Title: Test Report For SPIRE FM Warm Functional Test (WFT) 2

CI-No: 125200

Prepared by:	A. Koppe / S. Hamer	Date: 5.11.07
Checked by:	S. Idler	13.11.2007
Product Assurance:	R. Stritter	14.11.07
Configuration Control:	W. Wietbrock	15.11.07
Project Management:	W. Fricke	15/11/2007

Distribution: See Distribution List (last page)

Issue	Date	Sheet	Description of Change	Release
1	26.10.07	All	Formal Issue	

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0 Test Summary

0.1 Unit tested

SPIRE FM

0.2 Applied Procedures:

SPIRE FM Warm Functional Test	HP-2-ASED-TP-0167, Issue 2

0.3 Procedure Execution Summary:

Several NCR´s have been raised during this second run of the SPIRE WFT.

NC-3720: SPIRE SMEC Operation during WFT

NC-3725: SPIRE FM Detector Anomalies during WFT

NC-3733: SPIRE WFT2 SMEC encoder power level

This test has been rerun due to the SMEC operation which is only possible with the HERSCHEL S/C in horizontal position (X horizontal, +Y up vertical – precision ±0.5°) and due to problems with detector tests during the initial WFT. The LPU functional tests, however, have been excluded since no current reading on the CCS is available (see TRR).

The following protocols have been written documenting the SPIRE WFT 2 status in its different phases:

TRR for SPIRE FM WFT 2	23.10.2007 HP-2-ASED-MN-1425
SPIRE FM WFT 2 PTR	25.10.2007 HP-2-ASED-MN-1427

Location:	Astrium-EADS, Friedrichshafen
Test Session Name (prime):	2007_10_23_08_41_hercdmu_hpws23_REALTIME
Environment:	_SPIR_WSFT2
Test Session Name (redundant):	2007_10_24_05_37_hercdmu_hpws23_REALTIME
Environment:	_SPIR_WSFT2R

Any procedure variations are recorded in the Procedure Variation Summary in § 7.1 for the corresponding "as-run" procedure.

All non-compliances are recorded in the Observation/NCR Summary below and detailed further in Section 3.

The following main observations were made during the test or in the post-test results analysis:

Section/ Step No.	Description	Item Affected	NCR Raised	Affects Test Objective
7.2.3.19/1	Recurrence of NCR-3633 as in WFT1	no	3633	no
7.2.3.23/1	The frame counter increases by n+200	procedure	-	no
7.2.3.38/1	Launch latch position is unclear (see PVS1, PVS2)	no	3720	no
7.2.3.40	Confirmation of SMEC latch (PVS3)	no	-	no
7.2.5	LPU test skipped	no	-	Open issue
7.2.7.1	Execution of procedure changed (see procedure variation sheet, PSV4)	no	-	no
7.2.7.23/1	The frame counter increases by n+200, but script not executed	procedure	-	no
7.2.7.36/1	Script replaced by manual commands	no	-	no
7.2.7.38/1	Change of encoder power by manual command (PVS5)	procedure	-	no
7.2.7.39	SMEC dropped out of closed loop during test		3733	no

Table 1: SPIRE FM WFT 2 Summary

0.4 Summary Conclusion

The SPIRE FM Warm Functional Test (WFT) 2 has been performed using version SPIRE_MIB_FM_2.2.G5_PR_2 integrated into the HPSDB issue 15.

There were a couple of open issues arising from the integration and UFT and WSFT1 activities, which are listed in the following:
- NC-3276, which leads to longer test times, but was not considered as a blocking point to the test
- NC-3631, command execution failure when executing Start P/R Step2 will appear again
- NC-3725, Swap of channels PTC-3, PSW-D15, PWM-B6 & PWM-F7
- NC-3633, unknown type 21,4 packets

A number of Non-Conformance Reports (as listed above) were raised during the test, but none affected the test objectives.
All Spectrometer and Photometer packets were produced correctly.

0.5 Open Issues:

- SPIRE PRIME DPU EEPROM Partition 1 Failure (NCR-3204)
- SPIRE LPU functional tests prime/redundant which can be done in S/C vertical position, once the CDMS issue 3.1.2 is available

1 Scope

This document reports on the WSFT performed on the SPIRE FM Instrument to check correct operation, after final electrical integration on the HERSCHEL satellite with the S/C in horizontal position. The tests were executed using the Herschel CCS & I-EGSE.

1.1 Objective

The objectives of the WSFT 2 were:

- To check the correct functional operation of the SPIRE FM instrument both on prime and redundant side including the SMEC, however, without the LPU.

1.2 Test Flow

The WSFT test flow was structured to reflect nominal operations of SPIRE as much as possible to enable re-use higher-level Satellite tests.

The flow is as follows:

1. Power on and configure EGSE and satellite for test (ref. to test steps chapter 7.2.1 of test procedure [AD1])
2. Power on SPIRE prime DPU and DRCU (ref. to test steps chapter 7.2.2 of test procedure [AD1])
3. Perform SPIRE Warm Functional tests - nominal (ref. to test steps chapter 7.2.3 of test procedure [AD1])
4. Switch OFF SPIRE prime DPU and DRCU (ref. to test steps chapter 7.2.4 of test procedure [AD1])
5. Skip LPU test (ref. to test step chapter 7.2.5 of test procedure [AD1])
6. Disable Mil1553B-bus interface and Power off NOMINAL SPIRE warm units
7. Power on SPIRE redundant DPU and DRCU (ref. to test steps chapter 7.2.6 of test procedure [AD1])
8. Perform SPIRE Warm Functional tests - redundant (ref. to test steps chapter 7.2.7 of test procedure [AD1])
9. Switch OFF SPIRE redundant DPU and DRCU (ref. to test steps chapter 7.2.8 of test procedure [AD1])
10. Skip LPU test (ref. to test step chapter 7.2.9 of test procedure [AD1])
11. Satellite and EGSE switch off(ref. to test steps chapter 7.2.10 of test procedure [AD1])

2 Documents/Drawings

2.1 Applicable Documents

AD 1	SPIRE FM Warm Functional Test	HP-2-ASED-TP-0167, iss.2

2.2 Reference Documents

None

2.3 Other Documents

None

2.4 Acronyms & Abbreviations

See “as-run” procedure.

3 Main Observations and Problems Identified

3.1 DPU Prime EEPROM Failure (NCRs: 3204)

This is a remaining NCR from Instrument Warm Unit Electrical Integration:

EEPROM Failure in Primary Partition of DPU Prime has been detected during Warm Unit Integration. The NRB agreed to use the secondary partition for further testing. A respective test script to force boot from the secondary partition has been provided by SPIRE.

3.2 Command Execution Failures when starting -DRCU-START-P/R-STEP2 (NCR-3631)

During SPIRE WFT1 on Prime, 2 x Cmd execution failures (CLEAR_HK_REPORT) reported to the DRCU switch on (error in script SPIRE-FM-WFT-DRCU-START-P-STEP2). The same anomaly was reported on the redundant side (error in script SPIRE-FM-WFT-DRCU-START-R-STEP2).

3.3 Unknown Type 21,4 Packets Reported on CCS (NCR-3633)

During SPIRE WFT1, CCS (section 7.2.3.19) reports unknown 21,4 packets from APID 1288, but no type 21,4 packets were expected during the test.

3.4 Swap of channels (NCR-3725)

Detailed evaluation of the test results identified a swap of channels PTC-3, PSW-D15, PWM-B6 & PWM-F7.

3.5 SPIRE WFT2 SMEC encoder power (NCR-3733)

The SPIRE SMEC dropped out of closed loop scan test.

3.6 Procedure Changes

Updates and clarifications in the WFT2 procedures as required during the test execution were included by redlining. All necessary modification have bee reported in chapter 8.1, “Procedure Variation Summary”.

4 Conclusion

The SPIRE FM Warm Functional Test (WFT)2 was successfully performed apart from open issue (ref. to SPIRE FM WU PTR, HP-2-ASED-MN-1410, dated 28.09.2007) and the LPU prime/redundant tests:

- The SPIRE PRIME WFT had to be performed booting from the secondary partition of DPU EEPROM (ref. NC-3204).
- LPU prime/redundant test in accordance to procedure chapter 7.2.5 and 7.2.9 were skipped due to the unavailability of current readings on the CCS due to HPSDB omissions for CDMS ASW 2.8.11.

The detailed evaluation of the test results has been performed by RAL, the SPIRE instrument supplier, in a separate test report which is attached as annex 3. Initial results have been found satisfactory.

5 Appendix 1: SPIRE FM WFT As-Run Procedure

MASTER IN RED
AS RUN.
REDLINED

Title: **SPIRE FM Warm Functional Test**

CI-No: 125200

Prepared by:	S. Hamer/TERMA AS A. Koppe	Date:	22.10.2007
Checked by:	S. Idler		
Product Assurance:	R. Stritter		
Configuration Control:	W. Wietbrock		
Project Management:	W. Fricke		

Distribution: See Distribution List (last page)

Issue	Date	Sheet	Description of Change	Release
1.0	19.09.07	All	First Formal Issue	
2.0	22.10.07	All	Update to reflect RD2 issue 2.4 execution order	

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1 Scope

This document describes the set of warm functional tests to be performed on the SPIRE FM Instrument to check correct operation using the Herschel CCS after final mating between the HERSCHEL Cryostat and the SVM.

Specifically the functional test will verify the correct functioning of all subsystems at warm environmental conditions before cool down. Both redundancies are tested within this sequence.

Constraints

- This procedure requires the presence of SPIRE personnel as the I-EGSE will be required to assess the results online as part of the pass/fail criteria.
- Mechanism tests (marked in yellow in the sequence), which include opening and closing the internal SMEC Launch Latch shall only be performed with the Herschel Cryostat horizontal.
- Before carrying out the next procedure within the test sequence always ask for the go ahead by the SPIRE staff.
- Chapter 4 of this document specifies the sequence to be executed. Each of the steps in the sequence corresponds to procedures in sections 4.1 and 4.2.
- The procedure tables in section 4.1 and 4.2 include blank boxes where the actual values of parameters can be noted. Based on the comparison with the expected values the success or failure of a step should be recorded in the final column of the table.
- The last row in a procedure table should be used to record the overall Pass/Fail result of each test.
- Any text in boldface in the procedural steps generally indicates an action which may have to be performed manually by the CCS staff.

1.1 Objective

1. The objective of the test is to checkout the FM instrument.

1.2 Test Flow

This test flow is structured to reflect nominal operations of the FM SPIRE.

The flow is as follows:

1. Power on and configure SPIRE I-EGSE for test
2. Power on and configure SVM for test

3. Power on NOMINAL SPIRE Prime DPU and enable Mil1553B-bus interface
4. Power on DRCU(FCU) Prime
5. Run Nominal warm SFT Procedures
6. Power off MCU Prime
7. Power off DRCU(FCU) Prime
8. Disable Mil1553B-bus interface and Power off SPIRE Prime DPU
9. Repeat Steps 3 – 8 for Spire Redundant warm SFT Procedures
10. Power off SVM
11. Switch off all EGSE

2 Documents/Drawings

2.1 Applicable Documents

AD 1	FM SPIRE PFM Final Electrical Integration Procedure	HP-2-ASED-TP-166
AD 2	Herschel PCDU & CDMS Nominal Switch On/Off Procedure	HP-2-ASED-PR-070
AD 3	Herschel SAT Emergency Switch Off Procedure	HP-2-ASED-PR-071
AD 4	PA Plan	HP-2-ASED-PL-0007
AD 5	I-EGSE Switch ON/OFF Procedure	TBI
AD 6	Test Specification for Herschel Instrument AVM & FM Tests Performed at Satellite Level	H-P-2-ASP-TS-1083
AD 7	H-P GDIR	H-P-1-ASPI-SP-0027
AD 8	SPIRE I-EGSE Set-Up, Issue 2.1	SPIRE-RAL-DOC-002841

2.2 Reference Documents

RD 1	Herschel Planck Central Checkout System System User Manual	H-P-4-TE-MA-0010
RD 2	SPIRE Warm Functional Test Procedures	SPIRE-RAL-PRC-2422, iss. 2.4
RD 3	Herschel CDMU ASW S/W Interface Control Document	H-P-4-SSF-IC-0001
RD 4	Herschel CDMU BSW S/W Interface Control Document	H-P-4-SES-NT-0076
RD 5	SPIRE IID-B	SCI-PT-IIDB/SPIRE-02124
RD 6	SPIRE Functional Test Specification Iss. 1.4	SPIRE-RAL-DOC-001652
RD 7	SPIRE Instrument User Manual Iss. 1.0	SPIRE-RAL-PRJ-002395
RD 8	H/P OBT-UTC Time Synchronisation Technical Note Iss. 1.3	PT-CMOC-OPS-TN-6604-OPS- OGH

2.3 Other Documents

None

2.4 Acronyms & Abbreviations

1553	MIL-STD-1553B conform communication interface
AAD	Attitude Anomaly Detector
ACC	ACMS Control Computer
ACMS	Attitude Control and Measurement Subsystem
AD	Applicable Document
AIR	ACC In Reconfiguration
AIT	Assembly, Integration and Test
AIV	Assembly, Integration and Verification
APID	Application Process ID
ASW	Application Software
AVM	Avionics Model
BOLC	BOLometer Control unit (PACS)
BSW	Basic Software
CBH	Catalyst Bed Heater
CCS	Central Check-out System
CCSDS	Consultative Committee for Space Data Systems
CDMU	Control and Data Management Unit
CDMS	Control and Data Management Sub-system
CIR	CDMU In Reconfiguration
CLCW	Command Link Control Word
CLTU	Command Link Transmission Unit
CPDU	Command Pulse Distribution Unit
CRS	Coarse Rate Sensor
CTR	Central on board Reference Time
DCU	Detector Control Unit (SPIRE)
DEC	Detectors Electronics Control unit (PACS)
DMC	Detector and Mechanism Control unit (PACS)
DPU	Digital Processing Unit

DRCU	Detector Readout & Control Unit (SPIRE)
EEPROM	Electrically Erasable PROM
EGSE	Electrical Ground Support Equipment
FCL	Fold-back Current Limiter
FCU	FPU Control Unit (Spire)
FCV	Flow Control Valves
FDIR	Failure Detection, Isolation, and Recovery
FPU	Focal Plane Unit
GDIR	General Design and Interface Requirement
GRP	Group Heaters Switch
HBR	High Bit Rate
HL/HLC	High Level command
HP/HPC	High Priority commands
HPLM	Herschel PayLoad Module
HPSDB	Herschel Planck System Data Base
HW	Hardware
i.a.w.	In accordance with
I/F	InterFace
I/O	Input/Output
ICD	Interface Control Document
IST	Integrated System Test
LCL	Latching Current Limiter
LV	Latching Valves
LBR	Low Bit Rate
MAP	Multiplexed Access Point
MBR	Medium Bit Rate
MCU	Mechanisms Control Unit (SPIRE)
MEC	Mechanisms Electronics Control unit (PACS)
ML 16	Memory Load command (ML 16)
MM	Memory Module
MOIS	Mission Operations Information System
MTL	Mission Timeline

NRZ-L	Non Return to Zero – Litton
OBCP	On-Board Control Procedure
OBDH	On-Board Data Handling
OBMF	On-Board Monitoring Function
OBRT/OBT	On-Board Reference Time
OIRD	Operation Interface Requirement Document
PACS	Photodetector Array Camera & Spectrometer
P/L	Payload
PCDU/PCS	Power Control Distribution Unit/Power Control Subsystem
PM	Processor Module
PROM	Programmable Read Only Memory
PSK	Phase Shift Keying
RA	Rate Anomaly
RAM	Random Access Memory
RCS	Reaction Control Subsystem
RD	Reference Document
RF	Radio Frequency
RM	Reconfiguration Module
RT	1553 Remote Terminal
RTU	RT Unit
RTA	RTU
RWL	Reaction Wheel Assembly
SA	1553 Remote Terminal Sub Address
SAS	Sun Acquisition Sensor
SCOE	Special Check-out Equipment
SCU	Subsytems Control Unit (SPIRE)
SIR	S/C In Reconfiguration
SIT	Subsystem Integrated Test
SP	Sun Pointing
SPIRE	Spectral & Photometric Imaging Receiver
SPU	Signal Processing Unit (PACS)
SSMM	Solid State Mass Memory

STR	Star Tracker
SVM	Service Module
SW	Software
TAI	International Atomic Time
TC	TeleCommand
TFG	Transfer Frame Generator
TM	TeleMetry
TTC	Telemetry Tracking & Command subsystem
TTR	Telemetry Telecommand and Reconfiguration
UFT	Unit Functional Test
VC	Virtual Channel
WD	Watchdog

3 Configuration

3.1 Satellite Configuration

The test requires use of the FM SVM powered on in its basic test mode (i.e. quick switch on (PCDU & CDMS) in accordance with AD 2. SPIRE FM units will be powered ON as per this procedure and assumes that FPU has already been successfully integrated to the warm units.

SMEC WFT procedures highlighted in yellow in the procedure require the spacecraft to be horizontal. All other procedures can be executed in any foreseen orientation.

3.2 EGSE Configuration

This test requires the EGSE to be configured and elements powered on in accordance with AD 2.

I-EGSE shall be configured and connected to the HPCCS in accordance with AD 5 & AD 8.

3.3 Set-up

SPIRE Test Scripts for the test must be loaded on to the HPCCS and checked in prior to start of test.

4 Test Sequence

The following SPIRE test scripts are required for execution on the HPCCS they do NOT reflect the test steps or order in which the steps are executed (the latter is defined in the order of the procedure):

No.	Tcl Script Name	Comment	Confirmed
1.	SPIRE-FM-WFT-DPU-START-P-SP	DPU ON PRIME	
2.	SPIRE-FM-WFT-DRCU-START-P-STEP1	DRCU ON PRIME Step1	
3.	SPIRE-FM-WFT-DRCU-START-P-STEP2	DRCU ON PRIME Step2	
4.	SPIRE-FM-WFT-FUNC-SCU-01-P	SCU science generation check	
5.	SPIRE-FM-WFT-FUNC-SCU-03-P	SCU DC thermometry check	
6.	SPIRE-FM-WFT-FUNC-SCU-06-P	SCU AC thermometry check	
7.	SPIRE-FM-WFT-FUNC-SCU-02-P	SCU Nominal Science Contents Check	
8.	SPIRE-FM-WFT-FUNC-SCU-07-P	Sorption Cooler Heater Check	
9.	SPIRE-FM-WFT-FUNC-SCU-04-P	Photometer Calibration Check	
10.	SPIRE-FM-WFT-FUNC-SCU-05-P	Spectrometer Calibration Check	
11.	SPIRE-FM-WFT-FUNC-SCU-08-P	SCU Test Pattern Check	
12.	SPIRE-FM-WFT-FUNC-MCU-01-P	MCU (Prime) Boot Check	
13.	SPIRE-FM-WFT-FUNC-MCU-02-P	MCU Nominal Frame Generation Check	
14.	SPIRE-FM-WFT-FUNC-MCU-03-P	MCU Nominal Science Contents Check	
15.	SPIRE-FM-WFT-FUNC-MCU-04-P	MCU Test Pattern Check	
16.	SPIRE-FM-WFT-FUNC-BSM-01-P	BSM (Prime) Chop/Jiggle Sensor Check	
17.	SPIRE-FM-WFT-FUNC-BSM-02C-P	BSM (Prime) Chop Sensor Polarity Check	
18.	SPIRE-FM-WFT-FUNC-BSM-02J-P	BSM (Prime) Jiggle Sensor Polarity Check	
19.	SPIRE-FM-WFT-FUNC-BSM-03-P	BSM (Prime) Open Loop Dynamics Check	
20.	SPIRE-FM-WFT-FUNC-BSM-05A-P	BSM (Prime) Open Loop Chop Test	
21.	SPIRE-FM-WFT-FUNC-BSM-05B-P	BSM (Prime) Closed Loop Chop Test	
22.	SPIRE-FM-WFT-FUNC-BSM-06-P	BSM (Prime) operational Mode Check	
23.	SPIRE-FM-WFT-BSM-OFF-P	BSM (Prime) Switch OFF	

No.	Tcl Script Name	Comment	Confirmed
24.	SPIRE-FM-WFT-FUNC-DCU-01-P	DCU Nominal Science Packet Generation Check PRIME	
25.	SPIRE-FM-WFT-FUNC-DCU-02-P	DCU High Speed Link Check PRIME	
26.	SPIRE-FM-WFT-FUNC-DCU-03-P	DCU Test pattern Check PRIME	
27.	SPIRE-FM-WFT-FUNC-DCU-04-PHOT-P	Photometer LIAs Check PRIME	
28.	SPIRE-FM-WFT-FUNC-DCU-13-PHOT-P	Photometer BDAs Integrity Check PRIME	
29.	SPIRE-FM-WFT-FUNC-DCU-14-PHOT-P	Photometer BDAs Noise Check PRIME	
30.	SPIRE-FM-WFT-PDET-OFF-P	Photometer BDAs Switch OFF PRIME	
31.	SPIRE-FM-WFT-FUNC-DCU-04-SPEC-P	Spectrometer LIAs Check PRIME	
32.	SPIRE-FM-WFT-FUNC-DCU-11-SPEC-P	Spectrometer BDAs Integrity Check PRIME	
33.	SPIRE-FM-WFT-FUNC-DCU-13-SPEC-P	Spectrometer BDAs Integrity Check PRIME	
34.	SPIRE-FM-WFT-FUNC-DCU-14-SPEC-P	Spectrometer BDAs Noise Check PRIME	
35.	SPIRE-FM-WFT-SDET-OFF-P	Spectrometer BDAs Switch OFF PRIME	
36.	SPIRE-FM-WFT-MCU-OFF-P	MCU Switch OFF PRIME	
37.	SPIRE-FM-WFT-SCU-OFF-P	SCU Switch OFF PRIME	
38.	SPIRE-FM-WFT-DRCU-OFF-P	DRCU Switch OFF PRIME	
39.	SPIRE-FM-WFT-FUNC-SMEC-01-P	SMEC Encoder and LVDT check PRIME	
40.	SPIRE-FM-WFT-FUNC-SMEC-03-P	SMEC Encoder Levels Check PRIME	
41.	SPIRE-FM-WFT-FUNC-SMEC-02A-P	SMEC Open Launch Latch PRIME	
42.	SPIRE-FM-WFT-FUNC-SMEC-04A-P	SMEC Open Loop Position check PRIME	
43.	SPIRE-FM-WFT-FUNC-SMEC-09-P	SMEC Open Loop Scan check PRIME	
44.	SPIRE-FM-WFT-FUNC-SMEC-07-P	SMEC Closed Loop Scan check PRIME	
45.	SPIRE-FM-WFT-FUNC-SMEC-02B-P	SMEC Close Launch Latch PRIME	
46.	SPIRE-FM-WFT-SMEC-OFF-P	SMEC Switch OFF PRIME	
	REDUNDANT UNIT SCRIPTS		
47.	SPIRE-FM-WFT-DPU-START-R-PP	DPU ON REDUN	

No.	Tcl Script Name	Comment	Confirmed
48.	SPIRE-FM-WFT-DRCU-START-R-STEP1	DRCU ON REDUN Step1	
49.	SPIRE-FM-WFT-DRCU-START-R-STEP2	DRCU ON REDUN Step2	
50.	SPIRE-FM-WFT-FUNC-SCU-01-R	SCU Nominal Science Packet Generation Check REDUN.	
51.	SPIRE-FM-WFT-FUNC-SCU-03-R	SCU DC Thermometry Check REDUN.	
52.	SPIRE-FM-WFT-FUNC-SCU-06-R	SCU AC Thermometry Check REDUN.	
53.	SPIRE-FM-WFT-FUNC-SCU-02-R	SCU Nominal Science Contents Check REDUN.	
54.	SPIRE-FM-WFT-FUNC-SCU-04-R	Photometer Calibrator Check REDUN.	
55.	SPIRE-FM-WFT-FUNC-SCU-05-R	Spectrometer Calibrator Check REDUN.	
56.	SPIRE-FM-WFT-FUNC-SCU-07-R	Sorption Cooler Heaters Check REDUN.	
57.	SPIRE-FM-WFT-FUNC-SCU-08-R	SCU Test Pattern Check REDUN.	
58.	SPIRE-FM-WFT-FUNC-MCU-01-R	MCU Boot Check REDUN.	
59.	SPIRE-FM-WFT-FUNC-MCU-02-R	MCU Nominal Science Packet Generation Check REDUN.	
60.	SPIRE-FM-WFT-FUNC-MCU-03-R	MCU Nominal Science Contents Check REDUN.	
61.	SPIRE-FM-WFT-FUNC-MCU-04-R	MCU Test Pattern Check REDUN	
62.	SPIRE-FM-WFT-FUNC-BSM-01-R	BSM Chop/Jiggle Sensors Check REDUN.	
63.	SPIRE-FM-WFT-FUNC-BSM-02c-R	BSM Chop Sensor Polarity Check REDUN.	
64.	SPIRE-FM-WFT-FUNC-BSM-02j-R	BSM Jiggle Sensor Polarity Check REDUN.	
65.	SPIRE-FM-WFT-FUNC-BSM-03-R	BSM Open Loop Dynamics Check REDUN.	
66.	SPIRE-FM-WFT-FUNC-BSM-05A-R	BSM Open Loop Chop Test REDUN.	
67.	SPIRE-FM-WFT-FUNC-BSM-05B-R	BSM Closed Loop Chop Test REDUN.	
68.	SPIRE-FM-WFT-FUNC-BSM-06-R	BSM Operational Mode Check REDUN	
69.	SPIRE-FM-WFT-BSM-0FF-R	BSM Switch OFF REDUN.	
70.	SPIRE-FM-WFT-FUNC-DCU-01-R	DCU Nominal Science Packet Generation Check REDUN.	

No.	Tcl Script Name	Comment	Confirmed
71.	SPIRE-FM-WFT-FUNC-DCU-02-R	DCU High Speed Link Check REDUN.	
72.	SPIRE-FM-WFT-FUNC-DCU-03-R	DCU Test pattern Check REDUN.	
73.	SPIRE-FM-WFT-FUNC-DCU-04-PHOT-R	Photometer LIAs Check REDUN.	
74.	SPIRE-FM-WFT-FUNC-DCU-11-PHOT-R	Photometer BDAs Switch ON Check REDUN.	
75.	SPIRE-FM-WFT-FUNC-DCU-13-PHOT-R	Photometer BDAs Integrity Check REDUN.	
76.	SPIRE-FM-WFT-FUNC-DCU-14-PHOT-R	Photometer BDAs Noise Check REDUN.	
77.	SPIRE-FM-WFT-PDET-OFF-R	Photometer BDAs Switch OFF REDUN.	
78.	SPIRE-FM-WFT-FUNC-DCU-04-SPEC-R	Spectrometer LIAs Check REDUN.	
79.	SPIRE-FM-WFT-FUNC-DCU-11-SPEC-R	Spectrometer BDAs Integrity Check REDUN.	
80.	SPIRE-FM-WFT-FUNC-DCU-13-SPEC-R	Spectrometer BDAs Integrity Check REDUN.	
81.	SPIRE-FM-WFT-FUNC-DCU-14-SPEC-R	Spectrometer BDAs Noise Check REDUN.	
82.	SPIRE-FM-WFT-SDET-OFF-R	Spectrometer BDAs switch OFF REDUN.	
83.	SPIRE-FM-WFT-MCU-OFF-R	MCU Switch OFF REDUN.	
84.	SPIRE-FM-WFT-SCU-OFF-R	SCU Switch OFF REDUN.	
85.	SPIRE-FM-WFT-DRCU-OFF-R	DRCU Switch OFF REDUN	
86.	SPIRE-FM-WFT-FUNC-SMEC-01-R	SMEC Encoder and LVDT Check REDUN.	
87.	SPIRE-FM-WFT-FUNC-SMEC-03-R	SMEC Encoder Levels Check REDUN.	
88.	SPIRE-FM-WFT-FUNC-SMEC-02A-R	SMEC Open Launch Latch REDUN.	
89.	SPIRE-FM-WFT-FUNC-SMEC-04A-R	SMEC Open Loop Position Check REDUN.	
90.	SPIRE-FM-WFT-FUNC-SMEC-09-R	SMEC Open Loop Scan Check REDUN.	
91.	SPIRE-FM-WFT-FUNC-SMEC-07-R	SMEC Closed Loop Scan Check REDUN.	
92.	SPIRE-FM-WFT-FUNC-SMEC-02B-R	SMEC Close Launch Latch REDUN.	
93.	SPIRE-FM-WFT-SMEC-OFF-R	SMEC Switch OFF REDUN.	

