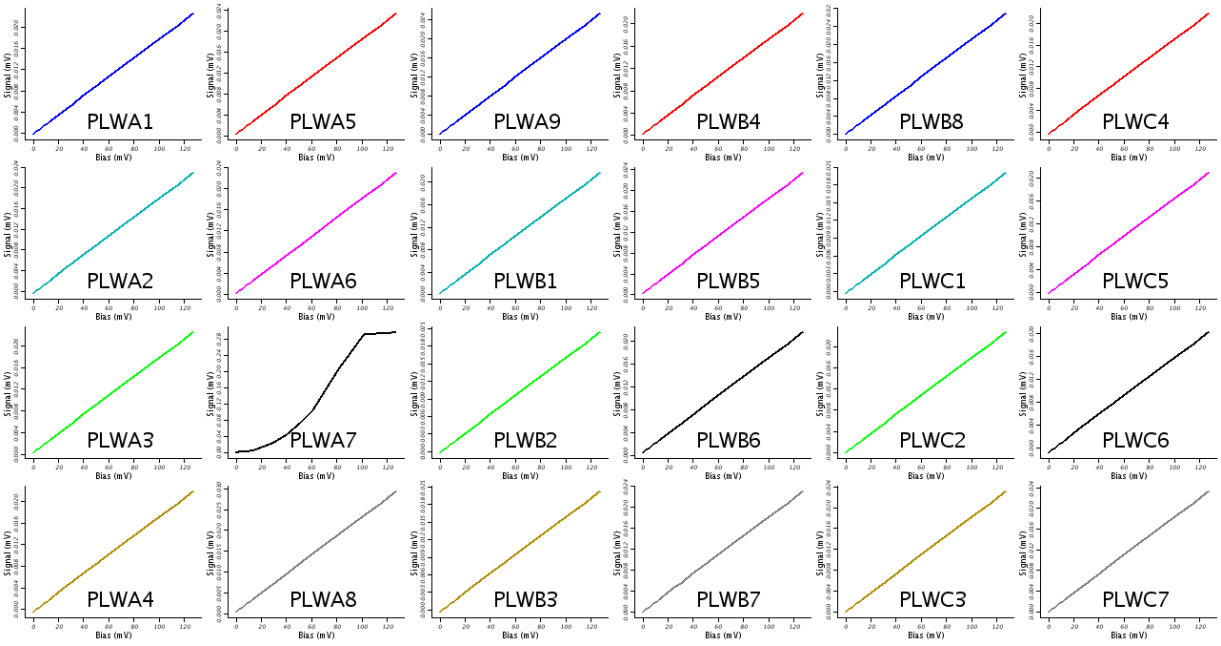


Figure 11. PLW Detectors (1)

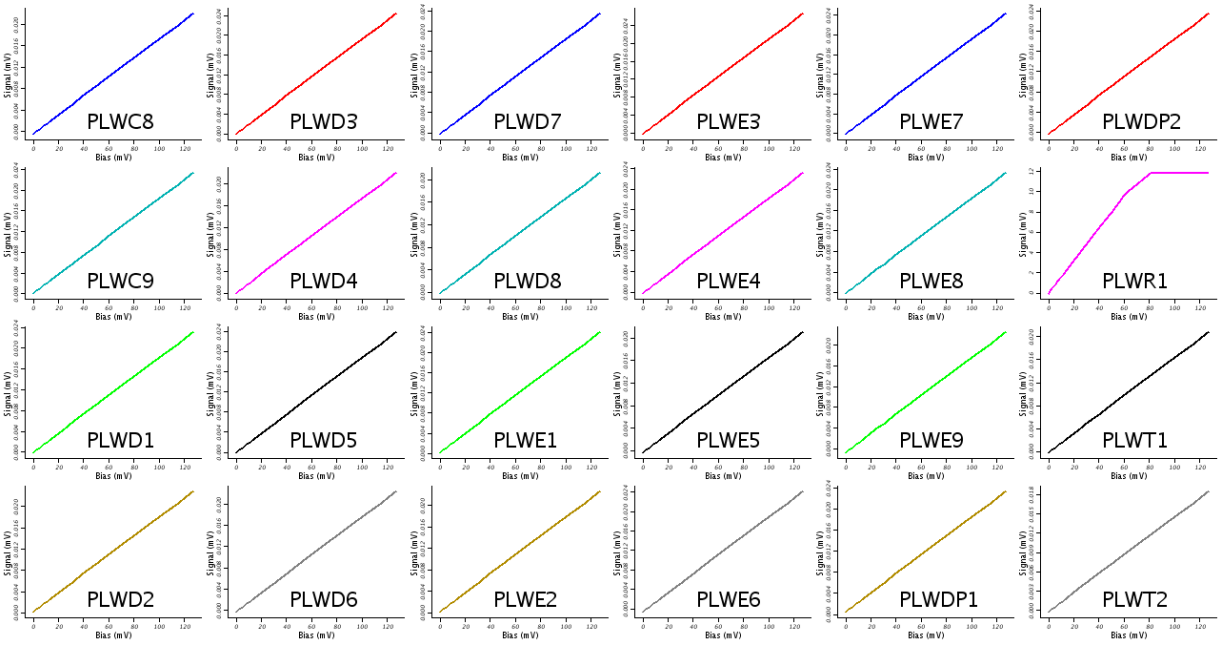


Figure 12. PLW Detectors (2)