The HPCSS must also have the following MIB files for SPIRE loaded:

HPCCS Software	Version	Comment	Confirmed Installed
SPIRE MIB version	15		

The SPIRE I-EGSE will be running the following software for the test:

I-EGSE Software	Version	Comment
SPIRE MIB version	SPIRE_MIB_	FM_2.LG5_PR_2
SCOS version		

5 Conditions

5.1 Personnel

Responsibility	Name / Organisation
Test Director	B. Collodin / TAS-F
Test Conductor	A. Koppe / ASED
EGSE Operator	S. Hamer / Terma
Electrical Engineer	–
Specialist Engineer	–
Element Cognizant	–
PA Responsible	D. Hendry / ASED
Instrument Representative	S. Sidher / K. King / RAL
Customer Representative	K. Goodey / C. Schlamberg / ESA
ESA Representative	–

5.2 Environmental

The actual clean room environmental conditions for the test shall be recorded below.

Environmental	Nominal	Actual	P	N
Clean Room Class	class 100000 or better	404	✓	
Temperature	22°C ± 3°C	22°C	✓	
Rel. Humidity	40 % - 60 %	49 %	✓	
Pressure	Ambient	973,6 hPa	✓	

5.3 General Precautions and Safety

Non-test specific precautions and safety considerations are detailed in section 5.3 of AD 2. Specific safety issues and general precautions for the tests to be performed are detailed in the following sections.

5.3.1 General Safety Requirements, Precautions

In the event of unrecoverable anomaly requiring emergency switch off of the satellite, the switch off shall be performed in accordance with AD 3.

5.3.2 ESD constraints

Normal ESD constraints are to be observed during the test.

5.3.3 Special QA Requirements

None.

5.4 GSE

Non-test specific GSE details are provided in section 5.4 of AD 2. Specific GSE needs for the tests to performed are detailed in the following sections.

5.4.1 MGSE

None.

5.4.2 CVSE

None.

5.4.3 EGSE

The I-EGSE is required for this test and will be connected to the HPCCS in accordance with AD 5.

5.4.4 OGSE

None.

5.4.5 Special Equipment

None.

6 Verification Requirements and Test Criteria

This is a functional check of all SPIRE PFM subsystems in warm conditions. No specific requirements are to be verified.

Functional performance and status parameter actual values recorded will be checked during the test and must be the same as the nominal status value indicated.

The test will only be deemed successful once all offline analysis of the results has been performed. Typically, the PTR will be held before completion of this activity and therefore only a preliminary assessment of the test success can be provided to allow disconnection of any specific GSE required for the test and which needs to be removed before further activities can be performed.

7 Test Procedure

7.1 Initial EGSE and Satellite Configuration for the Test

The Spire FM Final Integration according to the Test Procedure ref. AD 1 must be successfully completed before the execution of this procedure.

The EGSE and Satellite must be configured according to AD 2 prior to start of test.

In case of anomaly on SPIRE requiring immediate switch off as directed by SPIRE responsible supporting the test section 7.2.11 shall be executed.

In the event of emergency the Satellite SHALL be switched down according to AD 3.

7.2 Step by Step Procedure

7.2.1 EGSE & Satellite Switch On

08:58

Redundant: 2007_10_24_05_37_hercdmu_hpws23_REALTIME_SP WSFT2R

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	Install Test Box and Satellite & EGSE Switch On						
1.1	Confirm I-EGSE physically connected to HPCCS	OK		OK			
1.2	If not already on, switch on HPCCS, SCOEs and Satellite/SVM and configure into Basic Test Mode i.a.w. AD 2 Section 7.1 to 7.5			OK			
1.3	Record Test Session Name: Prime	2007_10_23_08_41_hercdmu_hpws23_REALTIME_ SP_WSFT2					
1.4	Confirm that EGSE and Satellite are in the correct configuration as per AD 2	OK		OK			
1.7	Switch on & configure SPIRE I-EGSE i.a.w. **AD5 & AD 8**						

Enter Date/Time:	23/10/07	09:13	**Sign Off:**	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
1.8	Confirm SPIRE I-EGSE is in the correct configuration as per AD5 & AD 8	OK		OK			
1.9	From HPCCS Test Conductor console issue command to connect to SPIRE I-EGSE **connect HSPIREEGSE**			OK			
1.10	Confirm from HPCCS and SPIRE I-EGSE that the connection has been established	OK		OK			
1.11	On HPCCS start the following test script: **ALL_SubscribeParams.tcl**	OK		OK			
	START OF SPIRE WFT						
1.12	Load Synoptics INSTRUMENTS on HPCCS to display SPIRE status overview			OK			

7.2.2 *Switch On SPIRE PRIME DPU & DRCU*

09:24

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH ON DPU PRIME						
	Initial Conditions: DPU-A & DRCU A OFF						
2.1	On HPCCS execute the following test script to power on the SPIRE DPU and DRCU. **S102999SCVT009_ASDWFTSPIR_PWR_ON_P.tcl** Respond to the prompts as listed below:				AND: ZAD07999, ZAD14999 MIM: LCL_HERSCHEL		

Enter Date/Time:	23/10/07	09:24	**Sign Off:**	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	The test script (calling the specific SPIRE scripts as appropriate) powers ON the DPU and enables the MilBus before forcebooting the ASW (NB: currently powers ON DPU using secondary partition). The DRCU is then powered and configured.						
2.2	Check that Nominal and Critical HK packets are arriving at the HPCCS: **SPIRE Nominal HK:** • (type ,subtype) : (3,25) • APID : 0x502 (1282) **SPIRE Critical HK:** • (type ,subtype) : (3,25) • APID: 0x500 (1280)	OK			Ok		
2.3	On I-EGSE/HPCCS check that THSK parameter is refreshing every second	OK			Ok		
2.4	On I-EGSE check that TM2N parameter is incrementing by 1 every second	OK			Ok		
2.5	On I-EGSE check that TM1N parameter is incrementing by 1 every 2 second	OK			Ok		
2.6	On HPCCS check the consistency of the SPIRE on board time to the HCDMU time and the CCS (need to clarify if SPIRE requests a time verification report as part of DPU ON sequence).	OK			Ok		
2.7	On IEGSE check the consistency between SCOS time and THSK and QLA time.	OK			Ok		
2.8	Continue test script by responding to prompt						

Enter Date/Time:	23/10/07		**Sign Off:**	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH ON DRCU PRIME						
2.9	When prompted by test script:						
2.10	On I-EGSE/HPCCS check that THSK parameter is not refreshing anymore	OK		OK			
2.11	On I-EGSE/HPCCS check that TM2N parameter is not incrementing anymore	OK		OK			
2.12	Continue test script by responding to prompt to power on DRCU			OK			
2.13	On I-EGSE check that THSK parameter is refreshing every second	OK		OK			
2.14	On I-EGSE check that TM2N parameter is incrementing by 1 every second	OK		OK			
2.15	Continue test script by responding to prompt						
	SPIRE PRIME DPU & DRCU POWER ON COMPLETE						

Enter Date/Time:	23 | 10 | 07	09:41	**Sign Off:**	

7.2.3 Warm Functional Tests - Nominal

7.2.3.1 Procedure SPIRE-FM-WFT-FUNC-SCU-01-P

Version	2.4
Date	16th Oct. 2007
Purpose	SCU science packet generation check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • DPU AND OBS PARAMETERS & FUNCTIONAL TEST PARAMETERS displays are selected on the CCS
Duration	3 minutes
Pass/Fail Criteria	Specified SCU HK parameters show expected increment.

Procedure Steps:

09:43

Step	**Description**	**Parameter**	**Expected Values Before/ After**	**Actual Values Before /After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-01-P.tcl	SCUFRAMECNT TM5N	0/31 0x3FFF/1	31 1	
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	09:44	**Sign Off:**	

7.2.3.2 Procedure SPIRE-FM-WFT-FUNC-SCU-03-P

Version	2.4
Date	16th Oct. 2007
Purpose	SCU DC thermometry check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and DC thermometry is ON
Constraints	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • SFT PARAMETERS display is selected on the CCS
Duration	8 minutes
Pass/Fail Criteria	DC Thermometry channels show temperature readings according to the actual instrument temperature* *: At warm temperatures all channels should show short circuit RAW readings of -32768

Procedure Steps: 09:45

Step	**Description**	**Parameter - Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-03-P.tcl	—	—	— ✓	—
2	**Wait for the parameter BBFULLTYPE to get set to SCU_DC_Therm**				
3	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0/0xFFFF/0xFFFF	0xFFFF	

Enter Date/Time:	23/10/07		**Sign Off:**	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
4	**Configure the SFT PARAMETERS display to show the RAW values of SCU DC thermometry channels.** Record the values of SCU DC thermometry channels. Nominal values should show a short circuit status (or RAW - 32768) **Non Nominal (Open Circuit Criterion): RAW reading in the range [0, -100]**	PUMPHTRTEMP	—	To be provided by RAL from IGG-SE	
		PUMPHSTEMP	—		
		EVAPHSTEMP	—		
		SHUNTTEMP	—		
		EMCFILTEMP	—		
		SL0TEMP	—		
		PL0TEMP	—		
		OPTTEMP	—		
		BAFTEMP	—		
		BSMIFTEMP	—		
		SCAL2TEMP	—		
		SCAL4TEMP	—		
		SCALTEMP	—		
		SMECIFTEMP	—		
		SMECTEMP	—		
		BSMTEMP	—		
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	09:46	**Sign Off:**	

7.2.3.3 Procedure SPIRE-FM-WFT-FUNC-SCU-06-P

Version	2.4
Date	16th Oct. 2007
Purpose	SCU AC thermometry check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and DC thermometry is ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Constraints	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • SFT PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail Criteria	AC Thermometry channel shows temperature readings according to the actual instrument temperature

Enter Date/Time:	23|10|07		**Sign Off:**	

Procedure Steps:

09:48

Step	**Description**	**Parameter - Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-06-P.tcl	—	—	— ✓	—
2	**Wait for the parameter BBFULLTYPE to get set to SCU_AC_Therm**			OK	
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	0/1/1	1	
4	**Configure the SFT PARAMETERS display to show the RAW values of SCU AC thermometry channel.** Record the value of SCU AC thermometry channel if it indicates an open circuit. Nominal value should show a short circuit status (or RAW ~ -32768) **Non Nominal (Open Circuit Criterion): RAW reading in the range [0, -100]**	SUBKTEMP	—	32749	

Test Result (Pass/Fail):

Enter Date/Time:	23/10/07	09:49	**Sign Off:**	

Enter Date/Time:			**Sign Off:**	

7.2.3.4 Procedure SPIRE-FM-WFT-FUNC-SCU-02-P

Version	2.4
Date	16th Oct. 2007
Purpose	SCU Nominal Science Contents Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • DPU AND OBS PARAMETERS & FUNCTIONAL TEST PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail Criteria	Specified SCU HK parameters show expected increment.

Procedure Steps: 09:52

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-02-P.tcl	SCUFRAMECNT TM5N	31/62 1/3	31/62 1/3	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	09:53	**Sign Off:**	

7.2.3.5 Procedure SPIRE-FM-WFT-FUNC-SCU-04-P

Version	2.4
Date	16th Oct. 2007
Purpose	Photometer Calibration Check (PRIME)
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail Criteria	PCAL voltage and current agree with expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 09:54

Step	Description	Parameter Name – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-04-P.tcl **The expected values during the test should be monitored when parameter BBFULLTYPE in the FUNCTIONAL TEST PARAMETERS display is set to PCAL_Check This usually happens about 30 seconds from the start of test execution.**	PCALCURR - mA PCALV – V BBFULLTYPE	0.0/0.1/0.0 0.0/0.02/0.0 PCAL_Check	0.001/0.1 0.000/0.02 OK	A V.
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Final Configuration: Unchanged

Enter Date/Time:	23/10/07	09:55	**Sign Off:**	

7.2.3.6 Procedure SPIRE-FM-WFT-FUNC-SCU-05-P

Version	2.4
Date	16th Oct. 2007
Purpose	Spectrometer Calibration Check (PRIME)
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	SCAL2 and SCAL4 voltage and currents agree with expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 09:56

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-05-P.tcl	—	—	— ✓	
2	**Wait for the parameter BBFULLTYPE to get set to SCAL4_Check**	BBFULLTYPE	SCAL4_Check	— ✓	
3	A few seconds later record the value of parameters SCAL4CURR and SCAL4V *These parameters are set back to 0 after ~20 seconds*	SCAL4CURR – mA SCAL4V – V	0.0/0.10/0.0 0.0/0.05/0.0	— 0.1 A 0.05 V ✓	
4	**Wait for the parameter BBFULLTYPE to get set to SCAL2_Check**	BBFULLTYPE	SCAL2_Check	— ✓	
5	A few seconds later record the values of parameters SCAL2CURR and SCAL2V *These parameters are set back to 0 after ~20 seconds*	SCAL2CURR – mA SCAL2V – V	0.0/0.10/0.0 0.0/0.05/0.0	— 0.1 A 0.05 V ✓	
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—

Test Result (Pass/Fail):

Enter Date/Time: 23/10/07 09:57 **Sign Off:**

7.2.3.7 Procedure SPIRE-FM-WFT-FUNC-SCU-07-P

Version	2.4
Date	16th Oct. 2007
Purpose	Sorption Cooler Heater Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and DC thermometry is ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail Criteria	Sorption cooler heat switches and pump heater show expected voltages

Procedure Steps:

Enter Date/Time:			**Sign Off:**	

09:58

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-07-P.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to Cooler_Htr_Chk**	BBFULLTYPE	Cooler_Htr_Chk		
3	Record the value of parameter SPHSV – the Sorption Pump Heat Switch Voltage. *This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.*	SPHSV – mV	0/~323/0	To be provided by RAL from IEGSE	
4	Record the value of parameter EVHSV – the Evaporator Heat Switch Voltage. *This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.*	EVHSV – mV	0/~323/0		
5	Record the value of parameter SPHTRV – the Sorption Pump Heater Voltage. *This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.*	SPHTRV – V	0/~8.8/0		
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—

Enter Date/Time **Test Result (Pass/Fail):** 23/10/07 09:59 **Sign Off:**

7.2.3.8 Procedure SPIRE-FM-WFT-FUNC-SCU-08-P

Version	2.4
Date	16th Oct. 2007
Purpose	SCU test pattern check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • DPU AND OBS PARAMETERS & FUNCTIONAL TEST PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail Criteria	SCU Test Pattern generated agrees with the one generated on a previous execution.

Procedure Steps:

10:00

Step	**Description**	**Parameter**	**Expected Values Before/ After**	**Actual Values Before /After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-08-P.tcl	SCUFRAMECNT TM5N	62/93 3/5	62/93 3/5	✓
2	**Wait for the I-EGSE staff to confirm the success of the test.**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	10:01	**Sign Off:**	

7.2.3.9 Procedure SPIRE-FM-WFT-FUNC-MCU-01-P

Version	2.4
Date	16th Oct. 2007
Purpose	MCU (PRIME) Boot Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCU voltages and board temperatures show expected 'ON' values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: [illegible]:10:02

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-MCU-01-P.tcl	—	—	— ✓	—
2	Check that the MCU is booted up successfully	MCUBITSTAT	0/1/1		
3	Check MCU HK parameter values and ensure that the values are refreshing	MCUP5V - V MCUP14V - V MCUM14V - V MCUP15V - V MCUM15V- V MCUMACTEMP - K MCUSMECTEMP - K MCUBSMTEMP - K	~ 5.0 ± 0.2 ~ 14.0 ± 0.6 ~ -14.0 ± 0.6 ~ 15.0 ± 0.6 ~ -15.0 ± 0.7 ~300 ~300 ~300	5.01 14.15 -14.47 15.54 -15.63 290 295 295	
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	10:03	**Sign Off:**	

7.2.3.10 Procedure: SPIRE-FM-WFT-FUNC-MCU-02-P

Version	2.4
Date	16th Oct. 2007
Purpose	MCU Nominal Frame Generation Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	Unchanged.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified MCU HK parameters show expected increment

Procedure Steps: 10:05

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-MCU-02-P.tcl	MCUFRAMECNT	0/~ 6000	— 6492	—
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	10:07	**Sign Off:**	

7.2.3.11 Procedure: SPIRE-FM-WFT-FUNC-MCU-03-P

Version	2.4
Date	16th Oct. 2007
Purpose	MCU Nominal Science Contents Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	Unchanged.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified MCU HK parameters show expected increment

Procedure Steps:

10:09

Step	**Description**	**Parameter - Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-MCU-03-P.tcl	MCUFRAMECNT	~6000/~ 6297 Should increment by 297 6492	— ~ 6789	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	10:10	**Sign Off:**	

7.2.3.12 Procedure: SPIRE-FM-WFT-FUNC-MCU-04-P

Version	2.4
Date	16th Oct. 2007
Purpose	MCU Test Pattern Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	Unchanged.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCU Test Pattern generated agrees with the one generated on a previous execution.

Procedure Steps: 10:12

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-MCU-04-P.tcl	MCUFRAMECNT	N/N+99 6789	— ✓ 6888	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	10:13	**Sign Off:**	

7.2.3.13 Procedure SPIRE-FM-WFT-FUNC-BSM-01-P

Version	2.4
Date	16th Oct. 2007
Purpose	BSM (PRIME) Chop/Jiggle Sensor Check.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	HK Parameters CHOPSENSPWR and JIGGSENSPWR show expected ON values.

Procedure Steps: 10:16

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-01-P.tcl	—	—	—	—
2	Check that the Chop and Jiggle sensors have switched on	CHOPSENSPWR JIGGSENSPWR	0/1/1 0/1/1	0 1 1 0 1 1	

Test Result (Pass/Fail):

Enter Date/Time:	23/10/07	10.17	**Sign Off:**	

7.2.3.14 Procedure SPIRE-FM-WFT-FUNC-BSM-02C-P

Version	2.4
Date	16th Oct. 2007
Purpose	BSM (PRIME) Chop Sensor Polarity Check.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	CHOPSENSSIG HK parameter increments in the same direction as the commanded positions

Procedure Steps: 10:23

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-02C-P.tcl	—	—	— ✓	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	10:24	**Sign Off:**	

7.2.3.15 Procedure SPIRE-FM-WFT-FUNC-BSM-02J-P

Version	2.4
Date	16th Oct. 2007
Purpose	BSM (PRIME) Jiggle Sensor Polarity Check.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	JIGGSENSSIG HK parameter increments in the same direction as the commanded positions

Procedure Steps:

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10:30

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-02J-P.tcl	—	—	— ✓	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

7.2.3.16 Procedure SPIRE-FM-WFT-FUNC-BSM-03-P

Version	2.4
Date	16th Oct. 2007
Purpose	BSM (PRIME) Open Loop Dynamics Check.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	CHOPSENSSIG/JIGGSENSIG HK parameter evolve in the same direction as the commanded positions

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Procedure Steps: 10:36

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-03-P.tcl	—	—	— ✓	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				

Test Result (Pass/Fail):

7.2.3.17 Procedure SPIRE-FM-WFT-FUNC-BSM-05A-P

Version	2.4
Date	16th Oct. 2007
Purpose	BSM (PRIME) Open Loop Chop Test
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS

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Duration	5 minutes
Pass/Fail criteria	The BSM Chops in between the commanded positions

Procedure Steps: 10:47

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-05A-P.tcl	—	—	— ✓	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

7.2.3.18 Procedure SPIRE-FM-WFT-FUNC-BSM-05B-P

Version	2.4
Date	16th Oct. 2007
Purpose	BSM (PRIME) Closed Loop Chop Test
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	BSM is in closed loop mode
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database.

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	- CCS is up and running - CHOP PARAMETERS and JIGGLE PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail criteria	The BSM Chops in between the commanded positions

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Procedure Steps: 10:53

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-FM-WFT-BSM-INIT-P.tcl	CHOPLOOPMODE JIGGLOOPMODE	3/-/1 3/-/1	3/ 1 3/ 1	
2	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-05B-P.tcl	—	—	— ✓	—
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	10:56	**Sign Off:**	

7.2.3.19 Procedure SPIRE-FM-WFT-FUNC-BSM-06-P

Version	2.4
Date	16th Oct. 2007
Purpose	BSM (PRIME) Operational Mode Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON. BSM is in closed loop.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • CHOP PARAMETERS and JIGGLE PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail criteria	The BSM Chops in between the commanded positions

Procedure Steps: 10:58

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-06-P.tcl	CHOPLOOPMODE JIGGLOOPMODE	1 1	1 1	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Unknown pkt 2,4 seen (as in WFT1)

Enter Date/Time:	23/10/07	10:59	**Sign Off:**	

7.2.3.20 Procedure SPIRE-FM-WFT-BSM-OFF-P

Version	2.4
Date	16th Oct. 2007
Purpose	BSM (PRIME) Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are OFF.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters CHOPSENSPWR and JIGGSENSPWR show expected OFF values.

Procedure Steps:

11:02

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-FM-WFT-BSM-OFF-P.tcl	—	—	— ✓	—
2	Check that the power to the BSM sensors is switched off	CHOPSENSPWR JIGGSENSPWR	1/-/0 1/-/0	0 0	
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	11:03	**Sign Off:**	

7.2.3.21 Procedure SPIRE-FM-WFT-FUNC-DCU-01-P

Version	2.4
Date	16th Oct. 2007
Purpose	DCU science packet generation check for all Photometer and Spectrometer packet types (PF, PSW, PMW, PLW, SF, SSW and SLW)
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified DCU HK parameter shows expected increment

Procedure Steps: 11:05

Step	**Description**	**Parameter**	**Expected Values Before/ After**	**Actual Values Before /After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-01-P.tcl	DCUFRAMECNT	n/n+700 1200	→ 1900	
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	11:07	**Sign Off:**	

7.2.3.22 Procedure SPIRE-FM-WFT-FUNC-DCU-02-P

Version	2.4
Date	16th Oct. 2007
Purpose	To check the correct functioning of the DCU PRIME High Speed Link
Initial configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced and MCU is booted.
Final configuration	Unchanged
Preconditions	• SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • I-EGSE is up and running • DCU PARAMETERS display is selected on the CCS • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	The following DCU telemetry packet types are received at the IEGSE with : Full Photometer: - (type,subtype): (21,1). - APID 0x504 PSW - (type,subtype): (21,2). - APID 0x504 PMW -(type,subtype): (21,2). - APID 0x504 PLW -(type,subtype): (21,2). - APID 0x504 Full Spectrometer: - (type,subtype): (21,1). - APID 0x506

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	SSW - (type,subtype): (21,2). - APID 0x506 SLW -(type,subtype): (21,2). - APID 0x506

Procedure Steps: 11:09

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT--DCU-02-P.tcl	DCUFRAMECNT	n/n+700 1900	2600	

Enter Date/Time:	23/10/07	11:12	**Sign Off:**	

Step	**Description**	**Parameter**	**Expected Values Before/ After**	**Actual Values Before /After**	**Success/ Failure**
2	Verify that the following type of DCU science telemetry packets have been received at the CCS : Full Photometer: - (type,subtype): (21,1). - APID 0x504 PSW - (type,subtype): (21,2). - APID 0x504 PMW -(type,subtype): (21,2). - APID 0x504 PLW -(type,subtype): (21,2). - APID 0x504 Full Spectrometer: - (type,subtype): (21,1). - APID 0x506 SSW - (type,subtype): (21,2). - APID 0x506 SLW -(type,subtype): (21,2). - APID 0x506	—	—	— Values to be Provided by RAL	

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Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
Test Result (Pass/Fail):					

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7.2.3.23 Procedure SPIRE-FM-WFT-FUNC-DCU-03-P

Version	2.4
Date	16th Oct. 2007
Purpose	DCU Test Pattern Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU (Photometer/Spectrometer) Test Pattern generated agrees with the one generated on a previous execution.

Procedure Steps: 11:18

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-03-P.tcl	DCUFRAMECNT	n/n+200 ← 2600	25500	
Test Result (Pass/Fail):					

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7.2.3.24 Procedure SPIRE-FM-WFT-FUNC-DCU-04-PHOT-P

Version	2.4
Date	16th Oct. 2007
Purpose	Photometer LIAs check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Photometer LIAs are ON.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

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Procedure Steps: 11:20

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-04-PHOT-P.tcl	—	—	✓	—
2	Check that the Photometer LIAs are switched on	PLIAP5V PLIAP9V PLIAM9V	~0/ ~+5.17 ± 0.1V ~0/ ~+11.53 ± 0.1V ~0/ ~-11.53 ± 0.1V	5.23 11.58 -11.58	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

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7.2.3.25 Procedure SPIRE-FM-WFT-FUNC-DCU-11-PHOT-P

Version	2.4
Date	16th Oct. 2007
Purpose	Photometer BDAs switch ON check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Photometer BDAs are ON.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps:

11:24.

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-11-PHOT-P.tcl	—	—	✓ —	—
2	Check that the Photometer detectors and LIAs are switched on	PSWJFETSTAT PMLWJFETSTAT PLIABITSTAT	0/-/0x3F 0/-/0x7F 1	0/3F 0/7F 1	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	11:26	**Sign Off:**	

7.2.3.26 Procedure SPIRE-FM-WFT-FUNC-DCU-13-PHOT-P

Version	2.4
Date	16th Oct. 2007
Purpose	Photometer BDAs integrity check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Photometer BDAs are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	15 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps:

11:36

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that Photometer LIAs and detectors are switched on	PLIABITSTAT PSWJFETSTAT PMLWJFETSTAT	1 0x3F 0x7F	1 3F 7F	
2	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-13-PHOT-P.tcl	—	—	✓ —	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

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7.2.3.27 Procedure SPIRE-FM-WFT-FUNC-DCU-14-PHOT-P

Version	2.4
Date	16th Oct. 2007
Purpose	Photometer BDAs noise level check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Photometer BDAs are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Photometer BDAs signal show no excess noise

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 12:10

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that Photometer LIAs and detectors are switched on	PLIABITSTAT PSWJFETSTAT PMLWJFETSTAT	1 0x3F 0x7F	1 3F 7F	
2	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-14-PHOT-P.tcl	—	—	✓ —	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	12:12	**Sign Off:**	

7.2.3.28 Procedure SPIRE-FM-WFT-PDET-OFF-P

Version	2.4
Date	16th Oct. 2007
Purpose	Photometer BDAs Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Photometer BDAs are ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Photometer BDAs are OFF
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 12:14

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-PDET-OFF-P.tcl	—	—	✓	
2	Check that the Photometer detectors are switched off	PSWJFETSTAT PMLWJFETSTAT	0x3F/-/0 0x7F/-/0	3F | 0 7F | 0	
3	Check that the Photometer LIAs are switched off	PLIABITSTAT	1/-/0	1 | 0	
4	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—

Test Result (Pass/Fail):

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7.2.3.29 Procedure SPIRE-FM-WFT-FUNC-DCU-04-SPEC-P

Version	2.4
Date	16th Oct. 2007
Purpose	Spectrometer LIAs check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Spectrometer LIAs are ON.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 12:16

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-04-SPEC-P.tcl	—	—	— ✓	—
2	Check that the Spectrometer LIAs are switched on	SLIAP5V - V SLIAP9V - V SLIAM9V - V	~0/ ~+5.23 ± 0.1 ~0/ ~+11.57 ± 0.1 ~0/ ~-11.54 ± 0.1	5.25 11.59 -11.56	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

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7.2.3.30 Procedure SPIRE-FM-WFT-FUNC-DCU-11-SPEC-P

Version	2.4
Date	16th Oct. 2007
Purpose	Spectrometer BDAs switch ON check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Spectrometer BDAs are ON.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 12:21

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-11-SPEC-P.tcl	—	—	— ✓	—
2	Check that the Spectrometer detectors are switched on	SPECJFETSTAT SLIABITSTAT	0/-/7 1	0/7 1	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	12:23	**Sign Off:**	

7.2.3.31 Procedure SPIRE-FM-WFT-FUNC-DCU-13-SPEC-P

Version	2.4
Date	16th Oct. 2007
Purpose	Spectrometer BDAs integrity check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Spectrometer BDAs are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	12 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:	2		**Sign Off:**	

Procedure Steps: 12:26

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the Spectrometer detectors and LIAs are switched on	SPECJFETSTAT SLIABITSTAT	7 1	7 1	
2	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-13-SPEC-P.tcl	—	—	—	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

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7.2.3.32 Procedure SPIRE-FM-WFT-FUNC-DCU-14-SPEC-P

Version	2.4
Date	16th Oct. 2007
Purpose	Spectrometer BDAs noise check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Spectrometer BDAs are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Spectrometers BDAs signal show no excess noise

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 12:41

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the Spectrometer detectors and LIAs are switched on	SPECJFETSTAT SLIABITSTAT	7 1	7 1	
2	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-14-SPEC-P.tcl	—	—	✓—	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

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7.2.3.33 Procedure SPIRE-FM-WFT-SDET-OFF-P

Version	2.4
Date	16th Oct. 2007
Purpose	Spectrometer BDAs Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Spectrometer BDAs are ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and Spectrometer BDAs are OFF
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 12:49

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-SDET-OFF-P.tcl	—	—	↘	
2	Check that the Spectrometer detectors are switched off	SPECJFETSTAT	7/-/0	7/0	
3	Check that the Spectrometer LIAs are switched off	SLIABITSTAT	1/-/0	1/0	
4	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

7.2.3.34 Procedure SPIRE-FM-WFT-FUNC-SMEC-01-P

Version	2.4
Date	16th Oct. 2007
Purpose	SMEC (PRIME) Encoder/LVDT Sensor Check.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Preconditions	• SPIRE DRCU PRIME is switched ON

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	• SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected ON values.

Procedure Steps: 12:53

Step	**Description**	**Parameter – Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-01-P.tcl	—	—	— ✓	—
2	Check that power to the SMEC LED and LVDT sensor is on	SMECENCPWR SMECLVDTPWR	0/-/6 0/1/1	0/ 6 0/ 1	
Test Result (Pass/Fail):					

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7.2.3.35 Procedure SPIRE-FM-WFT-FUNC-SMEC-03-P

Version	2.4
Date	16th Oct. 2007
Purpose	SMEC (PRIME) Encoder Integrity Check.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCUENGSMECENCSIG1/2 increase as the encoder power is increased

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 13:01

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-03-P.tcl	—	—	— ✓	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	13:02	**Sign Off:**	

7.2.3.36 Procedure SPIRE-FM-WFT-FUNC-SMEC-02A-P

Version	2.4
Date	16th Oct. 2007
Purpose	Open the SMEC Launch Latch (Unlatch it)
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and SMEC is latched
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and SMEC is ON and Unlatched
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5 minutes
Pass/Fail criteria	TBD

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 13:15

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-02A-P.tcl	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	13:16	**Sign Off:**	

7.2.3.37 Procedure SPIRE-FM-WFT-FUNC-SMEC-04A-P

Version	2.4
Date	16th Oct. 2007
Purpose	SMEC (PRIME) Open Loop Positioning Test.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5 minutes
Pass/Fail criteria	SMEC moves to the commanded positions

Procedure Steps: 13:19 / *Repeat 16:21 (NCR-3720)

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-04A-P.tcl	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	13:23 / 16:25	**Sign Off:**	

7.2.3.38 Procedure SPIRE-FM-WFT-FUNC-SMEC-09-P

Version	2.4
Date	16th Oct. 2007
Purpose	SMEC (PRIME) Open Loop Scan Test.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5 minutes
Pass/Fail criteria	SMEC performs a scan between the commanded positions

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 13:34 / Repeat 16:33 (NCR-3720)

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9058xxxx** • **param 2 = 0** 5334 **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x905Axxxx** • **param 2 = 0** 668A **The 16 bit parameters xxxx will be provided by SPIRE staff**	SMECENCSIG1OFF SMECENCSIG2OFF 1st NCR Repeat 1st NCR Repeat	57E4 4F45 6D6Y 622C	5334 5780 668A 6B6C	1st Run. Not clear that smec launch latch released after step 7.2.336 NCR-3720
2	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-09-P.tcl	—	—	— ✓	—
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**				

Test Result (Pass/Fail):

XPVS1 Reform SPIRE-FM-WFT-FUNC-SMEC-02B-P (13:54)

Enter Date/Time:	23/10/07	13:39/16:35	**Sign Off:**	

Section 7.2.3.38. PVS1 Step 1

DS: 65535 ID: SAS0_5 Title: SMEC PARAMETERS Sample Time: 2007.296.14.00.03.876 Workstation: hpws22

NAME	DESCRIPTION	VALUE	UNIT
SM10N500	OBSID	B0000000	HEX
SM2LN500	BBFULLTYPE	Null	
SMD4N515	SMECSELECTTAB	00000000	HEX
SMS0W515	SMECENCPWR	00000006	HEX
SMS1W515	SMECLVDTPWR	00000001	HEX
SML0F515	SMECLATCHSTAT	00000000	HEX
SMS1M515	SMECLOOPMODE	00000006	HEX
SMS0P515	SCANSTART	1.0000	mm
SMS1P515	SCANEND	1.0000	mm
SMS0S515	SCANFSPEED	0.5250	mm/s
SMS0N515	SCANS	0	
SMS2M515	SCANMODE	00000001	HEX
SMG0N515	SMECKP	000003E8	HEX
SMG1N515	SMECKD	000003E8	HEX
SMS1N515	SMECDFILT	0000251C	HEX
SMG2N515	SMECKI	00000000	HEX
SMS3N515	SMECINTLIMIT	000007D0	HEX
SMS0B515	SMECINTTHRESH	0000FFFF	HEX
SMS1B515	SMECRATELIMIT	0000012C	HEX
SMS0T515	SMECDFILT2	00000000	HEX
SMS5N515	SMECFFGAIN	00004E26	HEX
SMS0A515	SMECFFOFFSET	00000000	HEX
SMS1S515	SCANRSPEED	0.5250	mm/s
SMS6N515	SMECBEMFGAIN	00000000	HEX
SMS00515	SMECMOTORRES	00000000	HEX
SMS01515	SMECMOTORBEMF	00000000	HEX
SMS7N515	SMECRATESCALE	00000064	HEX
SMS2B515	SMECLVDTOFFSET	8.0000	mm
SMSBN515	SMECLVDTSCALE	0.690520	mm
SMS0F515	SMECSTAT	00000008	HEX
SMS0X515	SMECFLAG	OK	
SMS1X515	SMECLVDTSIGN	NEGATIVE	

NAME	DESCRIPTION	VALUE	UNIT
SMS2X515	SMECINIT	NOTINIT/LOST	
SMS3X515	SMECSCANDIR	DOWN	
SMSPN515	SMECSCANCNT	0	DEC
SMS2P515	SMECENCPOSN	65.5340	mm
SMS0V515	SMECENCSIG1	00004F36	HEX
SMS1V515	SMECENCSIG2	00006F41	HEX
SMS2V515	SMECENCSIG3	0000ECC9	HEX
SMS3P515	SMECLVDTPOSN	5.1640	mm
SDS0P515	COMPLVDTPOSN	0	mm
SMS3A515	SMECLVDTACSIG	00006AE4	HEX
SMS4A515	SMECLVDTDCSIG	00001E22	HEX
SMS4P515	SMECTRAJPOSN	1.0000	mm
SMSCN515	SMECDACVAL	0000028F	HEX
SMS5P515	SMECPOSNDELTA	0	mm
SMS6P515	SMECENCFINEPOSN	998.0000	nm
SMS3S515	SMECMEANSPEED	0	mm/s
SMS3E515	SMECSCANPOSNERR	-310160.0000	nm
SMS5A515	SMECMOTORCURR	-39.3598	mA
SMS3V515	SMECMOTORVOLT	-0.5000	V
SMS6A515	SMECENCSIG1AMP	00000E2C	HEX
SMS7A515	SMECENCSIG1OFF	00004F45	HEX
SMS8A515	SMECENCSIG2AMP	00000C76	HEX
SMS9A515	SMECENCSIG2OFF	0000622C	HEX
SMSAA515	SMECENCSIG3AMP	0000FFFF	HEX
SMSBA515	SMECENCSIG3OFF	00004E20	HEX

1) Set the SMEC FF Offset to 0x7000

Send_DRCU_Command:

0x90557000

Confirmed ok.

2) Release the SMEC Latch.

Send_DRCU_Command:

0x90430002

Confirmed completion

3) Execute

SPIRE-FM-WFT-FUNC-SMEC-04A-

OK

~~4) Change Offset~~

NCR-3720

~~Before offsets applied~~
After Feed Forward Offset applied

DS: 65535 ID: SAS0_5 Title: SMEC PARAMETERS Sample Time: 2007.296.16.28.47.968 Workstation: hpws22

NAME	DESCRIPTION	VALUE	UNIT	NAME	DESCRIPTION	VALUE	UNIT
SM10N500	OBSID	B0000000	HEX	SMS2X515	SMECINIT	NOTINIT/LOST	
SM2LN500	BBFULLTYPE	Null		SMS3X515	SMECSCANDIR	DOWN	
SMD4N515	SMECSELECTTAB	00000000	HEX	SMSPN515	SMECSCANCNT	0	DEC
SMS0W515	SMECENCPWR	00000006	HEX	SMS2P515	SMECENCPOSN	65.5350	mm
SMS1W515	SMECLVDTPWR	00000001	HEX	SMS0V515	SMECENCSIG1	00005BDE	HEX
SML0F515	SMECLATCHSTAT	00000000	HEX	SMS1V515	SMECENCSIG2	00007048	HEX
SMS1M515	SMECLOOPMODE	00000006	HEX	SMS2V515	SMECENCSIG3	0000E1F1	HEX
SMS0P515	SCANSTART	1.0000	mm	SMS3P515	SMECLVDTPOSN	5.1640	mm
SMS1P515	SCANEND	1.0000	mm	SDS0P515	COMPLVDTPOSN	0	mm
SMS0S515	SCANFSPEED	0.5000	mm/s	SMS3A515	SMECLVDTACSIG	00006ADE	HEX
SMS0N515	SCANS	0		SMS4A515	SMECLVDTDCSIG	00001E24	HEX
SMS2M515	SCANMODE	00000001	HEX	SMS4P515	SMECTRAJPOSN	1.0000	mm
SMG0N515	SMECKP	000003E8	HEX	SMSCN515	SMECDACVAL	00007290	HEX
SMG1N515	SMECKD	000003E8	HEX	SMS5P515	SMECPOSNDELTA	0	mm
SMS1N515	SMECDFILT	0000251C	HEX	SMS6P515	SMECENCFINEPOSN	347.0000	nm
SMG2N515	SMECKI	00000000	HEX	SMS3S515	SMECMEANSPEED	0	mm/s
SMS3N515	SMECINTLIMIT	000007D0	HEX	SMS3E515	SMECSCANPOSNERR	-309700.0000	nm
SMS0B515	SMECINTTHRESH	0000FFFF	HEX	SMS5A515	SMECMOTORCURR	-9.2824	mA
SMS1B515	SMECRATELIMIT	0000012C	HEX	SMS3V515	SMECMOTORVOLT	-0.5000	V
SMS0T515	SMECDFILT2	00000000	HEX	SMS6A515	SMECENCSIG1AMP	00000E2C	HEX
SMS5N515	SMECFFGAIN	00004E26	HEX	SMS7A515	SMECENCSIG1OFF	00004F45	HEX
SMS0A515	SMECFFOFFSET	00007000	HEX	SMS8A515	SMECENCSIG2AMP	00000C76	HEX
~~SMS1S515~~	~~SCANRSPEED~~	0.5000	mm/s	SMS9A515	SMECENCSIG2OFF	0000622C	HEX
SMS6N515	SMECBEMFGAIN	00000000	HEX	SMSAA515	SMECENCSIG3AMP	0000FFFF	HEX
SMS00515	SMECMOTORRES	00000000	HEX	SMSBA515	SMECENCSIG3OFF	00004E20	HEX
SMS01515	SMECMOTORBEMF	00000000	HEX				
SMS7N515	SMECRATESCALE	00000064	HEX				
SMS2B515	SMECLVDTOFFSET	8.0000	mm				
SMSBN515	SMECLVDTSCALE	0.690520	mm				
SMS0F515	SMECSTAT	00000008	HEX				
SMS0X515	SMECFLAG	OK					
SMS1X515	SMECLVDTSIGN	NEGATIVE					

DS: 65535 ID: SAS0_5 Title: SMEC PARAMETERS Sample Time: 2007.296.16.32.55.971 Workstation: hpws22

(NCR3220) 7.2.3.3a Before new offsets applied

NAME	DESCRIPTION	VALUE	UNIT
SM10N500	OBSID	B0000000	HEX
SM2LN500	BBFULLTYPE	Null	
SMD4N515	SMECSELECTTAB	00000000	HEX
SMS0W515	SMECENCPWR	00000006	HEX
SMS1W515	SMECLVDTPWR	00000001	HEX
SML0F515	SMECLATCHSTAT	00000000	HEX
SMS1M515	SMECLOOPMODE	00000006	HEX
SMS0P515	SCANSTART	1.0000	mm
SMS1P515	SCANEND	1.0000	mm
SMS0S515	SCANFSPEED	0.5000	mm/s
SMS0N515	SCANS	0	
SMS2M515	SCANMODE	00000001	HEX
SMG0N515	SMECKP	000003E8	HEX
SMG1N515	SMECKD	000003E8	HEX
SMS1N515	SMECDFILT	0000251C	HEX
SMG2N515	SMECKI	00000000	HEX
SMS3N515	SMECINTLIMIT	000007D0	HEX
SMS0B515	SMECINTTHRESH	0000FFFF	HEX
SMS1B515	SMECRATELIMIT	0000012C	HEX
SMS0T515	SMECDFILT2	00000000	HEX
SMS5N515	SMECFFGAIN	00004E26	HEX
SMS0A515	SMECFFOFFSET	00007000	HEX
SMS1S515	SCANRSPEED	0.5000	mm/s
SMS6N515	SMECBEMFGAIN	00000000	HEX
SMS00515	SMECMOTORRES	00000000	HEX
SMS01515	SMECMOTORBEMF	00000000	HEX
SMS7N515	SMECRATESCALE	00000064	HEX
SMS2B515	SMECLVDTOFFSET	8.0000	mm
SMSBN515	SMECLVDTSCALE	0.690520	mm
SMS0F515	SMECSTAT	00000008	HEX
SMS0X515	SMECFLAG	OK	
SMS1X515	SMECLVDTSIGN	NEGATIVE	
NAME	**DESCRIPTION**	**VALUE**	**UNIT**
SMS2X515	SMECINIT	NOTINIT/LOST	
SMS3X515	SMECSCANDIR	DOWN	
SMSPN515	SMECSCANCNT	0	DEC
SMS2P515	SMECENCPOSN	65.5350	mm
SMS0V515	SMECENCSIG1	000059DB	HEX
SMS1V515	SMECENCSIG2	000071CC	HEX
SMS2V515	SMECENCSIG3	0000E214	HEX
SMS3P515	SMECLVDTPOSN	5.1640	mm
SDS0P515	COMPLVDTPOSN	0	mm
SMS3A515	SMECLVDTACSIG	00006AE6	HEX
SMS4A515	SMECLVDTDCSIG	00001E28	HEX
SMS4P515	SMECTRAJPOSN	1.0000	mm
SMSCN515	SMECDACVAL	00007290	HEX
SMS5P515	SMECPOSNDELTA	0	mm
SMS6P515	SMECENCFINEPOSN	266.0000	nm
SMS3S515	SMECMEANSPEED	-0.0002	mm/s
SMS3E515	SMECSCANPOSNERR	-309630.0000	nm
SMS5A515	SMECMOTORCURR	-8.0616	mA
SMS3V515	SMECMOTORVOLT	-0.5000	V
SMS6A515	SMECENCSIG1AMP	00000E2C	HEX
SMS7A515	SMECENCSIG1OFF	00004F45	HEX
SMS8A515	SMECENCSIG2AMP	00000C76	HEX
SMS9A515	SMECENCSIG2OFF	0000622C	HEX
SMSAA515	SMECENCSIG3AMP	0000FFFF	HEX
SMSBA515	SMECENCSIG3OFF	00004E20	HEX

(NCR 3x20) 7.2.3-38 After new offsets applied

DS: 65535 ID: SAS0_5 Title: SMEC PARAMETERS Sample Time: 2007.296.16.33.21.971 Workstation: hpws22

NAME	DESCRIPTION	VALUE	UNIT
SM10N500	OBSID	B0000000	HEX
SM2LN500	BBFULLTYPE	Null	
SMD4N515	SMECSELECTTAB	00000000	HEX
SMS0W515	SMECENCPWR	00000006	HEX
SMS1W515	SMECLVDTPWR	00000001	HEX
SML0F515	SMECLATCHSTAT	00000000	HEX
SMS1M515	SMECLOOPMODE	00000006	HEX
SMS0P515	SCANSTART	1.0000	mm
SMS1P515	SCANEND	1.0000	mm
SMS0S515	SCANFSPEED	0.5000	mm/s
SMS0N515	SCANS	0	
SMS2M515	SCANMODE	00000001	HEX
SMG0N515	SMECKP	000003E8	HEX
SMG1N515	SMECKD	000003E8	HEX
SMS1N515	SMECDFILT	0000251C	HEX
SMG2N515	SMECKI	00000000	HEX
SMS3N515	SMECINTLIMIT	000007D0	HEX
SMS0B515	SMECINTTHRESH	0000FFFF	HEX
SMS1B515	SMECRATELIMIT	0000012C	HEX
SMS0T515	SMECDFILT2	00000000	HEX
SMS5N515	SMECFFGAIN	00004E26	HEX
SMS0A515	SMECFFOFFSET	00007000	HEX
SMS1S515	SCANRSPEED	0.5000	mm/s
SMS6N515	SMECBEMFGAIN	00000000	HEX
SMS00515	SMECMOTORRES	00000000	HEX
SMS01515	SMECMOTORBEMF	00000000	HEX
SMS7N515	SMECRATESCALE	00000064	HEX
SMS2B515	SMECLVDTOFFSET	8.0000	mm
SMSBN515	SMECLVDTSCALE	0.690520	mm
SMS0F515	SMECSTAT	00000008	HEX
SMS0X515	SMECFLAG	OK	
SMS1X515	SMECLVDTSIGN	NEGATIVE	

NAME	DESCRIPTION	VALUE	UNIT
SMS2X515	SMECINIT	NOTINIT/LOST	
SMS3X515	SMECSCANDIR	DOWN	
SMSPN515	SMECSCANCNT	0	DEC
SMS2P515	SMECENCPOSN	65.5350	mm
SMS0V515	SMECENCSIG1	000059B3	HEX
SMS1V515	SMECENCSIG2	000071F5	HEX
SMS2V515	SMECENCSIG3	0000E218	HEX
SMS3P515	SMECLVDTPOSN	5.1650	mm
SDS0P515	COMPLVDTPOSN	0	mm
SMS3A515	SMECLVDTACSIG	00006AE2	HEX
SMS4A515	SMECLVDTDCSIG	00001E28	HEX
SMS4P515	SMECTRAJPOSN	1.0000	mm
SMSCN515	SMECDACVAL	00007290	HEX
SMS5P515	SMECPOSNDELTA	0	mm
SMS6P515	SMECENCFINEPOSN	49.0000	nm
SMS3S515	SMECMEANSPEED	-0.0001	mm/s
SMS3E515	SMECSCANPOSNERR	-309410.0000	nm
SMS5A515	SMECMOTORCURR	-7.9791	mA
SMS3V515	SMECMOTORVOLT	-0.5000	V
SMS6A515	SMECENCSIG1AMP	00000E2C	HEX
SMS7A515	SMECENCSIG1OFF	00005780	HEX
SMS8A515	SMECENCSIG2AMP	00000C76	HEX
SMS9A515	SMECENCSIG2OFF	00006B6C	HEX
SMSAA515	SMECENCSIG3AMP	0000FFFF	HEX
SMSBA515	SMECENCSIG3OFF	00004E20	HEX

7.2.3.39 Procedure SPIRE-FM-WFT-FUNC-SMEC-07-P

Version	2.4
Date	16th Oct. 2007
Purpose	SMEC (PRIME) Close Loop Scan Test.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	SMEC is in closed loop
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5 minutes
Pass/Fail criteria	SMEC performs a scan between the commanded positions and the loop remains closed

Procedure Steps: 16:41.

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-SMEC-INIT-P.tcl	SMECLOOPMODE	6/-/1	6/ 1	
2	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-07-P.tcl	—	—	✓	—
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	16:47	**Sign Off:**	

7.2.3.40 Procedure SPIRE-FM-WFT-FUNC-SMEC-02B-P

Version	2.4
Date	16th Oct. 2007
Purpose	Close the SMEC Launch Latch (Latch it)
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and SMEC is ON and unlatched
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and SMEC is ON and Latched
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	TBD

Procedure Steps: 16:58

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-02B-P.tcl	—	—	— ✓	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				← *
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07		**Sign Off:**	

NCR3: Change FF Offset to 0x7800 again and then repeat section 7.2.3.37 to confirm latched (i.e. shouldn't move).

7.2.3.41 Procedure SPIRE-FM-WFT-SMEC-OFF-P

Version	2.4
Date	16th Oct. 2007
Purpose	SMEC (PRIME) Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are OFF.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected OFF values.

Procedure Steps: 17:17

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-FM-WFT-SMEC-OFF-P.tcl	—	—	—	—
2	Check that the power to the SMEC sensors is switched off	SMECENCPWR SMECLVDTPWR	6/-/0 1/-/0	6 / 0 1 / 0	

Test Result (Pass/Fail):

Enter Date/Time:	23/10/07	17:18	**Sign Off:**	

7.2.3.42 Procedure SPIRE-FM-WFT-MCU-OFF-P

Version	2.4
Date	16th Oct. 2007
Purpose	MCU PRIME Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is OFF.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is ON. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail criteria	Specified MCU HK Parameter shows expected value.

Procedure Steps: 17:18

Step	**Description**	**Parameter – Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute SPIRE-FM-WFT-MCU-OFF-P.tcl	—	—	— ✓	—
2	Check that the MCU is switched off	MCUBITSTAT	1/-/0	1/0	
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	17:19	**Sign Off:**	

Enter Date/Time:			**Sign Off:**	

7.2.3.43 Procedure SPIRE-FM-WFT-SCU-OFF-P

Version	2.4
Date	16th Oct. 2007
Purpose	SCU PRIME Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is OFF
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail criteria	Specified SCU HK Parameters show expected value.

Procedure Steps:

Enter Date/Time:			**Sign Off:**	

17:20

Step	**Description**	**Parameter - Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-SCU-OFF-P.tcl	—	—	— ✓	—
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0xFFFF/-/0	FFFF/0	
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0	1/0	
Test Result (Pass/Fail):					

Enter Date/Time:	23/10/07	17:21	**Sign Off:**	

7.2.4 Switch Off DRCU & DPU PRIME

17:22

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH OFF DRCU PRIME						
	Initial Conditions: DPU-A & DRCU A ON						
4.1	On HPCCS execute the following test script to power on the SPIRE DPU and DRCU. **S102999SCVT011_ASDWFTSPIR_PWR_OFF_P.tcl** Respond to the prompts as listed below:				AND: ZAD07999, ZAD14999 MIM: LCL_HERSCHEL		
	The test script (calling the specific SPIRE scripts as appropriate) powers OFF the DRCU. The DPU is then powered OFF before disabling the Mil1553 bus interface.						
4.2	On I-EGSE/HPCCS check that THSK parameter is not refreshing anymore	OK		Ok			
4.3	On I-EGSE/HPCCS check that TM2N parameter is not incrementing anymore	OK		Ok			
4.4	Continue test script by responding to prompt						
	SWITCH OFF DPU PRIME						
4.5	Continue test script by responding to prompt						
	SPIRE PRIME DRCU & DPU POWER OFF COMPLETE						

Enter Date/Time:	23/10/07	17:27	**Sign Off:**	

7.2.5 *Procedure SPIRE-FM-WFT-LPU-01-P*

Version	1.0
Date	Tuesday, 28 August 2007
Purpose	DPU PRIME Switch OFF
Initial configuration	Prime and redundant DPU and DRCU are off
Final configuration	Prime and redundant DPU and DRCU are off
Constraints	• Cryostat is vertical to within ±45° • Prime and redundant DPU and DRCU are off
Duration	5 minutes
Pass/Fail criteria	The specified current is drawn when the LPU is enabled and is switched off when the LPU is disabled

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	**Power on Prime LPU LCL (LCL #25)**	LCL status	OFF/ /ON		State of LCL #25 switches to ON
2	**Send HL command #5 (LPU Enable Prime)**	LCL #25 current	0mA/ /130-180mA		Current between 130-180mA
4	**Send HL command #6 (LPU Disable Prime)**	LCL #25 current	130-180mA/ /0mA		Current off
5	**Un-power Prime LPU LCL (LCL # 25)**	LCL status	ON/ / OFF		State of LCL #25 switches to OFF
Test Result (Pass/Fail):					

7.2.6 Switch On SPIRE REDUNDANT DPU & DRCU

07:24

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH ON DPU REDUNDANT						
	Initial Conditions: DPU-B & DRCU B OFF						
6.1	On HPCCS execute the following test script to power on the SPIRE DPU and DRCU. **S102999SCVT010_ASDWFTSPIR_PWR_ON_R.tcl** Respond to the prompts as listed below:			Ok	AND: ZAD07999, ZAD14999 MIM: LCL_HERSCHEL		
	The test script (calling the specific SPIRE scripts as appropriate) powers ON the DPU and enables the MilBus before forcebooting the ASW *(NB: currently powers ON DPU using secondary partition).* ***The DRCU is then powered and configured.***						
6.2	Check that Nominal and Critical HK packets are arriving at the HPCCS: **SPIRE Nominal HK:** • (type ,subtype) : (3,25) • APID : 0x502 (1282) **SPIRE Critical HK:** • (type ,subtype) : (3,25) • APID: 0x500 (1280)	OK		Ok			

Enter Date/Time:	24/10/07		**Sign Off:**	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
6.3	On I-EGSE/HPCCS check that THSK parameter is refreshing every second	OK		Ok			
6.4	On I-EGSE check that TM2N parameter is incrementing by 1 every second	OK		ok			
6.5	On I-EGSE check that TM1N parameter is incrementing by 1 every 2 second	OK		Ok			
6.6	On HPCCS check the consistency of the SPIRE on board time to the HCDMU time and the CCS (need to clarify if SPIRE requests a time verification report as part of DPU ON sequence).	OK		Ok			
6.7	On IEGSE check the consistency between SCOS time and THSK and QLA time.	OK		ok			
6.8	Continue test script by responding to prompt						
	SWITCH ON DRCU REDUNDANT						
6.9	When prompted by test script:						
6.10	On I-EGSE/HPCCS check that THSK parameter is not refreshing anymore	OK		OK			
6.11	On I-EGSE/HPCCS check that TM2N parameter is not incrementing anymore	OK		OK			
6.12	Continue test script by responding to prompt to power on DRCU						
6.13	On I-EGSE check that THSK parameter is refreshing every second	OK		Ok			
6.14	On I-EGSE check that TM2N parameter is incrementing by 1 every second	OK		Ok			
6.15	Continue test script by responding to prompt						
	SPIRE REDUNDANT DPU & DRCU POWER ON COMPLETE						

Enter Date/Time:	24\10\07	07:36	**Sign Off:**	

Enter Date/Time:			**Sign Off:**	

7.2.7 Warm Functional Tests - Redundant

7.2.7.1 Procedure SPIRE-FM-WFT-FUNC-SCU-01-R

Version	2.3
Date	16th Oct. 2007
Purpose	SCU science packet generation check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • DPU AND OBS PARAMETERS & FUNCTIONAL TEST PARAMETERS displays are selected on the CCS
Duration	3 minutes
Pass/Fail Criteria	Specified SCU HK parameters show expected increment.

Procedure Steps:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-01-R.tcl	SCUFRAMECNT TM5N	0/31 0x3FFF/1		
Test Result (Pass/Fail):					

7.2.7.2 Procedure SPIRE-FM-WFT-FUNC-SCU-03-R

Version	2.3
Date	16th Oct. 2007
Purpose	SCU DC thermometry check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and DC thermometry is ON
Constraints	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • SFT PARAMETERS display is selected on the CCS
Duration	8 minutes
Pass/Fail Criteria	DC Thermometry channels show temperature readings according to the actual instrument temperature* *: At warm temperatures all channels should show short circuit RAW readings of -32768

Procedure Steps:

Step	**Description**	**Parameter - Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-03-R.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to SCU_DC_Therm**				
3	A few seconds later record the	SCUTEMPSTAT	0/0xFFFF/0xFFFF		

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
	value of parameter SCUTEMPSTAT				
4	**Configure the SFT PARAMETERS display to show the RAW values of SCU DC thermometry channels.** Record the values of SCU DC thermometry channels. Nominal values should show a short circuit status (or RAW -32768) **Non Nominal (Open Circuit Criterion): RAW reading in the range [0, -100]**	PUMPHTRTEMP PUMPHSTEMP EVAPHSTEMP SHUNTTEMP EMCFILTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	— — — — — — — — — — — — — — — —		
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.3 Procedure SPIRE-FM-WFT-FUNC-SCU-06-R

Version	2.3
Date	16th Oct. 2007
Purpose	SCU AC thermometry check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and DC thermometry is ON
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Constraints	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • SFT PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail Criteria	AC Thermometry channel shows temperature readings according to the actual instrument temperature

Enter Date/Time:			**Sign Off:**	

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-06-R.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to SCU_AC_Therm**				
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	0/1/1		
4	**Configure the SFT PARAMETERS display to show the RAW values of SCU AC thermometry channel.** Record the value of SCU AC thermometry channel if it indicates an open circuit. Nominal value should show a short circuit status (or RAW ~ -32768) **Non Nominal (Open Circuit Criterion): RAW reading in the range [0, -100]**	SUBKTEMP	—		

Test Result (Pass/Fail):

Enter Date/Time:			**Sign Off:**	

Enter Date/Time:			**Sign Off:**	

7.2.7.4 Procedure SPIRE-FM-WFT-FUNC-SCU-02-R

Version	2.3
Date	16th Oct. 2007
Purpose	SCU Nominal Science Contents Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • DPU AND OBS PARAMETERS & FUNCTIONAL TEST PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail Criteria	Specified SCU HK parameters show expected increment.