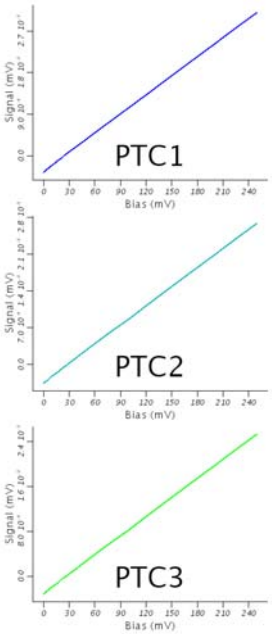


Figure 13. PTC Detectors (1)

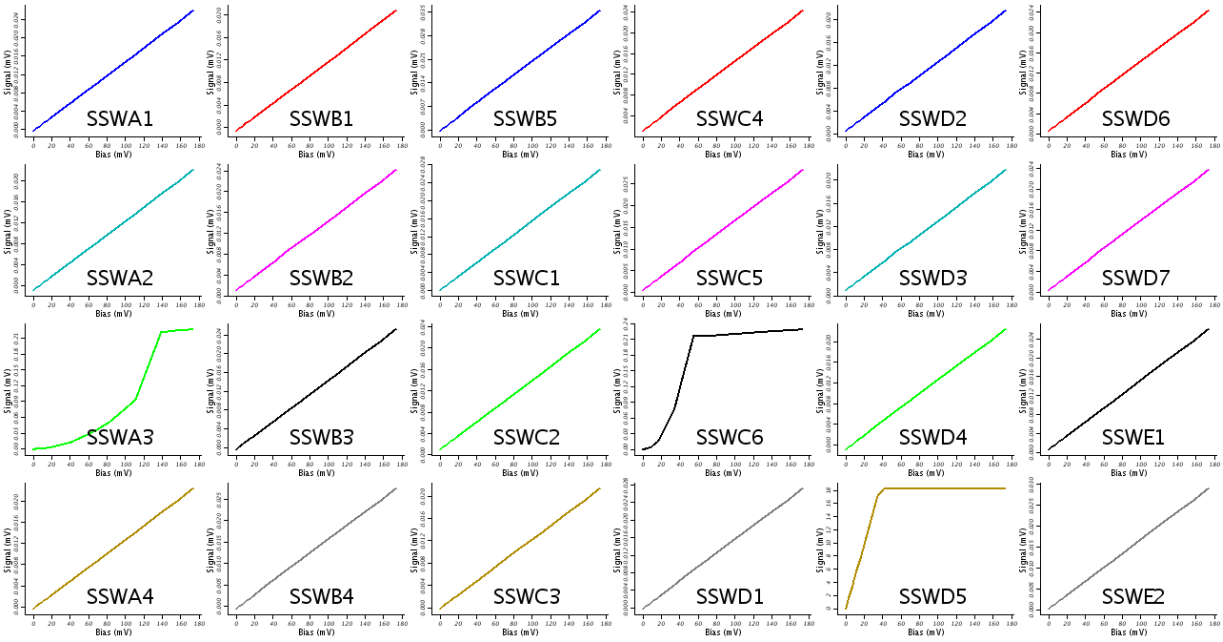


Figure 14. SSW Detectors (1)