Procedure Steps:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-02-R.tcl	SCUFRAMECNT TM5N	31/62 1/3		
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.5 Procedure SPIRE-FM-WFT-FUNC-SCU-04-R

Version	2.3
Date	16th Oct. 2007
Purpose	Photometer Calibration Check (REDUNDANT)
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail Criteria	PCAL voltage and current agree with expected values

Procedure Steps:

Step	Description	Parameter Name – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-04-R.tcl **The expected values during the test should be monitored when parameter BBFULLTYPE in the FUNCTIONAL TEST PARAMETERS display is set to PCAL_Check This usually happens about 30 seconds from the start of test execution.**	PCALCURR - mA PCALV – V BBFULLTYPE	0.0/0.1/0.0 0.0/0.02/0.0 PCAL_Check		
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Final Configuration: Unchanged

7.2.7.6 Procedure SPIRE-FM-WFT-FUNC-SCU-05-R

Version	2.3
Date	16th Oct. 2007
Purpose	Spectrometer Calibration Check (REDUNDANT)
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	SCAL2 and SCAL4 voltage and currents agree with expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-05-R.tcl	—	—	—	
2	**Wait for the parameter BBFULLTYPE to get set to SCAL4_Check**	BBFULLTYPE	SCAL4_Check	—	
3	A few seconds later record the value of parameters SCAL4CURR and SCAL4V *These parameters are set back to 0 after ~20 seconds*	SCAL4CURR – mA SCAL4V – V	0.0/0.10/0.0 0.0/0.05/0.0	—	
4	**Wait for the parameter BBFULLTYPE to get set to SCAL2_Check**	BBFULLTYPE	SCAL2_Check	—	
5	A few seconds later record the values of parameters SCAL2CURR and SCAL2V *These parameters are set back to 0 after ~20 seconds*	SCAL2CURR – mA SCAL2V – V	0.0/0.10/0.0 0.0/0.05/0.0	—	
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—

Test Result (Pass/Fail):

Enter Date/Time:			**Sign Off:**	

7.2.7.7 Procedure SPIRE-FM-WFT-FUNC-SCU-07-R

Version	2.3
Date	16th Oct. 2007
Purpose	Sorption Cooler Heater Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and DC thermometry is ON
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail Criteria	Sorption cooler heat switches and pump heater show expected voltages

Procedure Steps:

Step	**Description**	**Parameter – Unit**	**Expected Values Before/During/After**	**Actual Values Before/During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-07-R.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to Cooler_Htr_Chk**	BBFULLTYPE	Cooler_Htr_Chk		
3	Record the value of parameter SPHSV – the Sorption Pump Heat Switch Voltage. *This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.*	SPHSV – mV	0/~323/0		
4	Record the value of parameter EVHSV – the Evaporator Heat Switch Voltage. *This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.*	EVHSV – mV	0/~323/0		
5	Record the value of parameter SPHTRV – the Sorption Pump Heater Voltage. *This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.*	SPHTRV – V	0/~8.8/0		
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—

Enter Date/Time **Test Result (Pass/Fail):**		**Sign Off:**	

7.2.7.8 Procedure SPIRE-FM-WFT-FUNC-SCU-08-R

Version	2.3
Date	16th Oct. 2007
Purpose	SCU test pattern check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail Criteria	SCU Test Pattern generated agrees with the one generated on a previous execution.

Procedure Steps:

Step	**Description**	**Parameter**	**Expected Values Before/ After**	**Actual Values Before /After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SCU-08-R.tcl	SCUFRAMECNT TM5N	62/93 3/5		
2	**Wait for the I-EGSE staff to confirm the success of the test.**				
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.9 Procedure SPIRE-FM-WFT-FUNC-MCU-01-R

Version	2.3
Date	16th Oct. 2007
Purpose	MCU (REDUNDANT) Boot Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCU voltages and board temperatures show expected 'ON' values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 07:38

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-MCU-01-R.tcl	—	—	—	—
2	Check that the MCU is booted up successfully	MCUBITSTAT	0/1/1		
3	Check MCU HK parameter values and ensure that the values are refreshing	MCUP5V - V MCUP14V - V MCUM14V - V MCUP15V - V MCUM15V- V MCUMACTEMP - K MCUSMECTEMP - K MCUBSMTEMP - K	~ 5.0 ± 0.2 ~ 14.0 ± 0.6 ~ -14.0 ± 0.6 ~ 15.0 ± 0.6 ~ -15.0 ± 0.7 ~300 ~300 ~300		

Test Result (Pass/Fail):

Enter Date/Time:	24/10/07	07:39	**Sign Off:**	

7.2.7.10 Procedure: SPIRE-FM-WFT-FUNC-MCU-02-R

Version	2.3
Date	16th Oct. 2007
Purpose	MCU Nominal Frame Generation Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	Unchanged.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified MCU HK parameters show expected increment

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-MCU-02-R.tcl	MCUFRAMECNT	0/~ 6000	—	—
Test Result (Pass/Fail):					

7.2.7.11 Procedure: SPIRE-FM-WFT-FUNC-MCU-03-R

Version	2.3
Date	16th Oct. 2007
Purpose	MCU Nominal Science Contents Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	Unchanged.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified MCU HK parameters show expected increment

Procedure Steps:

Step	**Description**	**Parameter - Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-MCU-03-R.tcl	MCUFRAMECNT	~6000/~ 6297 Should increment by 297	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.12 Procedure: SPIRE-FM-WFT-FUNC-MCU-04-R

Version	2.3
Date	16th Oct. 2007
Purpose	MCU Test Pattern Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	Unchanged.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCU Test Pattern generated agrees with the one generated on a previous execution.

Procedure Steps:

Step	**Description**	**Parameter - Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-MCU-04-R.tcl	MCUFRAMECNT	N/N+99	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.13 Procedure SPIRE-FM-WFT-FUNC-BSM-01-R

Version	2.3
Date	16th Oct. 2007
Purpose	BSM (REDUNDANT) Chop/Jiggle Sensor Check.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are ON.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	HK Parameters CHOPSENSPWR and JIGGSENSPWR show expected ON values.

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-01-R.tcl	—	—	—	—
2	Check that the Chop and Jiggle sensors have switched on	CHOPSENSPWR JIGGSENSPWR	0/1/1 0/1/1		

Test Result (Pass/Fail):

7.2.7.14 Procedure SPIRE-FM-WFT-FUNC-BSM-02C-R

Version	2.3
Date	16th Oct. 2007
Purpose	BSM (REDUNDANT) Chop Sensor Polarity Check.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	CHOPSENSSIG HK parameter increments in the same direction as the commanded positions

Enter Date/Time:			**Sign Off:**	

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-02C-R.tcl	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

7.2.7.15 Procedure SPIRE-FM-WFT-FUNC-BSM-02J-R

Version	2.3
Date	16th Oct. 2007
Purpose	BSM (REDUNDANT) Jiggle Sensor Polarity Check.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes

Enter Date/Time:			**Sign Off:**	

Pass/Fail criteria	JIGGSENSSIG HK parameter increments in the same direction as the commanded positions

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-02J-R.tcl	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

7.2.7.16 Procedure SPIRE-FM-WFT-FUNC-BSM-03-R

Version	2.3
Date	16th Oct. 2007
Purpose	BSM (REDUNDANT) Open Loop Dynamics Check.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running

Enter Date/Time:			**Sign Off:**	

	• FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	CHOPSENSSIG/JIGGSENSIG HK parameter evolve in the same direction as the commanded positions

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-03-R.tcl	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

7.2.7.17 Procedure SPIRE-FM-WFT-FUNC-BSM-05A-R

Version	2.3
Date	16th Oct. 2007
Purpose	BSM (REDUNDANT) Open Loop Chop Test
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted.

	- SPIRE MIB REDUNDANT is imported in the CCS database. - CCS is up and running - FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	The BSM Chops in between the commanded positions

Procedure Steps:

Step	**Description**	**Parameter – Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-05A-R.tcl	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

7.2.7.18 Procedure SPIRE-FM-WFT-FUNC-BSM-05B-R

Version	2.3
Date	16th Oct. 2007
Purpose	BSM (REDUNDANT) Closed Loop Chop Test
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are ON.
Final configuration	BSM is in closed loop mode

Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • CHOP PARAMETERS and JIGGLE PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail criteria	The BSM Chops in between the commanded positions

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-FM-WFT-BSM-INIT-R.tcl	CHOPLOOPMODE JIGGLOOPMODE	3/-/1 3/-/1		
2	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-05B-R.tcl	—	—	—	—
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.19 Procedure SPIRE-FM-WFT-FUNC-BSM-06-R

Version	2.3
Date	16th Oct. 2007
Purpose	BSM (REDUNDANT) Operational Mode Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are ON. BSM is in closed loop.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • CHOP PARAMETERS and JIGGLE PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail criteria	The BSM Chops in between the commanded positions

Procedure Steps:

Step	**Description**	**Parameter – Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-BSM-06-R.tcl	CHOPLOOPMODE JIGGLOOPMODE	1 1		
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.20 Procedure SPIRE-FM-WFT-BSM-OFF-R

Version	2.3
Date	16th Oct. 2007
Purpose	BSM (REDUNDANT) Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are ON
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. BSM Chop/Jiggle sensors are OFF.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters CHOPSENSPWR and JIGGSENSPWR show expected OFF values.

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-FM-WFT-BSM-OFF-R.tcl	—	—	—	—
2	Check that the power to the BSM sensors is switched off	CHOPSENSPWR JIGGSENSPWR	1/-/0 1/-/0		
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

Enter Date/Time:			**Sign Off:**	

7.2.7.21 Procedure SPIRE-FM-WFT-FUNC-DCU-01-R

Version	2.3
Date	16th Oct. 2007
Purpose	DCU science packet generation check for all Photometer and Spectrometer packet types (PF, PSW, PMW, PLW, SF, SSW and SLW)
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified DCU HK parameter shows expected increment

Procedure Steps:

Step	**Description**	**Parameter**	**Expected Values Before/ After**	**Actual Values Before /After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-01-R.tcl	DCUFRAMECNT	n/n+700		
Test Result (Pass/Fail):					

7.2.7.22 Procedure SPIRE-FM-WFT-FUNC-DCU-02-R

Version	2.3
Date	16th Oct. 2007
Purpose	To check the correct functioning of the DCU REDUNDANT High Speed Link
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced and MCU is booted.
Final configuration	Unchanged
Preconditions	• SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • I-EGSE is up and running • DCU PARAMETERS display is selected on the CCS • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	The following DCU telemetry packet types are received at IEGSE with : Full Photometer: - (type,subtype): (21,1). - APID 0x505 PSW - (type,subtype): (21,2). - APID 0x505 PMW -(type,subtype): (21,2). - APID 0x505 PLW -(type,subtype): (21,2). - APID 0x505 Full Spectrometer: - (type,subtype): (21,1).

	- APID 0x507 SSW - (type,subtype): (21,2). - APID 0x507 SLW -(type,subtype): (21,2). - APID 0x507

Procedure Steps:

Enter Date/Time:			**Sign Off:**	

Step	**Description**	**Parameter**	**Expected Values Before/After**	**Actual Values Before/After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT--DCU-02-R.tcl	DCUFRAMECNT	n/n+700		
2	Verify that the following type of DCU science telemetry packets have been received at the CCS : Full Photometer: - (type,subtype): (21,1). - APID 0x505 PSW - (type,subtype): (21,2). - APID 0x505 PMW -(type,subtype): (21,2). - APID 0x505 PLW -(type,subtype): (21,2). - APID 0x505 Full Spectrometer: - (type,subtype): (21,1). - APID 0x507 SSW - (type,subtype): (21,2). - APID 0x507 SLW -(type,subtype): (21,2). - APID 0x507	—	—	—	

Test Result (Pass/Fail):

Enter Date/Time:			**Sign Off:**	

7.2.7.23 Procedure SPIRE-FM-WFT-FUNC-DCU-03-R

Version	2.3
Date	16th Oct. 2007
Purpose	DCU Test Pattern Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU (Photometer/Spectrometer) Test Pattern generated agrees with the one generated on a previous execution.

Procedure Steps:

Step	**Description**	**Parameter**	**Expected Values Before/ After**	**Actual Values Before /After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-03-R.tcl	DCUFRAMECNT	n/n+200		
Test Result (Pass/Fail):					

7.2.7.24 Procedure SPIRE-FM-WFT-FUNC-DCU-04-PHOT-R

Version	2.3
Date	16th Oct. 2007
Purpose	Photometer LIAs check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Photometer LIAs are ON.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Procedure Steps:

08:55

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-04-PHOT-R.tcl	—	—	—	—
2	Check that the Photometer LIAs are switched on	PLIAP5V PLIAP9V PLIAM9V	~0/ ~+5.19 ± 0.1V ~0/ ~+11.54 ± 0.1V ~0/ ~-11.53 ± 0.1V		
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	08:56	**Sign Off:**	

7.2.7.25 Procedure SPIRE-FM-WFT-FUNC-DCU-11-PHOT-R

Version	2.3
Date	16th Oct. 2007
Purpose	Photometer BDAs switch ON check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Photometer BDAs are ON.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 08 158

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-11-PHOT-R.tcl	—	—	—	—
2	Check that the Photometer detectors and LIAs are switched on	PSWJFETSTAT PMLWJFETSTAT PLIABITSTAT	0/-/0x3F 0/-/0x7F 1	0 / 0 /	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	09:01	**Sign Off:**	

7.2.7.26 Procedure SPIRE-FM-WFT-FUNC-DCU-13-PHOT-R

Version	2.3
Date	16th Oct. 2007
Purpose	Photometer BDAs integrity check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Photometer BDAs are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	15 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 09:02

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that Photometer LIAs and detectors are switched on	PLIABITSTAT PSWJFETSTAT PMLWJFETSTAT	1 0x3F 0x7F	3F 7F	
2	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-13-PHOT-R.tcl	—	—	✓	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	09:17	**Sign Off:**	

7.2.7.27 Procedure SPIRE-FM-WFT-FUNC-DCU-14-PHOT-R

Version	2.3
Date	16th Oct. 2007
Purpose	Photometer BDAs noise level check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Photometer BDAs are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Photometer BDAs signal show no excess noise

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that Photometer LIAs and detectors are switched on	PLIABITSTAT PSWJFETSTAT PMLWJFETSTAT	1 0x3F 0x7F		
2	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-14-PHOT-R.tcl	—	—	—	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.28 Procedure SPIRE-FM-WFT-PDET-OFF-R

Version	2.3
Date	16th Oct. 2007
Purpose	Photometer BDAs Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Photometer BDAs are ON
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Photometer BDAs are OFF
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 09:17

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-PDET-OFF-R.tcl	—	—		
2	Check that the Photometer detectors are switched off	PSWJFETSTAT PMLWJFETSTAT	0x3F/-/0 0x7F/-/0		
3	Check that the Photometer LIAs are switched off	PLIABITSTAT	1/-/0		
4	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	24 10 07	09:19	**Sign Off:**	

7.2.7.29 Procedure SPIRE-FM-WFT-FUNC-DCU-04-SPEC-R

Version	2.3
Date	16th Oct. 2007
Purpose	Spectrometer LIAs check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Spectrometer LIAs are ON.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 09:19

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-04-SPEC-R.tcl	—	—	—	—
2	Check that the Spectrometer LIAs are switched on	SLIAP5V - V SLIAP9V - V SLIAM9V - V	~0/ ~+5.23 ± 0.1 ~0/ ~+11.57 ± 0.1 ~0/ ~-11.54 ± 0.1		
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	09:20	**Sign Off:**	

7.2.7.30 Procedure SPIRE-FM-WFT-FUNC-DCU-11-SPEC-R

Version	2.3
Date	16th Oct. 2007
Purpose	Spectrometer BDAs switch ON check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Spectrometer BDAs are ON.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 09 :21

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-11-SPEC-R.tcl	—	—	✓—	—
2	Check that the Spectrometer detectors are switched on	SPECJFETSTAT SLIABITSTAT	0/-/7 1	0 /7 1	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	09: 24	**Sign Off:**	

7.2.7.31 Procedure SPIRE-FM-WFT-FUNC-DCU-13-SPEC-R

Version	2.3
Date	16th Oct. 2007
Purpose	Spectrometer BDAs integrity check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Spectrometer BDAs are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	12 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps:

09:24

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the Spectrometer detectors and LIAs are switched on	SPECJFETSTAT SLIABITSTAT	7 1	7 0	
2	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-13-SPEC-R.tcl	—	—	✓ —	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	09:38	**Sign Off:**	

7.2.7.32 Procedure SPIRE-FM-WFT-FUNC-DCU-14-SPEC-R

Version	2.3
Date	16th Oct. 2007
Purpose	Spectrometer BDAs noise check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Spectrometer BDAs are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Spectrometers BDAs signal show no excess noise

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the Spectrometer detectors and LIAs are switched on	SPECJFETSTAT SLIABITSTAT	7 1		
2	Execute TCL script SPIRE-FM-WFT-FUNC-DCU-14-SPEC-R.tcl	—	—	—	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.7.33 Procedure SPIRE-FM-WFT-SDET-OFF-R

Version	2.3
Date	16th Oct. 2007
Purpose	Spectrometer BDAs Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Spectrometer BDAs are ON
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and Spectrometer BDAs are OFF
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DCU HK parameters show expected values

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 09:39

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-SDET-OFF-R.tcl	—	—		
2	Check that the Spectrometer detectors are switched off	SPECJFETSTAT	7/-/0	7/0	
3	Check that the Spectrometer LIAs are switched off	SLIABITSTAT	1/-/0	1/0	
4	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	09:40	**Sign Off:**	

7.2.7.34 Procedure SPIRE-FM-WFT-FUNC-SMEC-01-R

Version	2.3
Date	16th Oct. 2007
Purpose	SMEC (REDUNDANT) Encoder/LVDT Sensor Check.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected ON values.

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 07:43

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-01-R.tcl	—	—	—✓	—
2	Check that power to the SMEC LED and LVDT sensor is on	SMECENCPWR SMECLVDTPWR	0/-/6 0/1/1	6 1	
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	07:44	**Sign Off:**	

7.2.7.35 Procedure SPIRE-FM-WFT-FUNC-SMEC-03-R

Version	2.3
Date	16th Oct. 2007
Purpose	SMEC (REDUNDANT) Encoder Integrity Check.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCUENGSMECENCSIG1/2 increase as the encoder power is increased

Procedure Steps: 07:47

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-03-R.tcl	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Enter Date/Time:	24/10/07	07:48.	**Sign Off:**	

7.2.7.36 Procedure SPIRE-FM-WFT-FUNC-SMEC-02A-R

Version	2.3
Date	16th Oct. 2007
Purpose	Open the SMEC Launch Latch (Unlatch it)
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and SMEC is latched
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and SMEC is ON and Unlatched
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5 minutes
Pass/Fail criteria	TBD

Procedure Steps:

Enter Date/Time:			**Sign Off:**	

07.52

Step	**Description**	**Parameter – Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	~~Execute TCL script~~ SPIRE-FM-WFT-FUNC-SMEC-02A-R.tcl *	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

7.2.7.37 Procedure SPIRE-FM-WFT-FUNC-SMEC-04A-R

* Replace by manual commands / See attached email. step 2

Version	2.3
Date	16th Oct. 2007
Purpose	SMEC (REDUNDANT) Open Loop Positioning Test.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5 minutes
Pass/Fail criteria	SMEC moves to the commanded positions

Procedure Steps:

Enter Date/Time:	24/10/07	07.56	**Sign Off:**	

07:58

Step	**Description**	**Parameter – Unit**	**Expected Values Before/ During/ After**	**Actual Values Before/ During/ After**	**Success/ Failure**
1	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-04A-R.tcl	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

7.2.7.38 Procedure SPIRE-FM-WFT-FUNC-SMEC-09-R

Version	2.3
Date	16th Oct. 2007
Purpose	SMEC (REDUNDANT) Open Loop Scan Test.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5 minutes
Pass/Fail criteria	SMEC performs a scan between the commanded positions

Enter Date/Time:	24/10/07	08:02	**Sign Off:**	

PVS.4. Section 7.2.7.36 & 7.2.7.40

To: 'sih@terma.com'
Cc: 'bernard.collaudin@thalesaleniaspace.com'; Koppe, Axel; Idler, Siegmund; 'Hendry, David (external)'; King, KJ (Ken); 'Kevin.Goodey@esa.int'
Subject: SPIRE redundant side tests and SMEC Unlatch/Latch manual commands

Hi Simon,

1) After SPIRE redundant side switch-on we will start with SPIRE-FM-WFT-FUNC-MCU-01-R

2) Commands for unlatching (replaces proc SPIRE-FM-WFT-FUNC-SMEC-02A-R):

```
SPIRE_SEND_DRCU_COMMAND (0x90557000, 0) - set SMECFFOFFSET to 0x7000
Wait about 30 seconds
SPIRE_SEND_DRCU_COMMAND (0x90430002, 0) - release the latch
```

OK

We then do all the SMEC tests which move the mechanism, i.e. SMEC-04A-R, SMEC-09-R and SMEC-07-R

3) Commands for latching (replaces proc SPIRE-FM-WFT-FUNC-SMEC-02B-R): Set back to openloop & stop trajectory gen.

```
SPIRE_SEND_DRCU_COMMAND (0x90556000, 0) - set SMECFFOFFSET to 0x6000
Wait about 30 seconds
SPIRE_SEND_DRCU_COMMAND (0x90430001, 0) - engage the latch
```

SCDCU505,0x90440006
SCDCU505,0x90490020

Ok

To check if the SMEC is really latched we will then run SMEC-04A-R.

4) Finally we will do the DCU-04-P/S-R, DCU-11-P/S-R, DCU-13-P/S-R and ~~DCU-14-P/S-R~~ for Photometer and Spectrometer respectively as in the test sequence .

Cheers,
Sunil

Dr Sunil Sidher
Space Science & Technology Department
Rutherford Appleton Laboratory
Chilton
Didcot
Oxon OX11 0QX

Tel +44 (0)1235 445114
Fax +44 (0)1235 446667
Email S.D.Sidher@rl.ac.uk

Procedure Steps:

08.05.

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9058xxxx** • **param 2 = 0** **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x905Axxxx** • **param 2 = 0** **The 16 bit parameters xxxx will be provided by SPIRE staff**	SMECENCSIG1OFF SMECENCSIG2OFF } Not Reqd.	34D3 5886	34D3 5886	
2	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-09-R.tcl	—	—	✓	—
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

Pass

Change Encoder PWR

SCD06505,
0x90400007

4970

6720

Enter Date/Time:	24/10/07	08:07	**Sign Off:**	

7.2.7.39 Procedure SPIRE-FM-WFT-FUNC-SMEC-07-R

Version	2.3
Date	16th Oct. 2007
Purpose	SMEC (REDUNDANT) Close Loop Scan Test.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	SMEC is in closed loop
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5 minutes
Pass/Fail criteria	SMEC performs a scan between the commanded positions and the loop remains closed

Procedure Steps: 08:10 / 08:32

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-SMEC-INIT-R.tcl	SMECLOOPMODE	6/-/1	6/1/6/1	
2	Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-07-R.tcl	—	—	— √/ √	—
3	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

NCR - 3733

NCR - Raised
Dropped out of
closed loop
mid-test
See PVS 5
~~Step repeat~~
Section repeated
as part of PVS5

Enter Date/Time:	24/10/07	08:15 / 08:37	**Sign Off:**	

7.2.7.40 Procedure SPIRE-FM-WFT-FUNC-SMEC-02B-R

Version	2.3
Date	16th Oct. 2007
Purpose	Close the SMEC Launch Latch (Latch it)
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and SMEC is ON and unlatched
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and SMEC is ON and Latched
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	TBD

Procedure Steps:

Enter Date/Time:			**Sign Off:**	

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	~~Execute TCL script SPIRE-FM-WFT-FUNC-SMEC-02B-R.tcl~~	—	—	—	—
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**				
Test Result (Pass/Fail):					

RVS 4.
Replaced.
by manually
commanding

7.2.7.41 Procedure SPIRE-FM-WFT-SMEC-OFF-R

Version	2.3
Date	16th Oct. 2007
Purpose	SMEC (REDUNDANT) Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are OFF.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected OFF values.

Enter Date/Time:			**Sign Off:**	

Procedure Steps: 08:53

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-FM-WFT-SMEC-OFF-R.tcl	—	—	—	—
2	Check that the power to the SMEC sensors is switched off	SMECENCPWR SMECLVDTPWR	6/-/0 1/-/0		
Test Result (Pass/Fail):					

7.2.7.42 Procedure SPIRE-FM-WFT-MCU-OFF-R

Version	2.3
Date	16th Oct. 2007
Purpose	MCU REDUNDANT Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is OFF.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is ON. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail criteria	Specified MCU HK Parameter shows expected value.

Enter Date/Time:	24/10/07	08:54	**Sign Off:**	

Procedure Steps:

09:40

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-FM-WFT-MCU-OFF-R.tcl	—	—	— ✓	—
2	Check that the MCU is switched off	MCUBITSTAT	1/-/0	0	
Test Result (Pass/Fail):					

Enter Date/Time:		09:41	**Sign Off:**	

7.2.7.43 Procedure SPIRE-FM-WFT-SCU-OFF-R

Version	2.3
Date	16th Oct. 2007
Purpose	SCU REDUNDANT Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is OFF
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail criteria	Specified SCU HK Parameters show expected value.

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-WFT-SCU-OFF-R.tcl	—	—	—	—
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0xFFFF/-/0		
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0		
Test Result (Pass/Fail):					

Enter Date/Time:			**Sign Off:**	

7.2.8 Switch Off DRCU & DPU REDUNDANT

09:42

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH OFF DRCU REDUNDANT						
	Initial Conditions: DPU-A & DRCU B ON						
8.1	On HPCCS execute the following test script to power on the SPIRE DPU and DRCU. **S102999SCVT012_ASDWFTSPIR_PWR_OFF_R.tcl** Respond to the prompts as listed below:				AND: ZAD07999, ZAD14999 MIM: LCL_HERSCHEL		
	The test script (calling the specific SPIRE scripts as appropriate) powers OFF the DRCU. The DPU is then powered OFF before disabling the Mil1553 bus interface.						
8.2	On I-EGSE/HPCCS check that THSK parameter is not refreshing anymore	OK		OK			
8.3	On I-EGSE/HPCCS check that TM2N parameter is not incrementing anymore	OK					
8.4	Continue test script by responding to prompt						
	SWITCH OFF DPU REDUNDANT						
8.5	Continue test script by responding to prompt						
	SPIRE REDUNDANT DRCU & DPU POWER OFF COMPLETE						

Enter Date/Time:	24/10/07		**Sign Off:**	

7.2.9 *Procedure SPIRE-FM-WFT-LPU-01-R*

Version	1.0
Date	Tuesday, 28 August 2007
Purpose	DPU PRIME Switch OFF
Initial configuration	Prime and redundant DPU and DRCU are off
Final configuration	Prime and redundant DPU and DRCU are off
Constraints	• Cryostat is vertical to within ±45° • Prime and redundant DPU and DRCU are off
Duration	5 minutes
Pass/Fail criteria	The specified current is drawn when the LPU is enabled and is switched off when the LPU is disabled

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	**Power on Redundant LPU LCL (LCL #26)**	LCL status	OFF/ /ON		State of LCL #26 switches to ON
3	**Send HL command #21 (LPU Enable Redundant)**	LCL #26 current	0mA/ /130-180mA		Current between 130-180mA
4	**Send HL command #22 (LPU Disable Redundant)**	LCL #26 current	130-180mA/ /0mA		Current off
5	**Un-power Prime LPU LCL (LCL # 25)**	LCL status	ON/ / OFF		State of LCL #26 switches to OFF
Test Result (Pass/Fail):					

7.2.10 Satellite & EGSE Switch Off

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value		P	N
	Satellite & EGSE Switch Off						
	Initial Conditions: Nominal & Redundant SPIRE warm units OFF						
10.1	On HPCSS terminate **ALL_SubscribeParams.tcl** test script.	OK					
10.2	From HPCCS Test Conductor console issue command to disconnect from SPIRE I-EGSE **disconnect HSPIREEGSE**	OK					
10.3	Confirm from HPCSS and SPIRE I-EGSE that the disconnection was successful	OK					
10.4	Switch OFF I-EGSE i.a.w. AD 5						
10.5	Switch OFF Satellite/SVM, HPCCS and SCOEs i.a.w. procedure AD 2 Sections 7.7 to 7.11	OK					
10.6	Confirm both Satellite and EGSE powered down	OK					
	End Conditions: Satellite and EGSE OFF						
	END OF TEST						

Enter Date/Time:			**Sign Off:**	

7.2.11 SPIRE SAFE Switch Off

The following procedure describes the necessary steps to safely switch off SPIRE when directed by RAL personne if an anomaly should occur.

Version	2.4
Date	16th Oct. 2007
Purpose	To switch OFF the SPIRE instrument if an anomaly should occur
Initial configuration	SPIRE can be on ANY configuration as specified on the procedure steps
Final configuration	SPIRE is OFF
Preconditions	• SPIRE FM DPU is electrically integrated with the Herschel Satellite • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	~5-8 minutes
Pass/Fail Criteria	SPIRE is OFF. All instrument subsystems are completely powered OFF.

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value		P	N
	SPIRE Main or Redundant SAFE Switch Off						
	Initial Conditions: Nominal or Redundant SPIRE warm units ON and anomaly requiring SAFE switch OFF has occurred. When executed as directed by SPIRE responsible the scripts below will perform the following actions: ▪ SPIRE-FM-WFT-PDET-OFF-P/R ▪ SPIRE-FM-WFT-BSM-OFF-P/R ▪ SPIRE-FM-WFT-SDET-OFF-P/R						

Enter Date/Time:			**Sign Off:**	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value		P	N
	▪ SPIRE-FM-WFT-SMEC-OFF-P/R ▪ SPIRE-FM-WFT-MCU-OFF-P/R ▪ SPIRE-FM-WFT-SCU-OFF-P/R ▪ S102999SCVT011/012_ASDWFTSPIR_PWR_OFF_P/R						
11.1	If Nominal SPIRE warm units powered execute the following test script on the HPCSS to switch SPIRE off safely: **S102999SCVT013_ASDWFTSPIR_SAFE_OFF_P.tcl**	OK					
11.2	If Redundant SPIRE warm units powered execute the following test script on the HPCSS to switch SPIRE off safely: **S102999SCVT014_ASDWFTSPIR_SAFE_OFF_R.tcl**	OK					
	End Conditions: SPIRE Nominal or Redundant OFF						
	END OF SAFE Switch OFF						

Enter Date/Time:			**Sign Off:**	

8 Summary Sheets

8.1 Procedure Variation Summary

	Test Change	Curr. No.:1 Date 23-24/10/2007 Page 1 of 1	
Test designation: SPIRE WSFT2	Test Procedure: TP-0167	Issue: 2	Rev.: -
Test step changed: See below	Reason for Change: See below		

PVS1: Not clear from executing Section 7.2.3.38 that SMEC launch latch is unlatched
Run Section 7.2.3.40 which latches SMEC again and then checks that it is latched by trying to move SMEC.

PVS2: Still not clear that whether SMEC was unlatched previously because of Feed Forward (FF) Offset setting (NCR-3720 refers)

Manually command SMEC to change FF Offset and then release latch:

SCD06505 with parameter 0x90557000
SCD06505 with parameter 0x90430002

Execute script: SPIRE-FM-WFT-FUNC-SMEC-04A-P

Continue from Section 7.2.3.38

PVS3: Extra step to confirm SMEC latch engaged
Manually command SMEC to change FF Offset again (SCD06505 with parameter 0x90557000) then repeat section 7.2.3.37

PVS4: SPIRE Redundant: Omit Sections (see PTR for rationale) and change order of execution

Sections: 7.2.7.1-7.2.7.8, 7.2.7.10-7.2.7.23, 7.2.7.27, 7.2.7.32, 7.2.7.43

Perform Sections 7.2.7.9, 7.2.7.34 – 7.2.7.43 before sections 7.2.7.24-7.2.7.26, 7.2.7.28-7.2.7.31, 7.2.7.33

Replace scripts in section 7.2.7.36 by manual commanding below:

SCD06505 with parameter 0x90557000
wait ca. 30 secs
SCD06505 with parameter 0x90430002

Replace scripts in section 7.2.7.40 by the following:

SCD06505 with parameter 0x90440006
SCD06505 with parameter 0x90490000
SCD06505 with parameter 0x90556000
wait ca. 30 secs
SCD06505 with parameter 0x90430001

Execute script: SPIRE-FM-WFT-FUNC-SMEC-04A-P

PVS5: Scan Test dropped out of Closed Loop

Change Encoder Power by manual command:

SCD06505 with parameter 0x90400007

Repeat section 7.2.7.37

Repeat section 7.2.7.38 and update SMEC offsets by manual command:

SCD06505 with parameter 0x90584970
SCD06505 with parameter0x905A6720

Prepared by:	Resp. Test Leader	Project Engineer
PA/QA	Prime	Customer

Table 8.1-1: Procedure Variation Sheet

8.2 Non Conformance Report (NCR) Summary

NCR - No.	NCR - Title	Date	Open Closed	PA sig.
3720	SPIRE SMEC Operation during WFT	23/10/07		
3725	SPIRE FM Detector Anomalies during WFT.	24/10/07		
37 33	SPIRE SMEC Drops out of Closed Loop Scan Test.	24/10/07		

Table 8.2-1: Non-Conformance Record Sheet

8.3 Sign-off Sheet

	Date	Signature
Test Manager		
Operator	24/10/07	
PA Responsible	24.10.07	
ESA Representative	26/10/07	

END OF DOCUMENT

	Name	Dep./Comp.		Name	Dep./Comp.
X	Alberti von Mathias Dr.	ASG22		Schweickert Gunn	ASG22
	Baldock Richard	FAE12	X	Sonn Nico	ASG51
	Barlage Bernhard	AED13		Steininger Eric	AED32
	Bayer Thomas	ASA42	X	Stritter Rene	AED11
	Brune Holger	ASA45		Suess Rudi	OTN/ASA44
	Edelhoff Dirk	AED2		Wagner Klaus	ASG22
	Fehringer Alexander	ASG13	X	Wietbrock Walter	AET12
X	Fricke Wolfgang Dr.	AED 65		Wöhler Hans	ASG22
	Geiger Hermann	ASA42		Wössner Ulrich	ASE252
	Grasl Andreas	OTN/ASA44	X	Theunissen Martijn/Dutch Space	ASA43
	Grasshoff Brigitte	AET12	X	Martin Olivier	ASA43
X	Hamer Simon	Terma			
X	Hendry David	Terma			
	Hengstler Reinhold	ASA42			
	Hinger Jürgen	ASG22			
X	Hohn Rüdiger	AED65			
	Hölzle Edgar Dr.	AED32			
	Huber Johann	ASA42			
	Hund Walter	ASE252			
	Idler Siegmund	AED312			
	Ivády von András	FAE12			
	Jahn Gerd Dr.	ASG22			
	Kalde Clemens	ASM2			
	Kameter Rudolf	OTN/ASA42			
	Kettner Bernhard	AET42			
	Knoblauch August	AET32	X	Alcatel Alenia Space Cannes	AAS-F
X	Koelle Markus	ASA43		Alcatel Alenia Space Torino	AAS-I
X	Koppe Axel	AED312	X	ESA/ESTEC	ESA
X	Kroeker Jürgen	AED65			
X	La Gioia Valentina	Terma		**Instruments:**	
	Lang Jürgen	ASE252		MPE (PACS)	MPE
	Langenstein Rolf	AED15	X	RAL (SPIRE)	RAL
	Langfermann Michael	ASA41		SRON (HIFI)	SRON
X	Maukisch Jan	ASA43			
X	Much Christoph	ASA43			
	Müller Jörg	ASA42		**Subcontractors:**	
X	Müller Martin	ASA43		Alcatel Alenia Space Antwerp	ABSP
	Peltz Heinz-Willi	ASG13		Austrian Aerospace	AAE
	Pietroboni Karin	AED65		Austrian Aerospace	AAEM
	Platzer Wilhelm	AED2		BOC Edwards	BOCE
	Reichle Konrad	ASA42		Dutch Space Solar Arrays	DSSA
	Runge Axel	OTN/ASA44		EADS Astrium Sub-Subsyst. & Equipment	ASSE
	Schink Dietmar	AED32		EADS CASA Espacio	CASA
	Schlosser Christian	OTN/ASA44		EADS CASA Espacio	ECAS
	Schmidt Rudolf	FAE12		European Test Services	ETS
	Schmidt Thomas	ASA42		Patria New Technologies Oy	PANT
	Schuler Günter	ASA42		SENER Ingenieria SA	SEN

6 Appendix 2: SPIRE FM WFT2 Test Set-up

SCOE CABLES CONNECTION to HERSCHEL S/C

SKIN-01 PWR Panel (PCDU)

Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
BS Nom Power	SK01BJ09	PCDU	BS SCOE Cable Plugged	✓
BS Red Power	SK01BJ10	PCDU	BS SCOE Cable Plugged	✓
BDR1 AIT	SK01BJ11	PCDU	SAS SCOE Cable Plugged	✓
BDR2 AIT	SK01BJ12	PCDU	SAS SCOE Cable Plugged	✓
SA Nom Power	SK01AJ01	PCDU	SAS SCOE Cable Plugged	✓
SA Nom Power	SK01AJ02	PCDU	SAS SCOE Cable Plugged	✓
SA Nom Power	SK01AJ03	PCDU	SAS SCOE Cable Plugged	✓
SA Red Power	SK01AJ05	PCDU	SAS SCOE Cable Plugged	✓
SA Red Power	SK01AJ06	PCDU	SAS SCOE Cable Plugged	✓
SA Red Power	SK01AJ07	PCDU	SAS SCOE Cable Plugged	✓

SKIN-02 PWR Panel (ACC, CDMU, RCS, 1553 & Thruster)

	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-02	DMS 1553 Bus_A	J01	CDMU	CDMU SCOE Cable Plugged	✓
SKIN-02	DMS 1553 Bus_B	J02	CDMU	CDMU SCOE Cable Plugged	Test Cap
SKIN-02	ACMS 1553 Bus_A	J03	ACC	ACMS SCOE Cable Plugged	NA
SKIN-02	ACMS 1553 Bus_B	J04	ACC	ACMS SCOE Cable Plugged	NA
SKIN-02	LV1/FCV 20N CMD S/A M	J05	ACC/RCS	ACMS SCOE Cable Plugged	NA
SKIN-02	LV2/FCV 20N CMD S/A R	J06	ACC/RCS	ACMS SCOE Cable Plugged	NA
SKIN-02	RCS Press/Tank Temp/PT Pwr	J07	ACC/PT&TH	ACMS SCOE Cable Plugged	NA
SKIN-02	Thruster Temp M/LV1 Sts	J08	ACC/RCS	ACMS SCOE Cable Plugged	NA
SKIN-02	Thruster Temp R/LV2 Sts	J11	ACC/RCS	ACMS SCOE Cable Plugged	NA
SKIN-02	Thruster C/B Heaters M	J12	ACC/CBH	ACMS SCOE Cable Plugged	NA
SKIN-02	Thruster C/B Heaters R	J13	ACC/CBH	ACMS SCOE Cable Plugged	NA
SKIN-02	Str1/2 On/Off Cmd M/Str1 Sts	J14	ACC/STR-1	ACMS SCOE Cable Plugged	NA
SKIN-02	Str1/2 On/Off Cmd R/Str2 Sts	J15	ACC/STR-2	ACMS SCOE Cable Plugged	NA
SKIN-02	Gyro A On/Off Cmd	J16	ACC/GYRO-E1	NA	ACMS Flight Cap SK02P16 Plugged
SKIN-02	Gyro B On/Off Cmd	J17	ACC/GYRO-E2	NA	ACMS Flight Cap SK02P17 Plugged

SKIN-03 TTC Panel

	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-03	Test point TC + protection jumper EPC1	SK03J01	XPND1/EPC1	NA	Plastic cap (See note1)
SKIN-03	Test point TC + protection jumper EPC2	SK03J02	XPND2/EPC2	NA	Plastic cap (See note1)

	RF LINK				
	Connector Function	**Skin Connector**	**S/C unit**	**SCOE CABLE**	**Flight Connector**
	RF link for antenna LGA1	N/A	LGA1	TT&C SCOE Cable LGA1 Plugged	LGA1 Anechoic Cap √
	RF link for antenna LGA2	N/A	LGA2	TT&C SCOE Cable LGA2 Plugged	LGA2 Anechoic Cap √
	RF link for antenna MGA	N/A	MGA	TT&C SCOE Cable MGA Plugged	MGA Anechoic Cap √
SKIN-04	ACMS Panel (RWE)				
	Connector Function	**Skin Connector**	**S/C unit**	**SCOE CABLE**	**Flight Connector**
SKIN-04	RWL1 Sgn	J01	ACC/RWL-1	NA	ACMS Flight Cap SK04P01 Plugged
SKIN-04	RWL2 Sgn	J02	ACC/RWL-2	NA	ACMS Flight Cap SK04P02 Plugged
SKIN-04	RWL3 Sgn	J03	ACC/RWL-3	NA	ACMS Flight Cap SK04P03 Plugged
SKIN-04	RWL4 Sgn	J04	ACC/RWL-4	NA	ACMS Flight Cap SK04P04 Plugged
SKIN-05	GYR/QRS Panel				
	Connector Function	**Skin Connector**	**S/C unit**	**SCOE CABLE**	**Flight Connector**
SKIN-05	CRS1 AOCS Sgn	J01	CRS-1/ACC	NA	ACMS Flight Cap SK05P01 Plugged
SKIN-05	CRS2 AOCS Sgn	J02	CRS-2/ACC	NA	ACMS Flight Cap SK05P02 Plugged
SKIN-05	GYRO RS422 / Test	J03	GYRO	ACMS SCOE Cable Plugged	NA
SKIN-05	CRS 1/2 Stimuli	J04	CRS-1,2	ACMS SCOE Cable Plugged	NA
SKIN-05	AAD Sgn M	J05	AAD/ACC	ACMS SCOE Cable Plugged	NA
SKIN-05	SAS1/2 Sgn M	J06	SAS/ACC	ACMS SCOE Cable Plugged	NA
SKIN-05	SAS1/2 Sgn R	J07	SAS/ACC	ACMS SCOE Cable Plugged	NA
SKIN-05	AAD Sgn R	J08	AAD/ACC	ACMS SCOE Cable Plugged	NA
SKIN-06	STR Panel				
	Connector Function	**Skin Connector**	**S/C unit**	**SCOE CABLE**	**Flight Connector**
SKIN-06	STR1 Stimuli	J01	STR1	ACMS SCOE Cable Plugged	NA
SKIN-06	STR2 Stimuli	J02	STR2	ACMS SCOE Cable Plugged	NA
	UMBILICAL				
	Connector Function	**Connector**	**S/C unit**	**SCOE CABLE**	
	Power/Data	HUJ01	SYSTEM	SCOEs cable Plugged	V
	Power/Data	HUJ02	SYSTEM	SCOEs cable Plugged	V

Note1:

SK03P01 and SK03P02 Flight Caps to be connected for flight ONLY

SPIRE

19.EGSE CONFIGURATION ELEMENTS

Test setup for SIT-2 & WSFT

19.1. S/C SKIN PLUG CONFIGURATION

The following table details the S/C skin plug usage in relation with the different S/C IST sequences:

yes

yes

NO

Yes

connector bracket identification	connector reference	unit or function	SCOE configuration as a function of S/C IST test sequence	Launch sequence RMS	INST commissioning Mode transition S/C reconfiguration Launch mode robustness CDMS management DTCP worst case scnr	NOM mode robustness	Clean run	Comments
PU1 PU2	J01 J02	M R	Umbilical connection	TMTC DFE ✓	TMTC DFE ✓	TMTC DFE	"OPEN" (during main sequence)	
SK01A	J01 J05 J02 J06 J03 J07	M M M R M R	Solar Array connector (SAS input)	POWER SCOE (LPS then SAS config) ✓	POWER SCOE (SAS)	POWER SCOE (SAS)	Solar Array connected (if present)	SA1, sections 1, 4, 7, 10, 13, 16, 19, 22, 25, 28 SA2, sections 2, 5, 8, 11, 14, 17, 20, 23, 26, 29 SA3, sections 3, 6, 9, 12, 15, 18, 21, 24, 27, 30
SK1B	J09 J10	M R	Flight Battery power jumper (PCDU side = BATSIM input)	FLIGHT PLUG (FM battery connected) ✓	POWER SCOE (BATSIM) ✓	POWER SCOE (BATSIM)	FLIGHT PLUG (FM battery connected)	
	J11 J12	M R	BDR AIT ON/OFF DTC (emergency S/C OFF)	LPS SCOE ✓	LPS SCOE	LPS SCOE	FLIGHT PLUG	
SK02	J01 J02	M R	CDMS 1553 bus jumper (S/C bus monitoring)	BUS MONITOR ✓	BUS MONITOR	BUS MONITOR and CDMU SCOE (jamming)	FLIGHT PLUG	
	J03 J04	M R	ACMS 1553 bus jumper (S/C bus monitoring)	ACMS SCOE (bus monitor)	ACMS SCOE (bus monitor)	ACMS SCOE (bus monitor)	FLIGHT PLUG	
	J05 J06	M R	LV / THR FCV cmd safety plugs (safe plug with loads)	ACMS SCOE	ACMS SCOE	ACMS SCOE	TEST LOADS	
	J07	M	PCS TANK sensor jumpers (simulation input)	ACMS SCOE	ACMS SCOE	ACMS SCOE	FLIGHT PLUG (sensors connected)	
	J08	M	THR thermocouple and LV status (simulation input)	ACMS SCOE	ACMS SCOE	ACMS SCOE	FLIGHT PLUG (sensors connected)	
	J09 J10	M R	CDMU and ACC EEPROM quick reprogramming input	FLIGHT CAP	FLIGHT CAP	FLIGHT CAP	FLIGHT CAP	
	J11	R	THR thermocouple and LV status (simulation input)	ACMS SCOE	ACMS SCOE	ACMS SCOE	FLIGHT PLUG (sensors connected)	
	J12 J13	M R	THR heaters cmd safety plugs (safe plug with load)	ACMS SCOE	ACMS SCOE	ACMS SCOE	TEST LOADS	
	J14 J15	1 2	STR ON/OFF STS signal jumper (simulation input)	FLIGHT PLUG (STR connected)	FLIGHT PLUG (STR connected)	FLIGHT PLUG (STR connected)	FLIGHT PLUG (STR connected)	
	J16 J17	1 2	GYRO ON/OFF STS signal jumper (simulation input)	FLIGHT PLUG (GYRO connected)	FLIGHT PLUG (GYRO connected)	FLIGHT PLUG (GYRO connected)	FLIGHT PLUG (GYRO connected)	
SK03	J01 J02	1 2	TTC XPND aux. ouputs and TWTA safety plug	GROUND PLUG (with helix protection strap)	GROUND PLUG (with helix protection strap)	GROUND PLUG (with helix protection strap)	FLIGHT CAP	
SK04	J01 J02 J03 J04	1 2 3 4	RWL1 signal jumper RWL2 signal jumper RWL3 signal jumper RWL4 signal jumper	FLIGHT PLUG (RWL connected)	FLIGHT PLUG (RWL connected)	FLIGHT PLUG (RWL connected)	FLIGHT PLUG (RWL connected)	
SK05	J01 J02	1 2	CRS signal jumper (simulation input)	FLIGHT PLUG (CRS connected)	FLIGHT PLUG (CRS connected)	FLIGHT PLUG (CRS connected)	FLIGHT PLUG (CRS connected)	
	J03		GYRO test plug (stimulation)	ACMS SCOE	ACMS SCOE	ACMS SCOE	FLIGHT CAP	
	J04		CRS stimulation input					
	J05	M	AAD signal jumper (simulation input)				FLIGHT PLUGS (sensors connected) SAS and AAD optically stimulated (room light)	
	J06 J07	M R	SAS 1and 2 signal jumpers (simulation input)					
	J08	R	AAD signal jumper (simulation input)					
SK06	J01 J02	1 2	STR stimulation input	ACMS SCOE	ACMS SCOE	ACMS SCOE	FLIGHT CAP	
ANT	LGA1 LGA2 LGA3 MGA		Low gain antenna (Earth) +X looking LGA (used for Launch and SM only) Medium gain antenna (Earth)	RF SCOE ✓	RF SCOE ✓	RF SCOE	RF SCOE	

Values in red are delta with respect to most common test configuration.

Note: the above configuration holds for PFM tests. For AVM, the need to simulate some of the ACMS sensors and actuators leads to a specific configuration.

WARNING: the above configuration holds for test at ambient. It shall not be copied and pasted for one TVTB test.

7 Appendix 3: Instrument Test Reports

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: APID: 0x508; Type: 21; Subtype: 1; SID: 0xA20; FrameID: 0x20; Frame length: 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.

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**: 0x508; **Type**: 21; **Subtype**: 3; **SID**: 0x1121; **FrameI D**: 0x21; **Frame length**: 0x1E 2. The SCU Test Pattern agrees with the reference test pattern. QLA to give go ahead.

APID	**Type**	**Subtype**	**SID**	**FrameI D**	**Frame length**
0x508	21	3	0x1121	0x21	0x1E

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

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						

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

<table>
<tr><th>Test Id:</th><th>FUNC-MCU-03: MCU Nominal Contents Check</th></tr>
<tr><td>Initial Configuration:</td><td>DRCU_ON + AC/DC thermometry ON +MCU ON</td></tr>
<tr><td>Final Configuration:</td><td>DRCU_ON + AC/DC thermometry ON +MCU ON</td></tr>
<tr><td>Success Criteria:</td><td>Test passed if :
1. MCU produces 99 frames of each type of frames requested with the following characteristics:
<table>
<tr><td>Frame</td><td>APID</td><td>Type</td><td>Subtype</td><td>SID</td><td>FrameID</td><td>Frame length</td></tr>
<tr><td>Eng.</td><td>0x508</td><td>21</td><td>3</td><td>0x814</td><td>0x14</td><td>0x15</td></tr>
<tr><td>BSM</td><td>0x508</td><td>21</td><td>1</td><td>0x612</td><td>0x12</td><td>0xD</td></tr>
<tr><td>SMEC</td><td>0x508</td><td>21</td><td>1</td><td>0x410</td><td>0x10</td><td>0xC</td></tr>
<tr><td>BSM +SMEC</td><td>▨</td><td>▨</td><td>▨</td><td>▨</td><td>▨</td><td>▨</td></tr>
</table>
2. No events are generated during the different frames generation.
3. QLA analysis results are correct.
QLA to give go ahead.</td></tr>
</table>

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: Frame: **Test**; APID: **0x508**; Type: **21**; Subtype: **3**; SID: **0x915**; FrameID: **0x15**; Frame length: **0x15** 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**	**0/1**	0/1	N/A	**Success**
	CHOPLOOPMODE	**3/3**	3/3		
	CHOPDACVAL	**0x8000/0x8000**	0x8000/0x8000		
	CHOPFFGAIN	**0xBEB/0x700**	0xBEB/0x770		
	CHOPSENSSIG	**~0x8000**	~0x7FFE/~0x8EB9		
	JIGGSENSPWR	**0/1**	0/1		
	JIGGLOOPMODE	**3/3**	3/3		
	JIGGDACVAL	**0x8000/0x8000**	0x8000/0x8000		
	JIGGFFGAIN	**0xBEB/0xF6E**	0xBEB/0xF6E		
	JIGGSENSSIG	**~0x8000/?**	0x7FF2/~ 0x8F3A		

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:

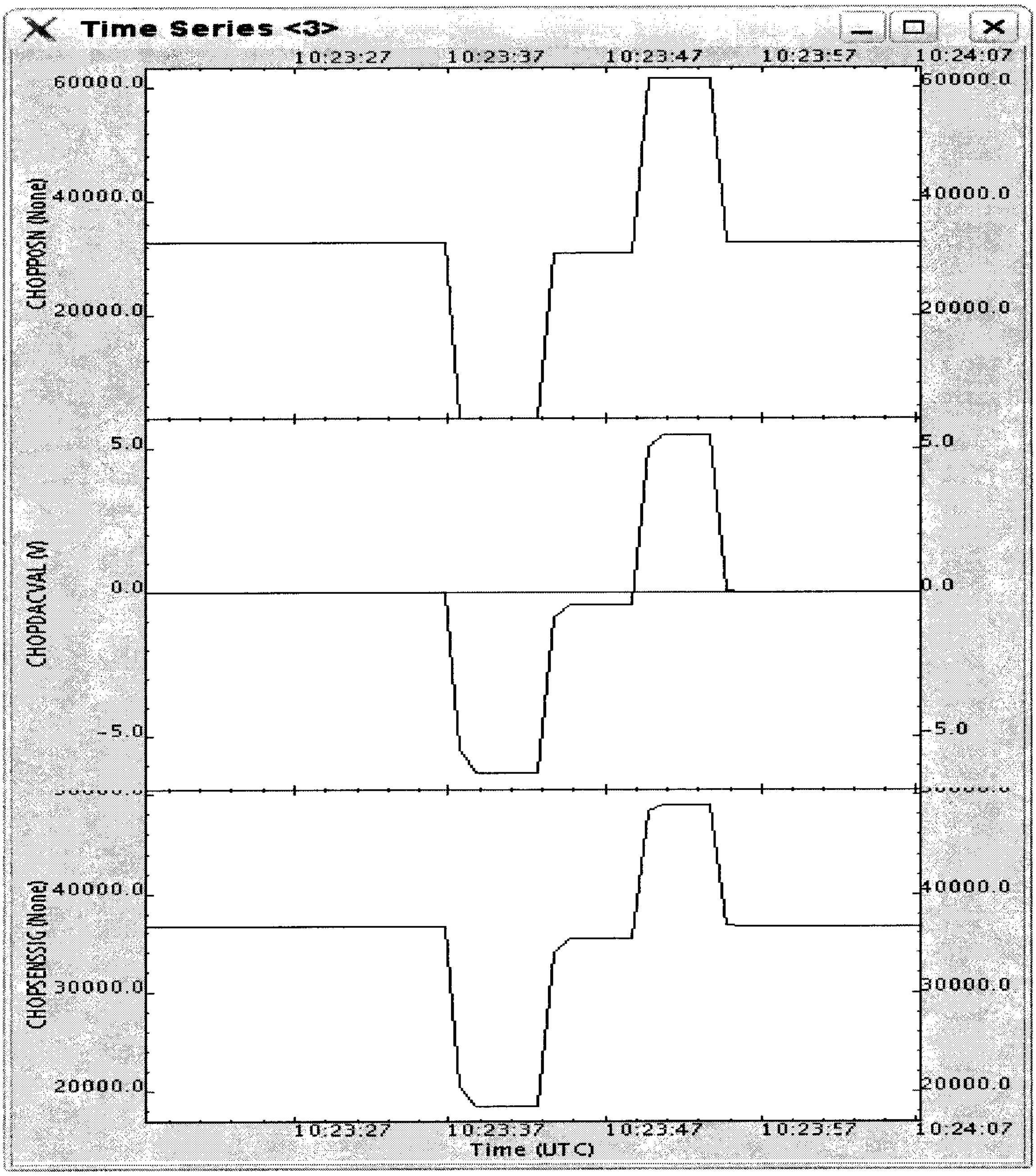
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-02C	**CHOPDACVAL CHOPSENSSIG**		See below	N/A	Success

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:

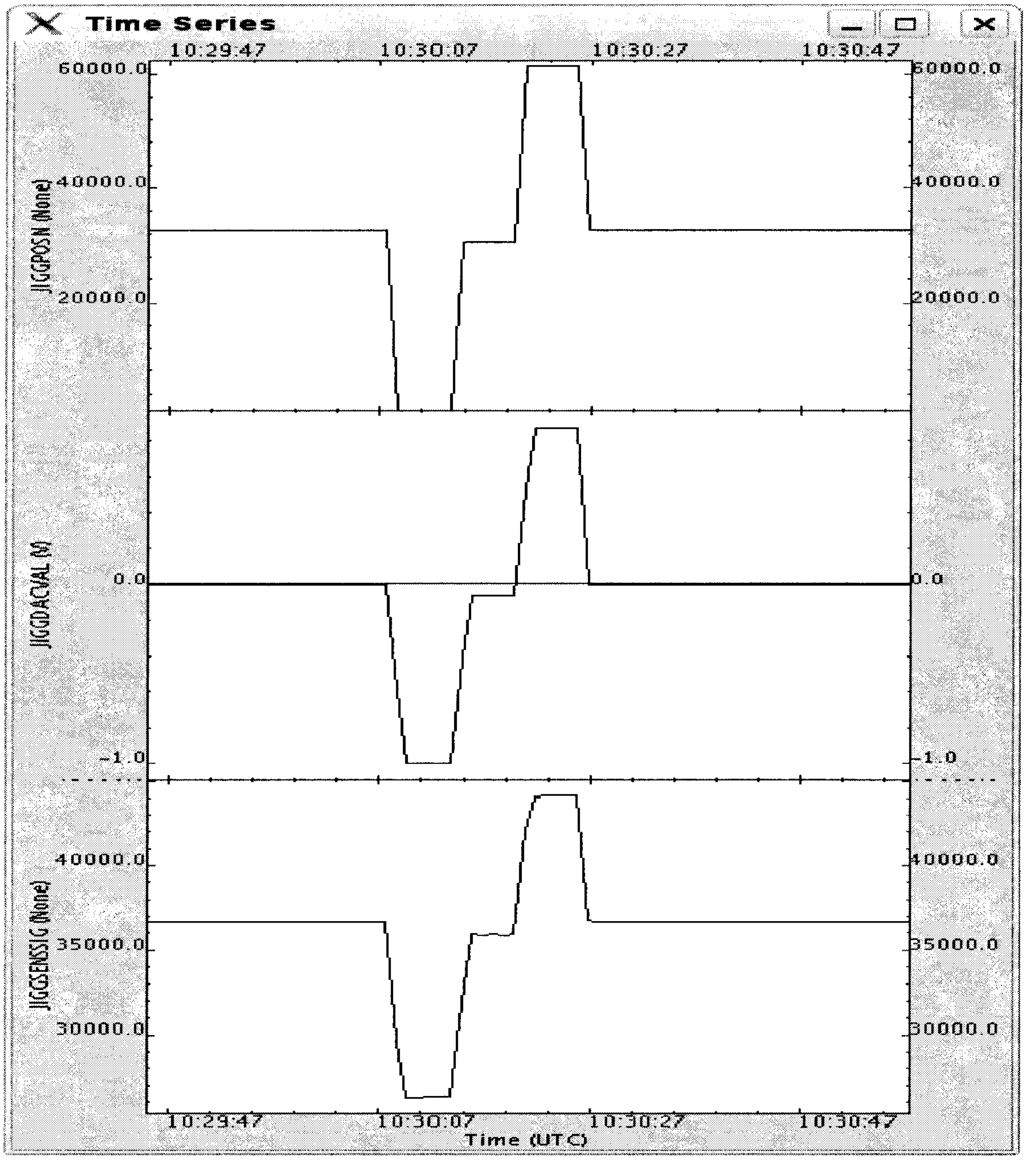
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-02J	**JIGGDACVAL** **JIGGSENSSIG**		See below	N/A	Success