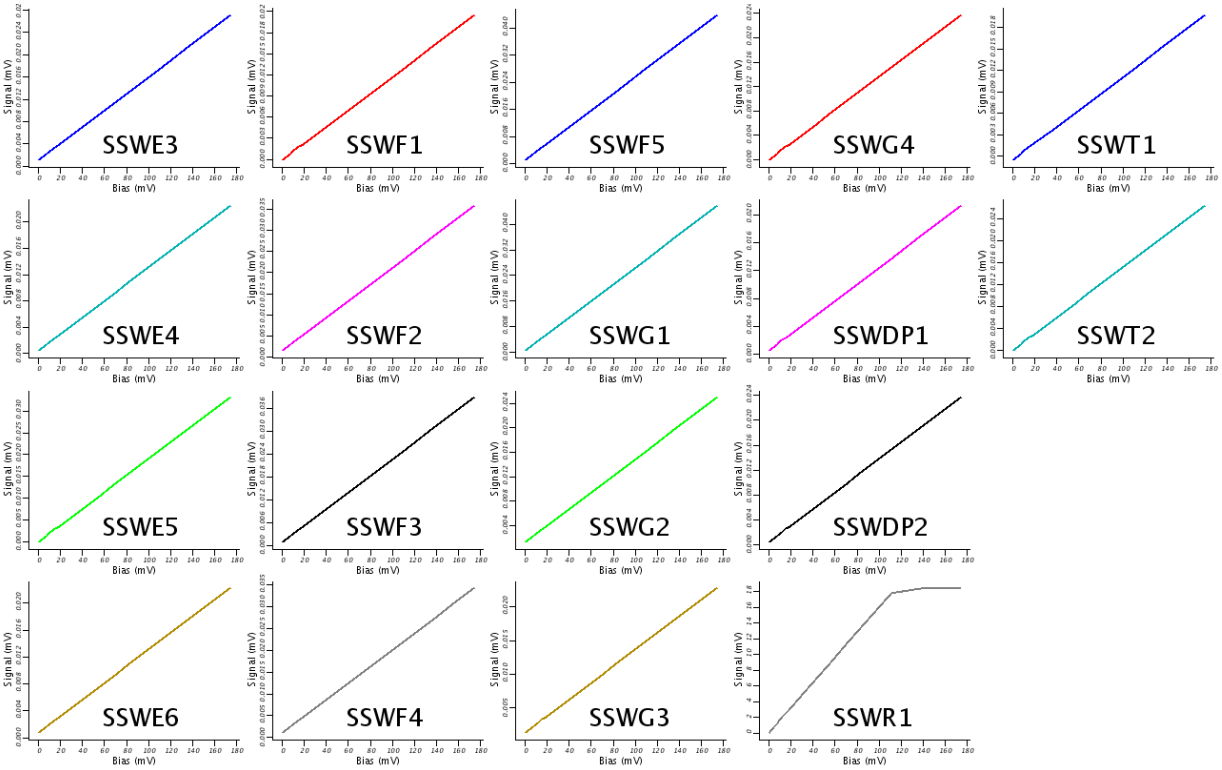


Figure 135. SSW Detectors (2)

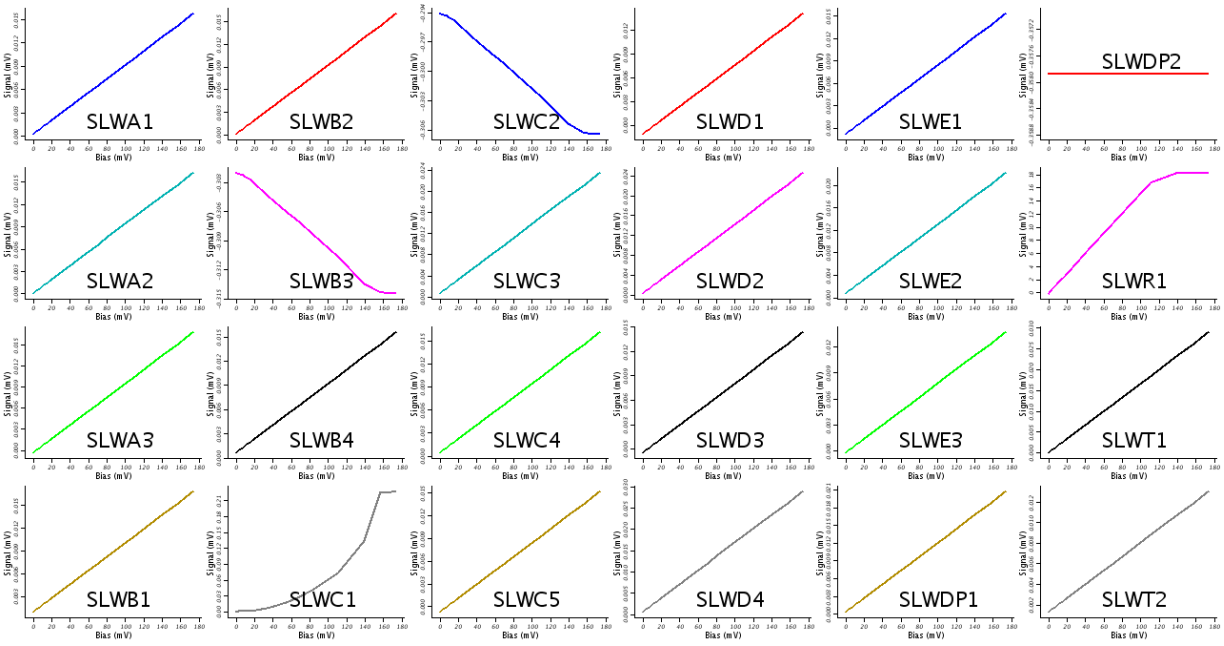


Figure 146. SLW Detectors (1)