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:

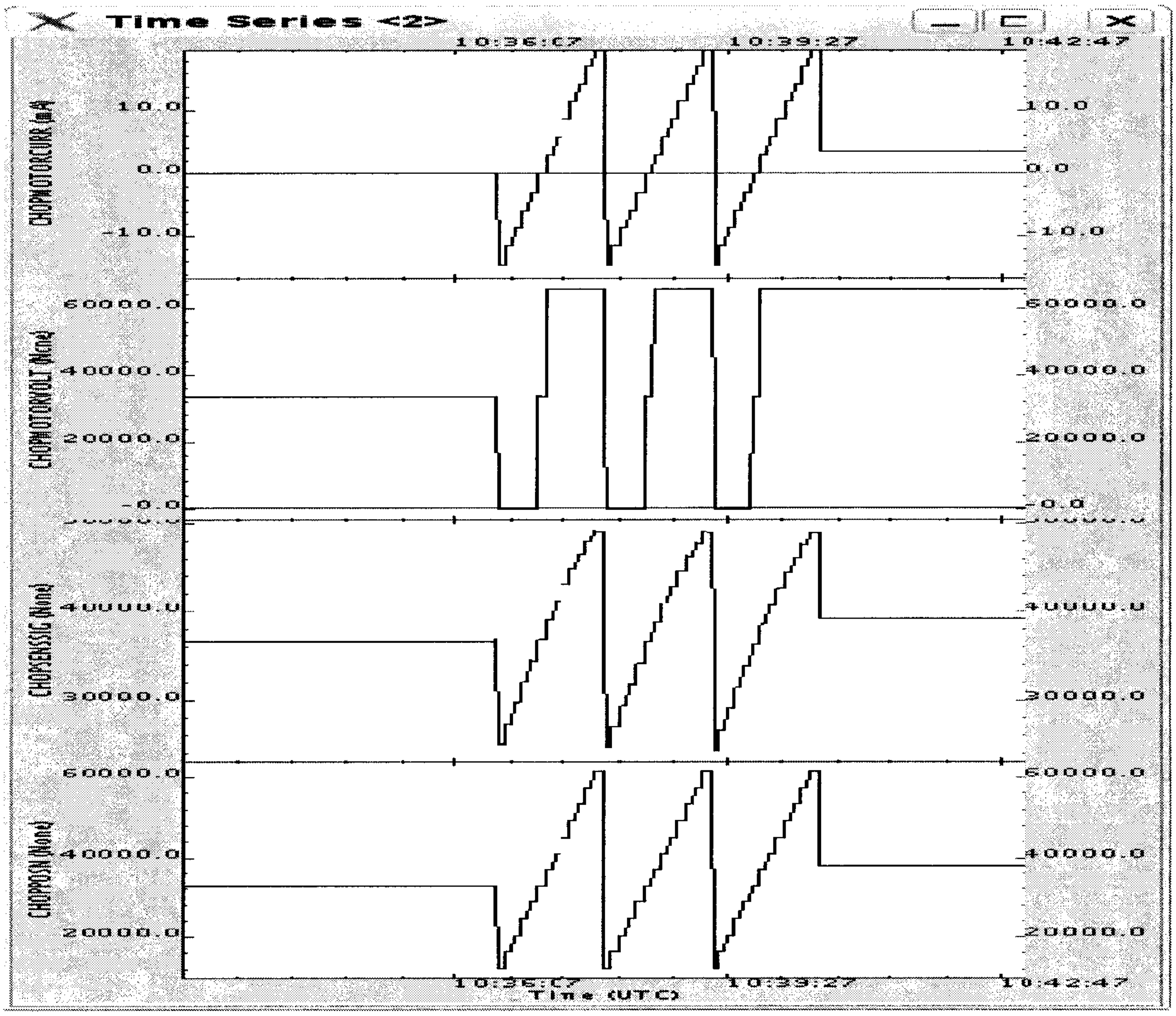
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-BSM-03				N/A	**Success**

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

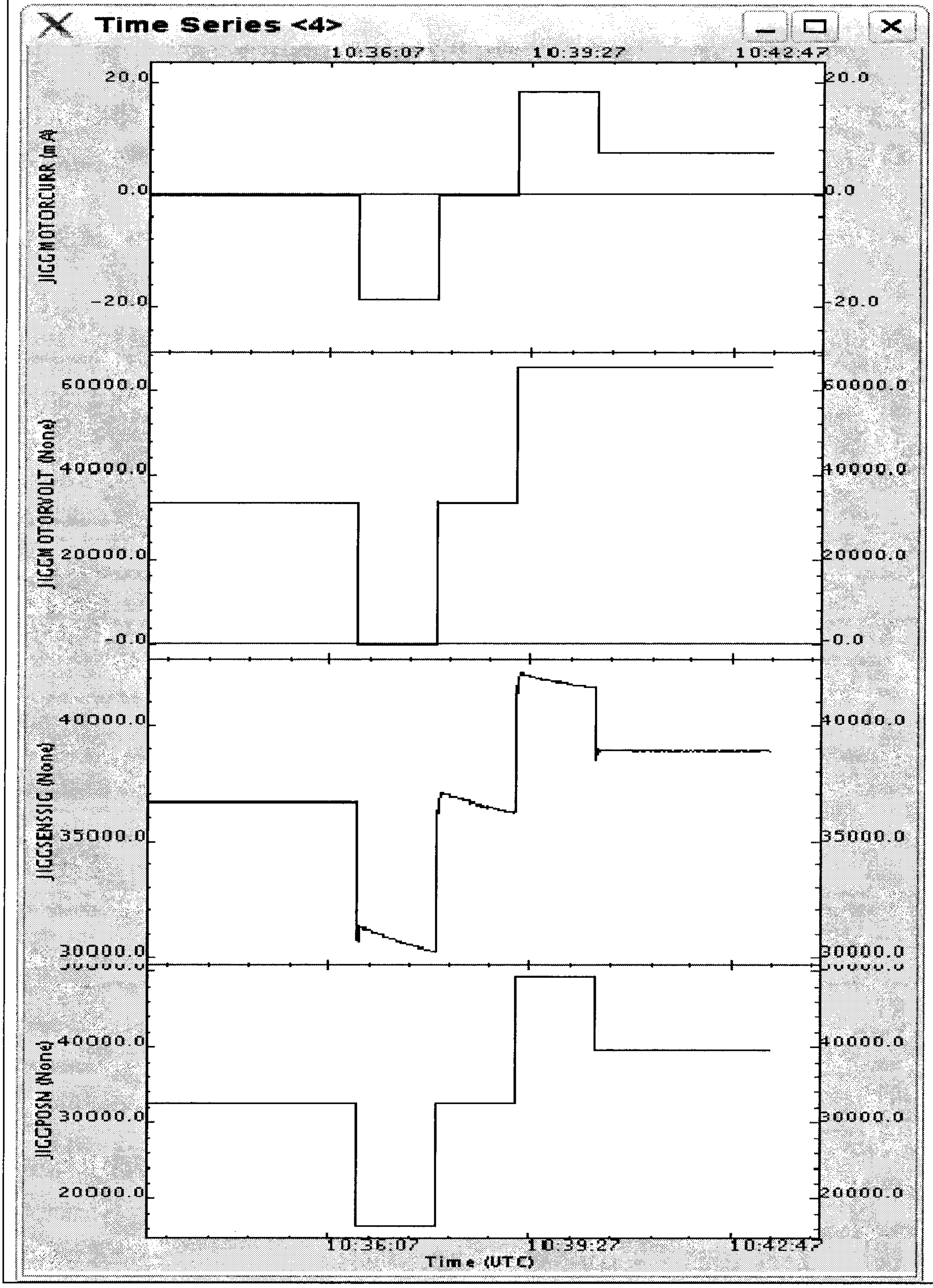
```
string frametype = "BSM"; // Specifies MCU frame type [
double framerate = 64.0; // Specifies the frame rate
int j_start = 0x4000; // RAW jiggle target start position
int j_end = 0xc000; // RAW jiggle target end position
int j_step = 0x4000; // RAW jiggle target step in position
int j_delay = 2; // 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.	

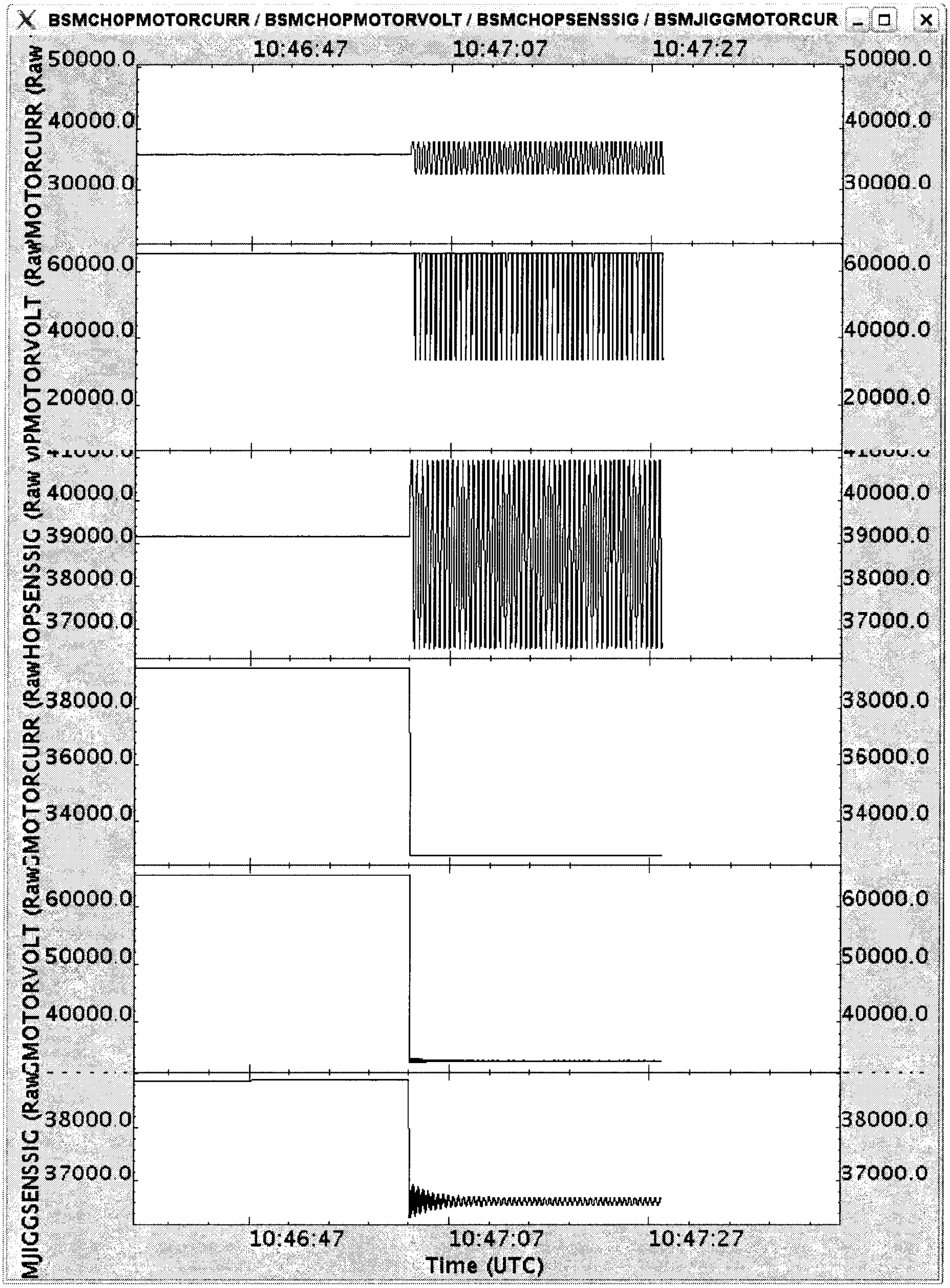
Test Log:

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
50000.0
40000.0
30000.0
60000.0
40000.0
20000.0
41000.0
40000.0
39000.0
38000.0
37000.0
38000.0
36000.0
34000.0
60000.0
50000.0
40000.0
38000.0
37000.0
MOTORCURR (Raw
PMOTORVOLT (Raw
HOPSENSSIG (Raw
GMOTORCURR (Raw
GMOTORVOLT (Raw
MJIGGSENSSIG (Raw
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

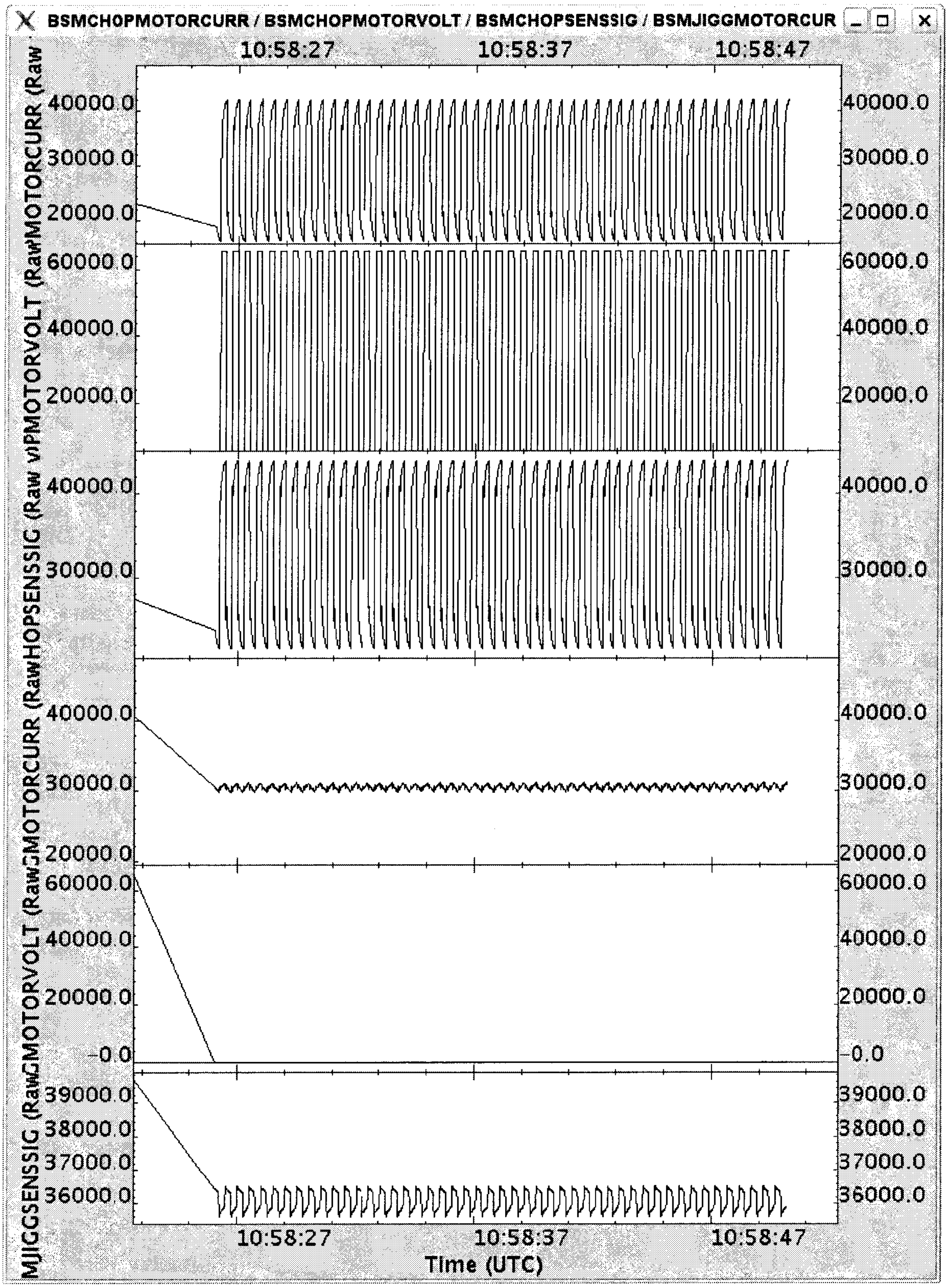
Start time: 10:57
OBSID:0xb00002cb

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
MJIGGSENSSIG (RawGMOTORVOLT (RawGMOTORCURR (RawHOPSENSSIG (Raw vPMOTORVOLT (RawMOTORCURR (Raw
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 (Δt ~ 65.5 ms) **and spectrometer 80Hz** Δt ~ 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

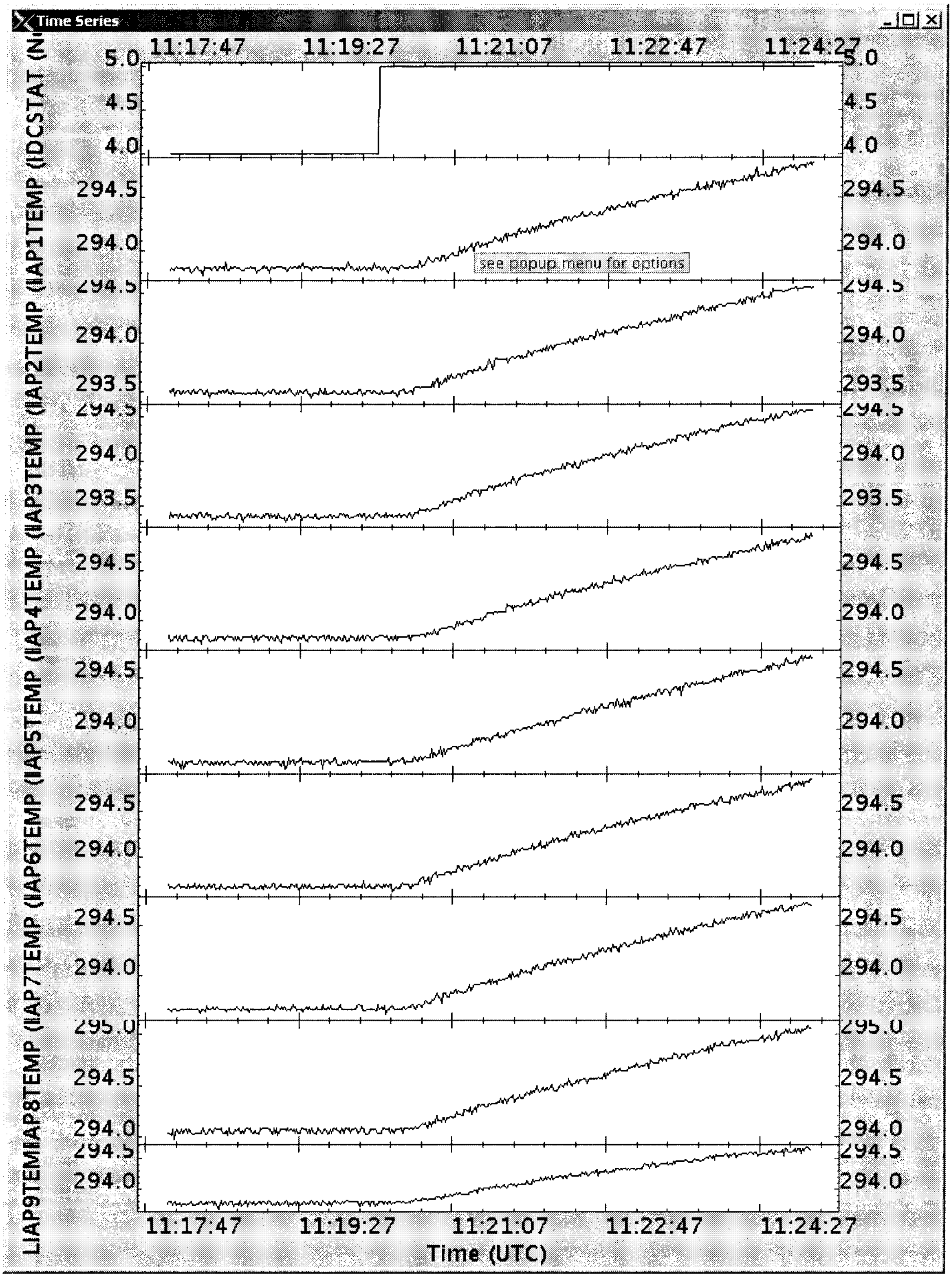
Output file FUNC-DCU-04p_B00002D0.txt from QLA script:

```
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
LIAP9TEMIAP8TEMP (IIAP7TEMP (IIAP6TEMP (IIAP5TEMP (IIAP4TEMP (IIAP3TEMP (IIAP2TEMP (IIAP1TEMP (IDCSTAT (N
11:17:47
11:19:27
11:21:07
11:22:47
11:24:27
5.0
4.5
4.0
294.5
294.0
294.5
294.0
293.5
294.5
294.0
293.5
294.5
294.0
294.5
294.0
294.5
294.0
294.5
294.0
295.0
294.5
294.0
294.5
294.0
see popup menu for options
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**

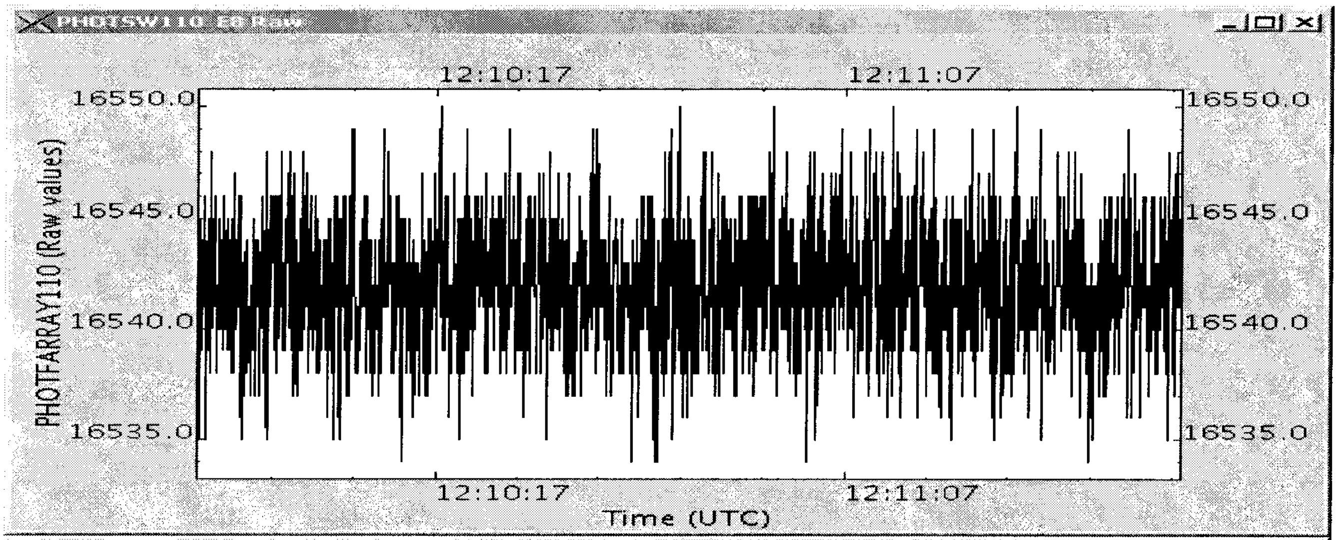
Start time: 12:08
OBSID: 0xb00002d3

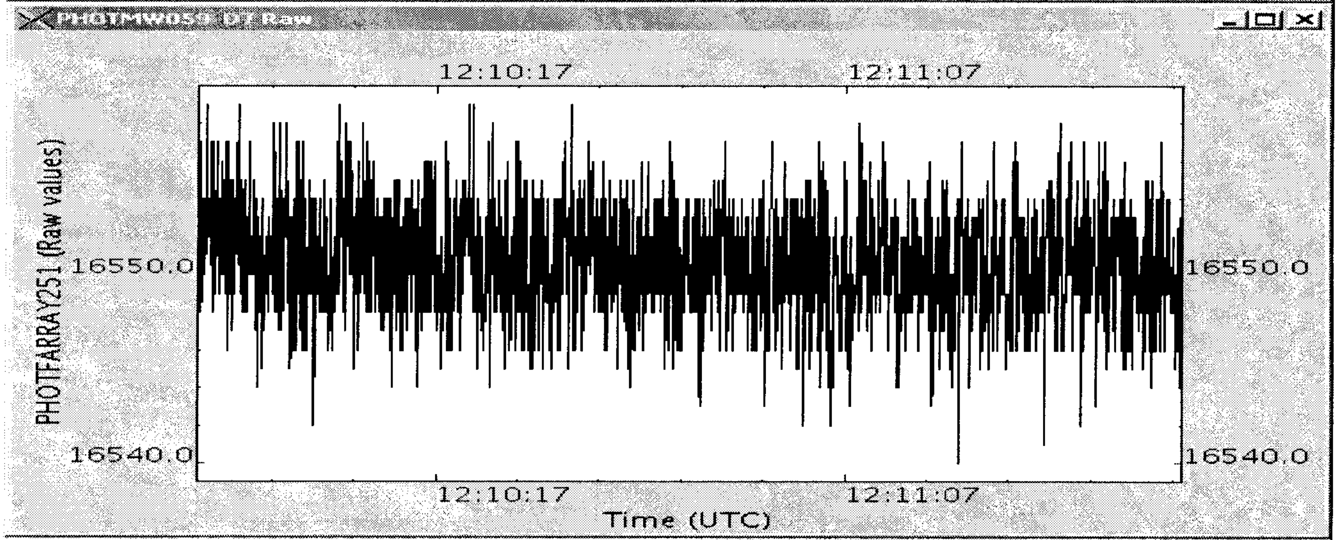
CUS Input Default Parameters:
string dcumode = "PF"; //Array
int ftime = 120; //time

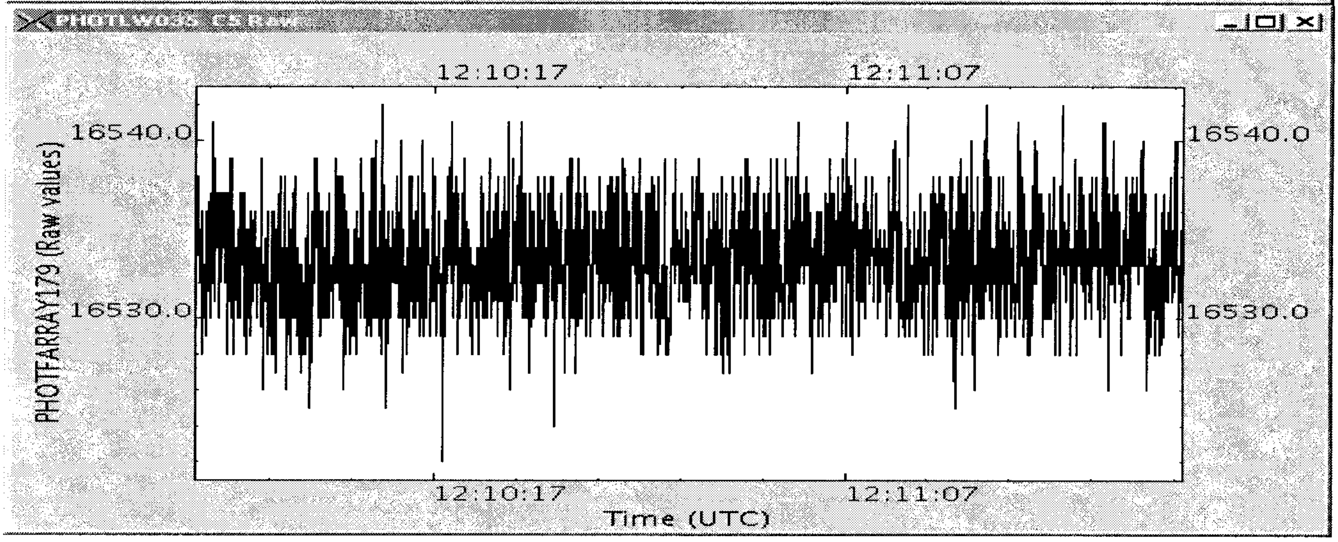
Comments: Test OK
Detectors settings:
Bias frequency: 130.2Hz
Sampling frequency: 18.6 Hz
PSW phase: 180.71 deg
PMW phase: 180.71 deg
PLW phase: 180.71 deg
PSW bias : ~ 31mV
PMW bias : ~ 31mV
PLW bias : ~ 31mV
TC bias : ~ 62 mV

Duration of test: 2 minutes

QLA plots below (one pixel per array)


PHOTSW110 E6 Raw
12:10:17
12:11:07
16550.0
16545.0
16540.0
16535.0
PHOTFARRAY110 (Raw values)
Time (UTC)


PHOTMW059 D7 Raw
12:10:17
12:11:07
16550.0
16540.0
PHOTFARRAY251 (Raw values)
Time (UTC)


PHOTLW036 C5 Raw
12:10:17
12:11:07
16540.0
16530.0
PHOTFARRAY179 (Raw values)
Time (UTC)

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

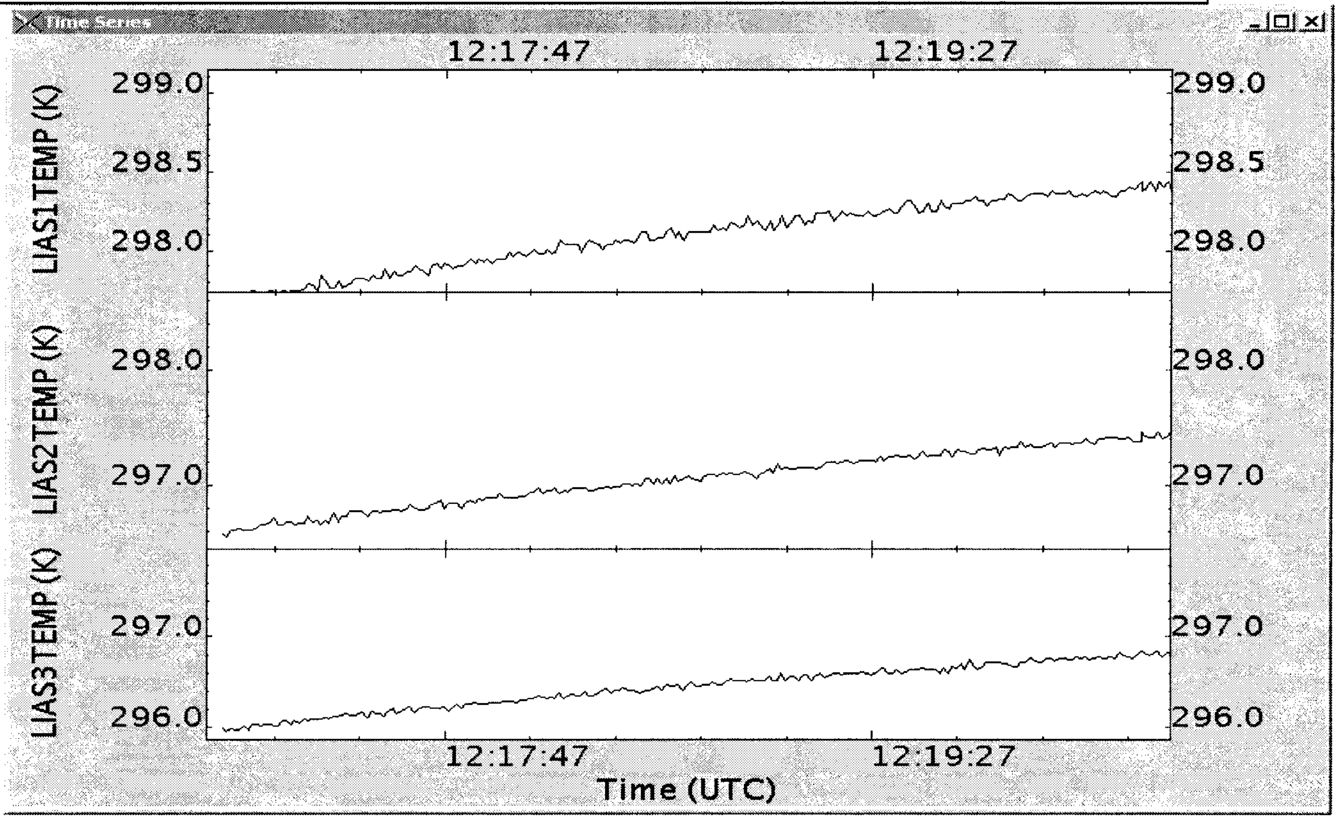
Comments: SLIABITSTAT 0 to 1
Spectrometer LIAs switched ON correctly
Output file FUNC-DCU-04s_B00002D5.txt from QLA script:

```
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**	**6/6**	6/6	N/A	**Success**
	LIASTAT	**0/0**	0/0		
	SLIAP5V	**0V/ ~ 5V**	/5.25		
	SLIAP9V	**0V/~11V**	/11.59		
	SLIAM9V	**0V/-11V**	/-11.59		
	SPECJFETSTAT	**0/0x7**	0/0x7		
	SSWJFET1/2V	**0V/~-1.5V**	See comments		
	SLWJFET1/2V	**0V/~-1.5V**	below		

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

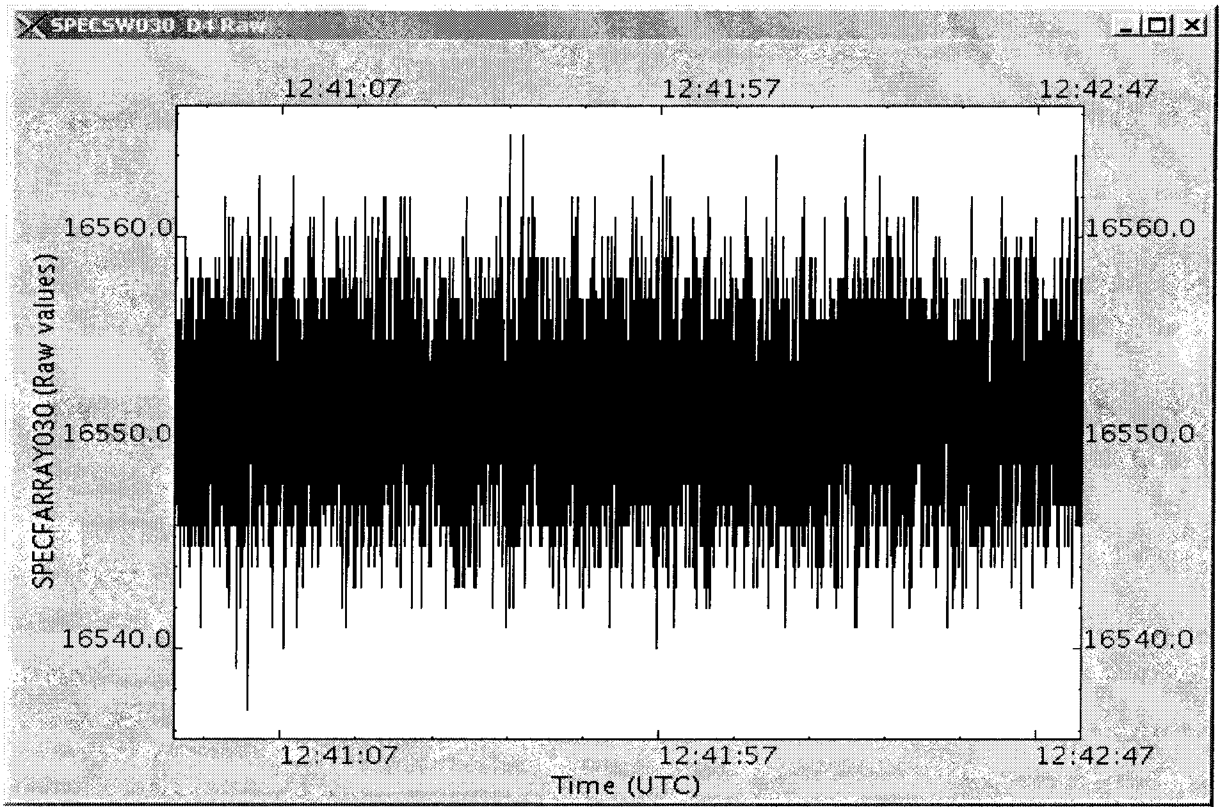
CUS Input Default Parameters:
string dcumode = "PF"; //Array
int ftime = 120; //time

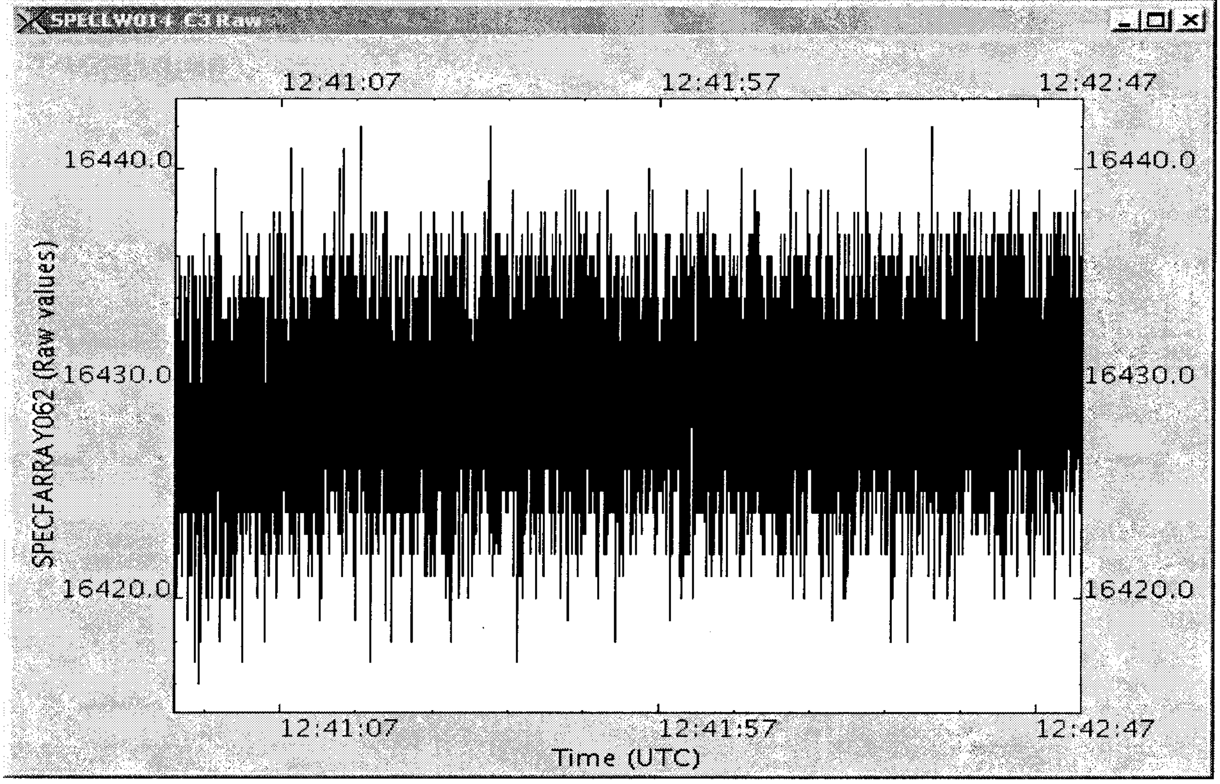
Comments:

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
12:41:07
12:41:57
12:42:47
16440.0
16430.0
16420.0
SPECFARRAY062 (Raw values)
Time (UTC)

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.	

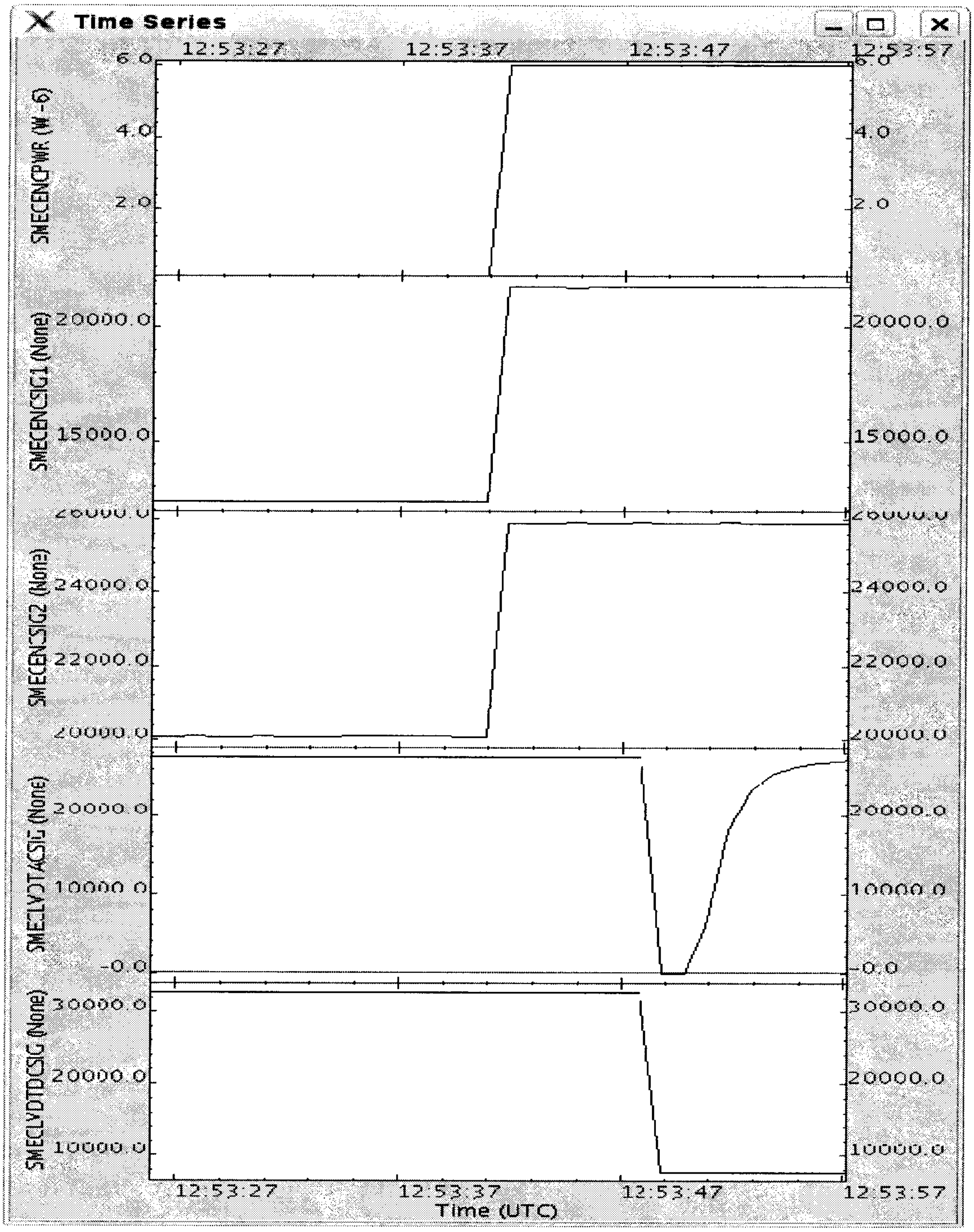
Test Log:

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

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:

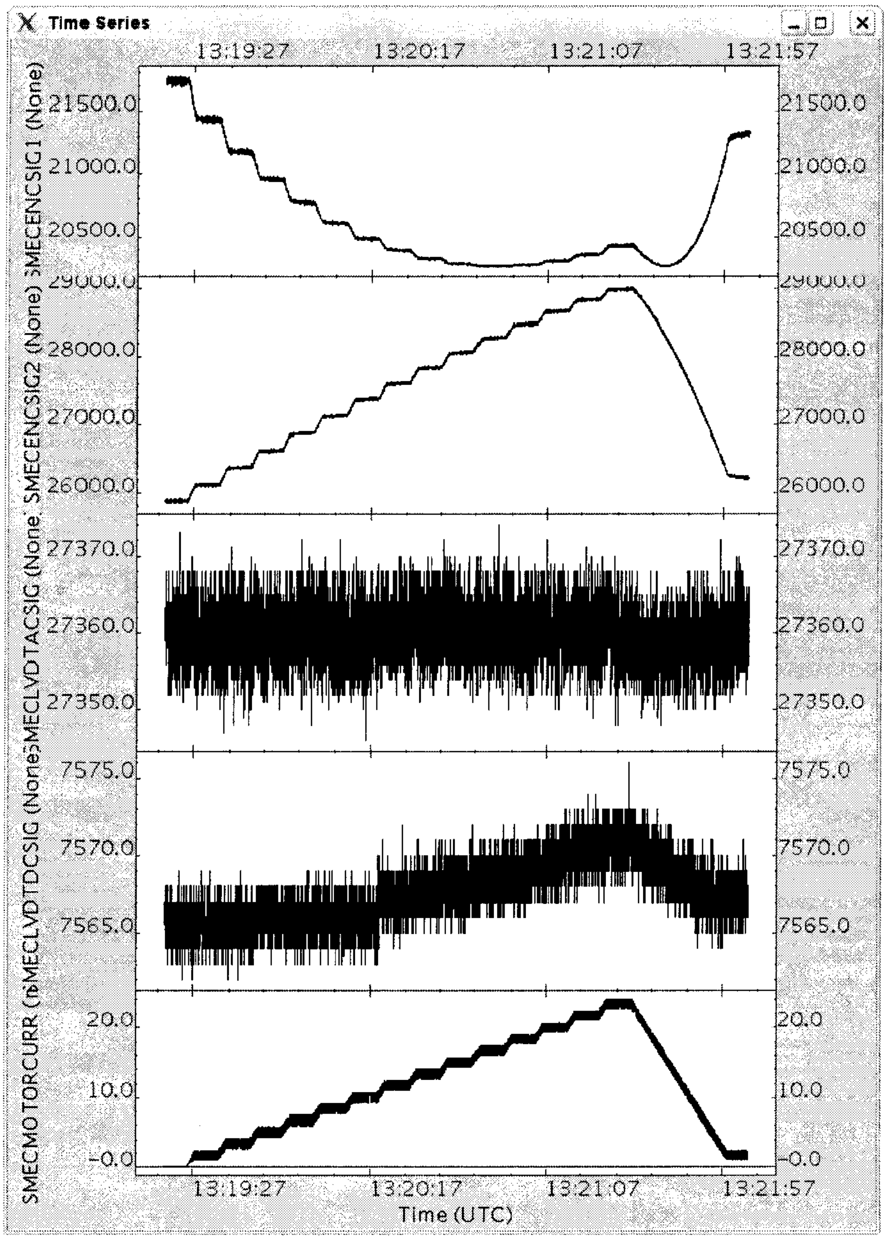
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SMEC-04A					

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

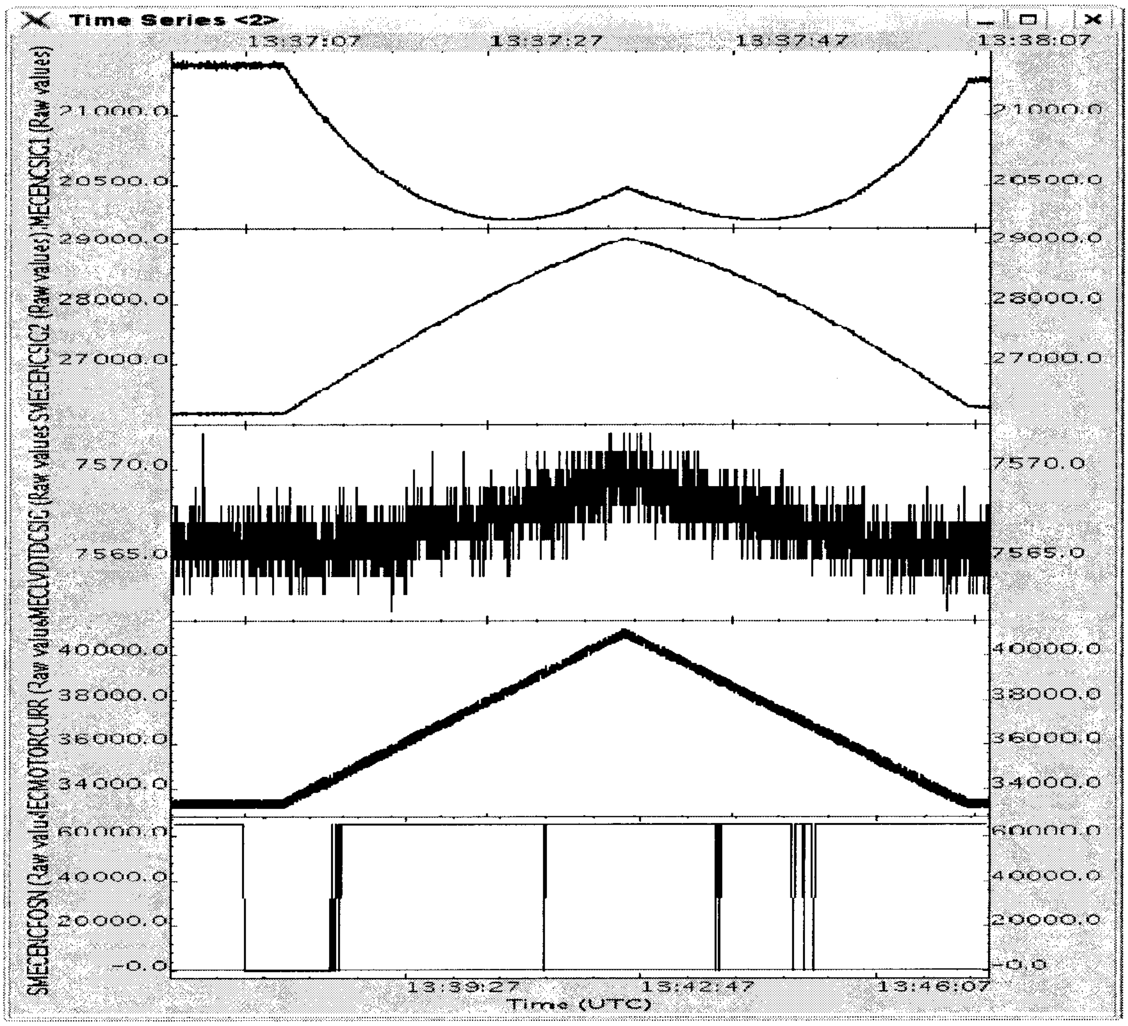
SIG1: 21300
SIG2: 26250

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

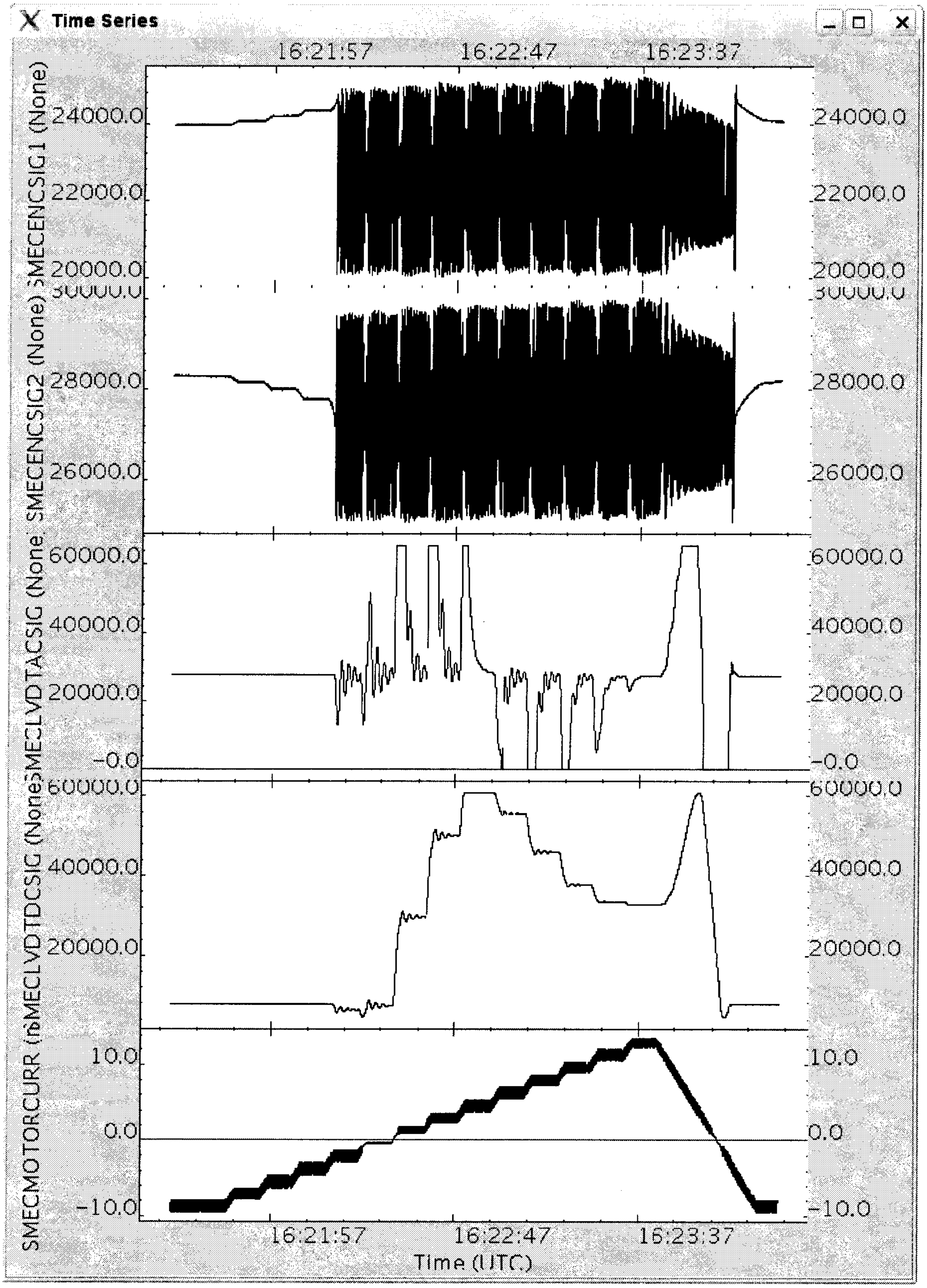
16:12 – After talking to Dominique Pouliquen he suggests the following:

- **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

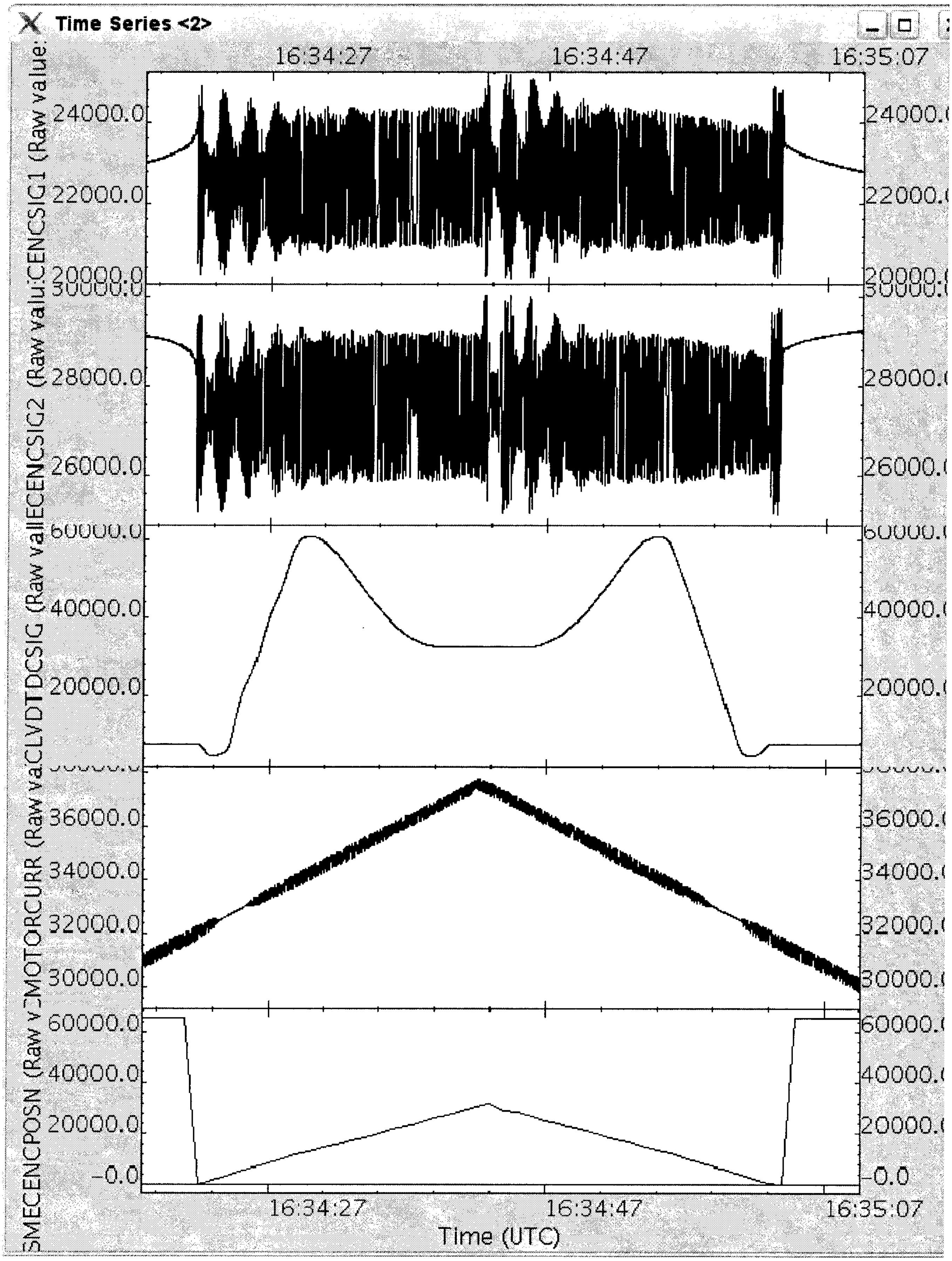
The SMEC moved! See plot below. The LVDTDCSIG plot looks strange compared to last warm ILT.


Time Series
16:21:57
16:22:47
16:23:37
SMECENCSIG1 (None)
24000.0
22000.0
20000.0
SMECENCSIG2 (None)
30000.0
28000.0
26000.0
SMECLVDTACSIG (None)
60000.0
40000.0
20000.0
-0.0
SMECLVDTDCSIG (None)
60000.0
40000.0
20000.0
SMECMOTORCURR (mA)
10.0
0.0
-10.0
16:21:57
16:22:47
16:23:37
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
SMECENCSIG1 (Raw value:
24000.0
22000.0
20000.0
SMECENCSIG2 (Raw valu
30000.0
28000.0
26000.0
SMECLVDTDCSIG (Raw va
60000.0
40000.0
20000.0
SMECMOTORCURR (Raw va
36000.0
34000.0
32000.0
30000.0
SMECENCPOSN (Raw v
60000.0
40000.0
20000.0
-0.0
16:34:27
16:34:47
16:35:07
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:

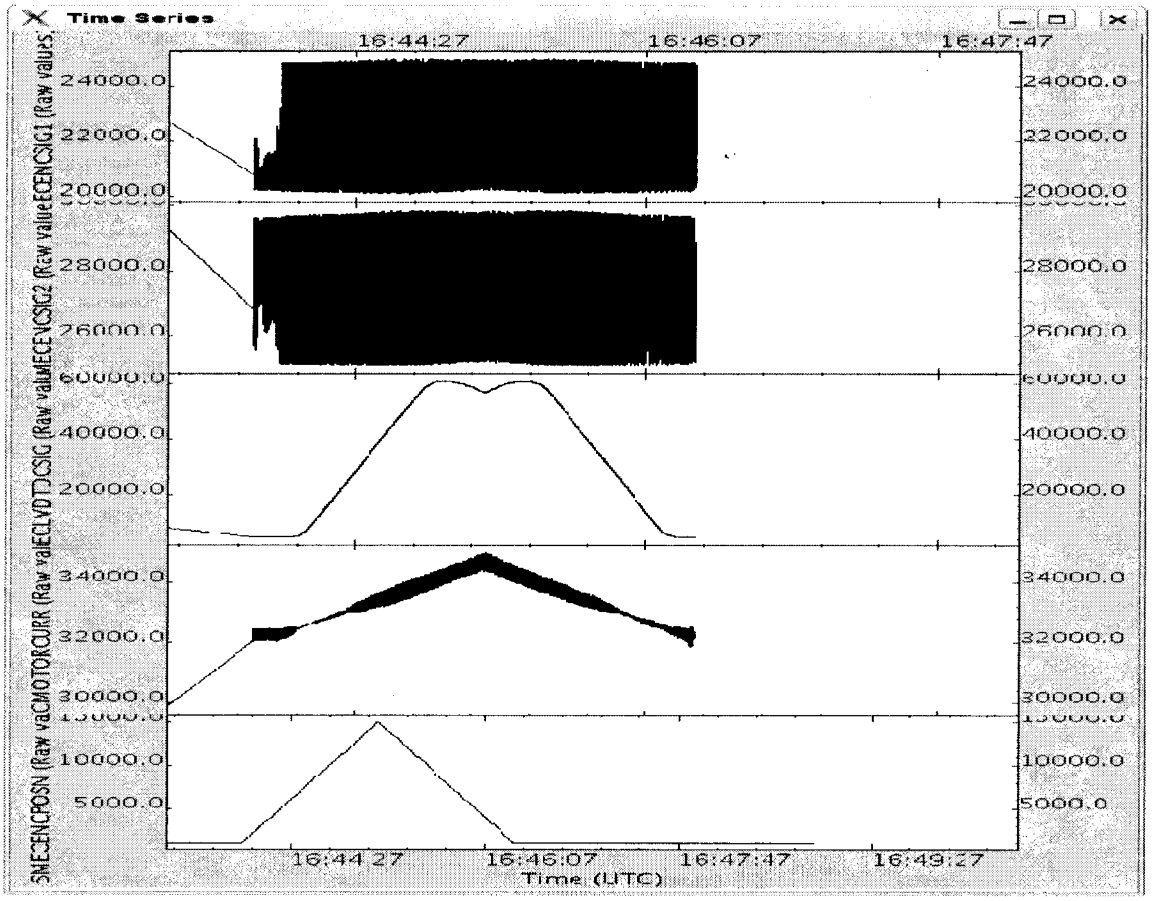
string smec_temp = "warm"; // (cold/warm) Used to specify the PID values

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

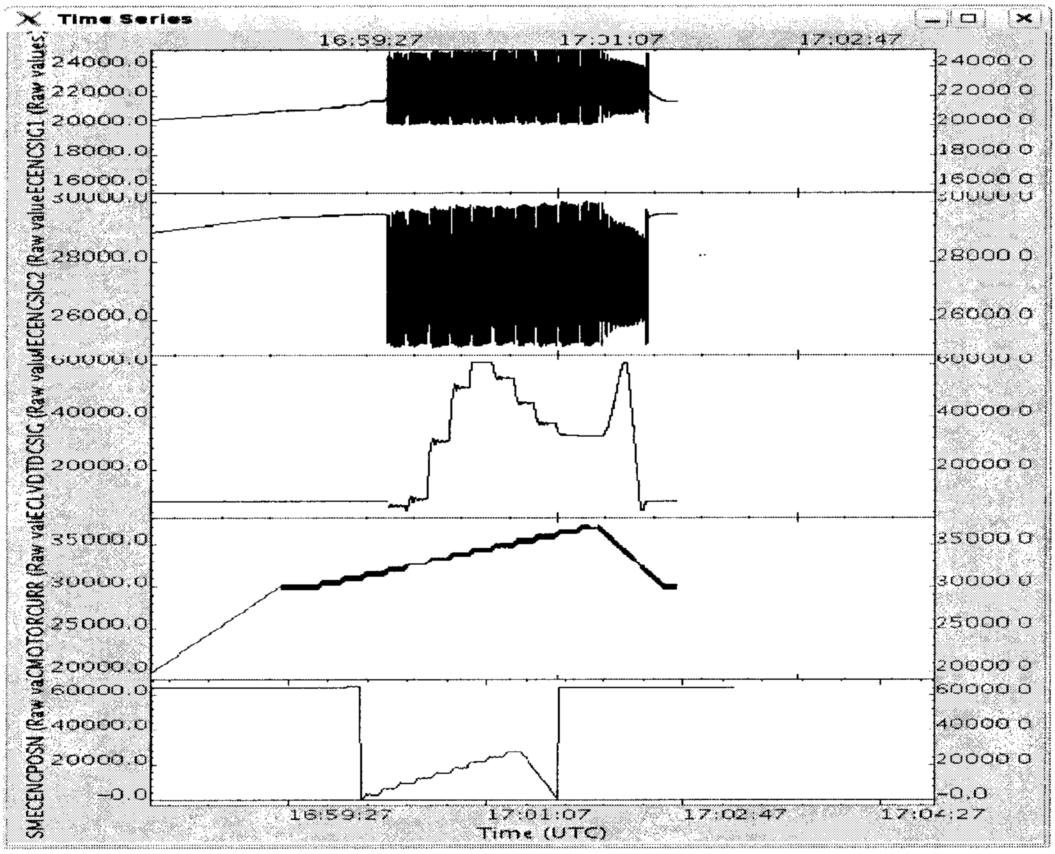
CUS Input Default Parameters:
string ltch = "latch"; // Command SMEC to unlatch

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!!!!!!

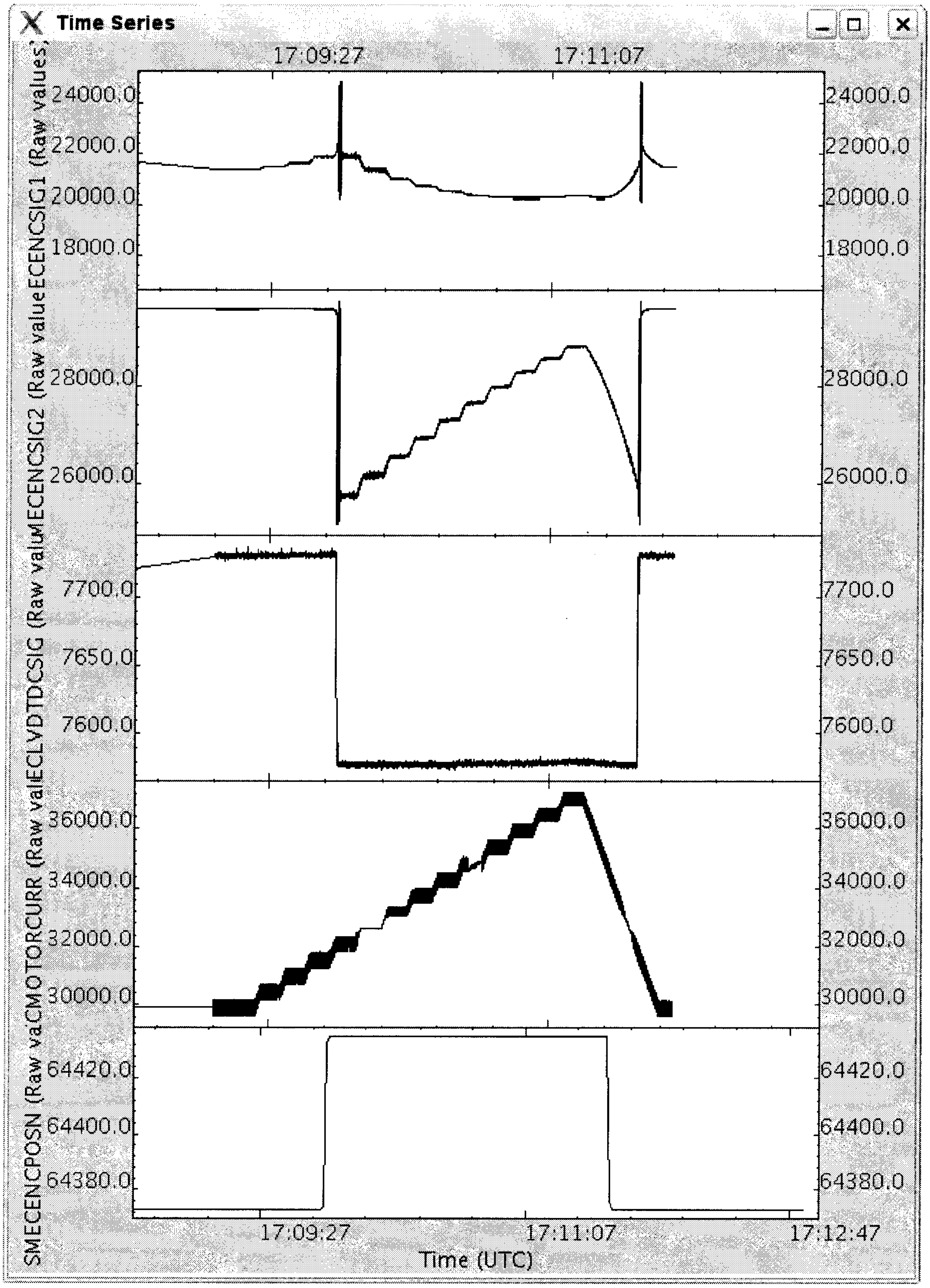


It is not latched

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
SMECENCPOSN (Raw valCMOTORCURR (Raw valECLVDTDCSIG (Raw valuECENCSIG2 (Raw valueECENCSIG1 (Raw values)
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
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
```

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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.

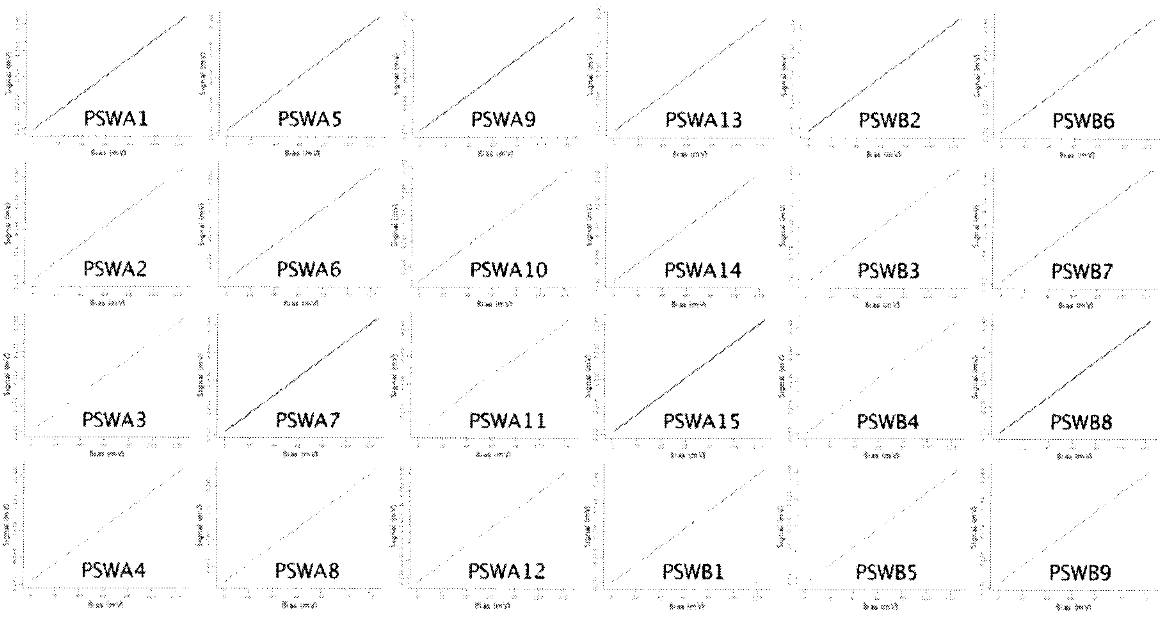


Figure 1. PSW Detectors (1)

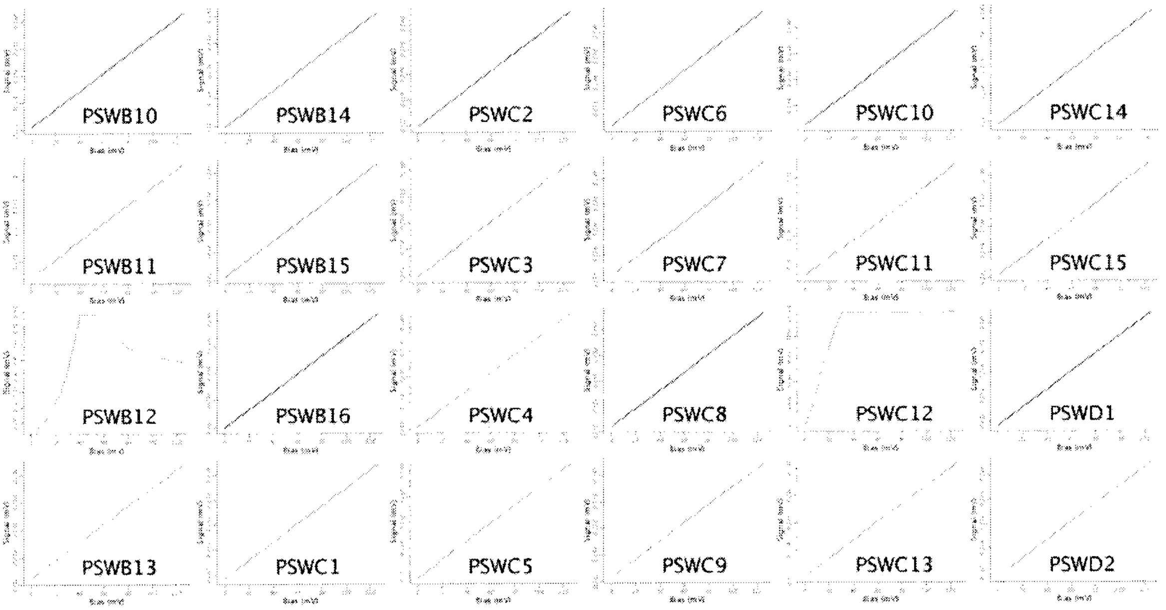


Figure 2. PSW Detectors (2)

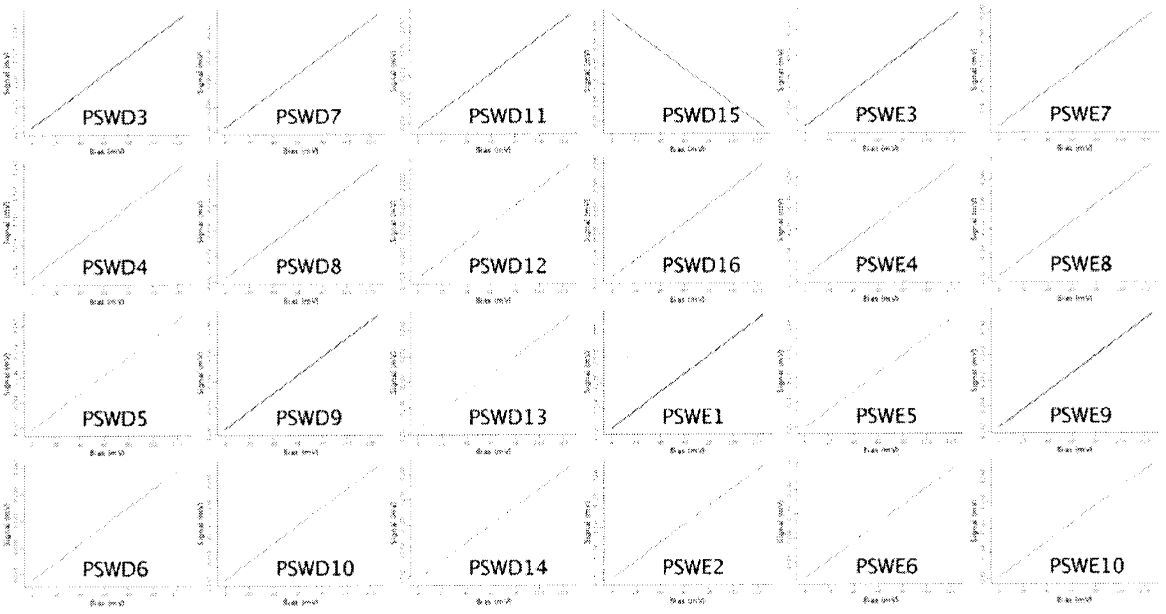


Figure 3. PSW Detectors (3)

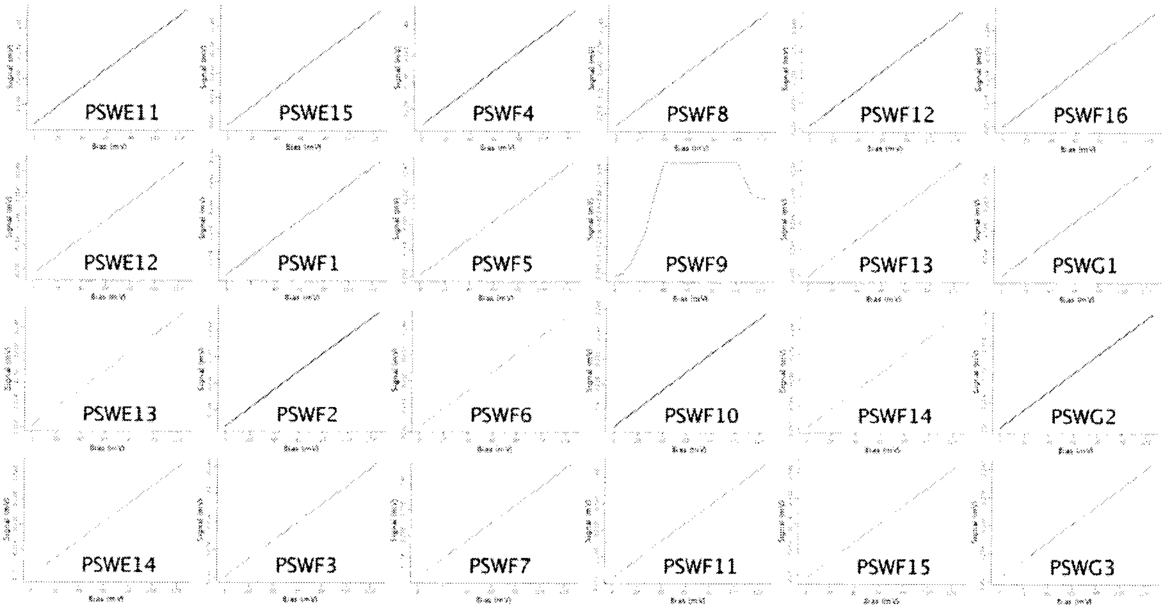


Figure 4. PSW Detectors (4)

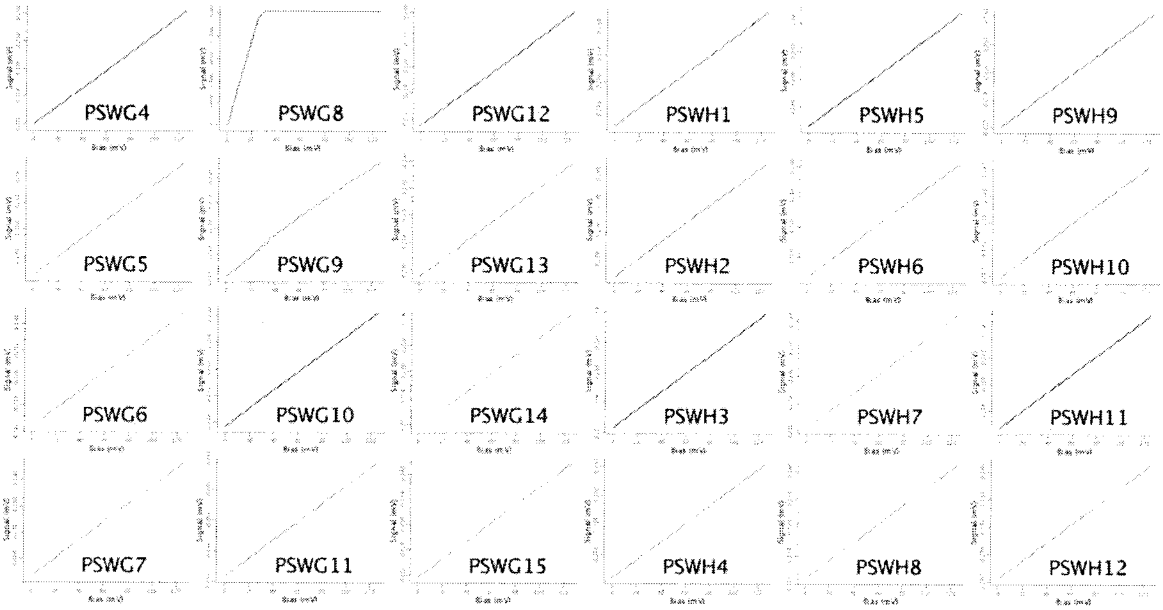


Figure 5. PSW Detectors (5)

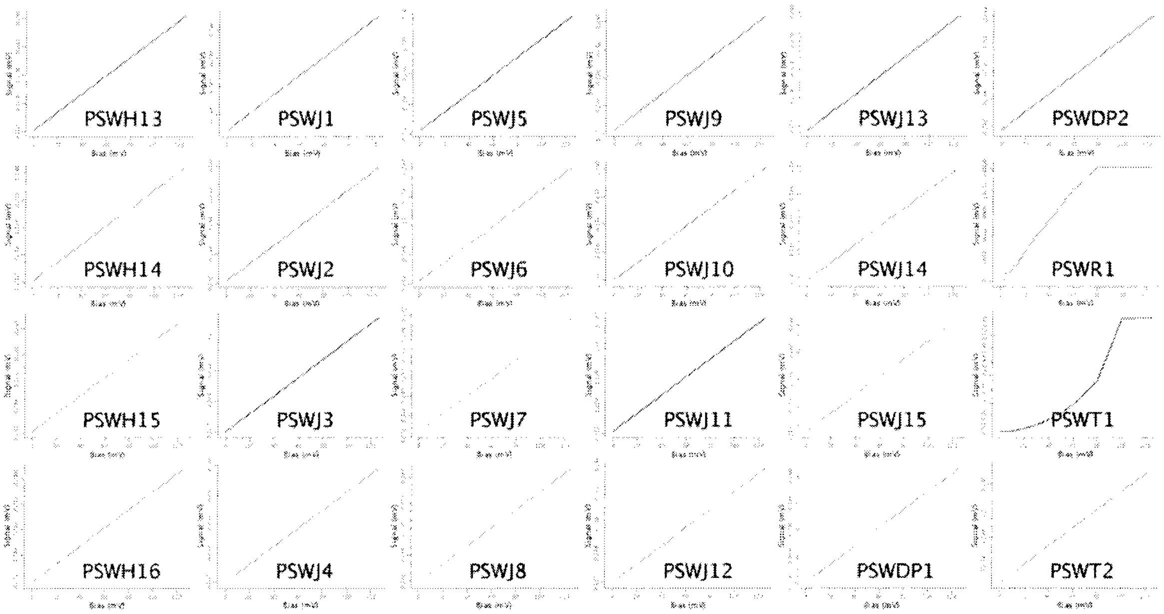


Figure 6. PSW Detectors (6)

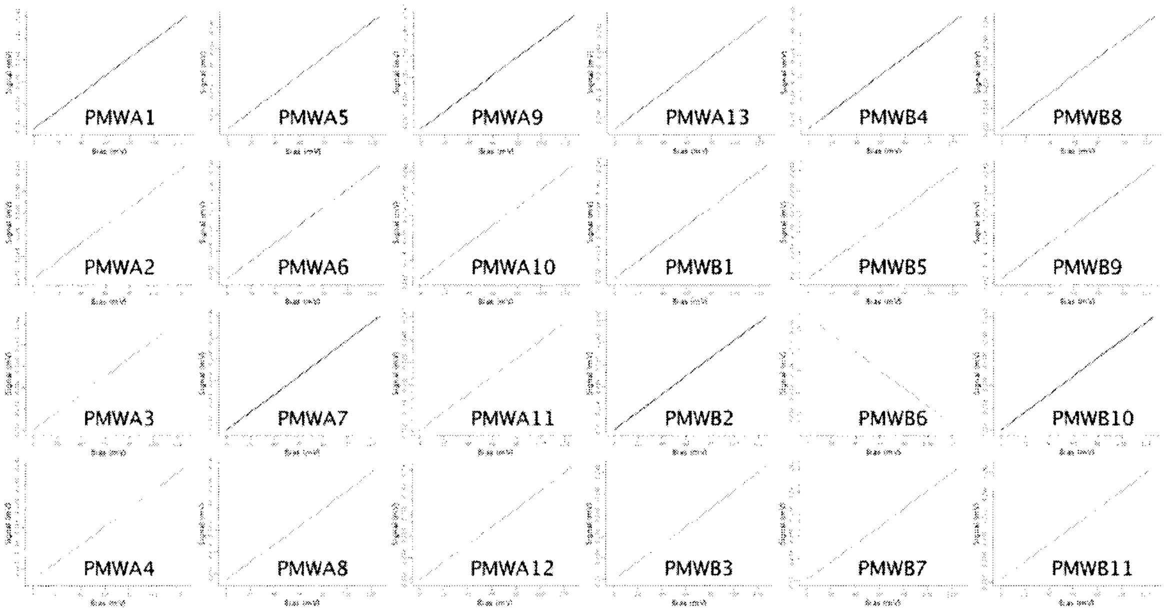


Figure 7. PMW Detectors (1)

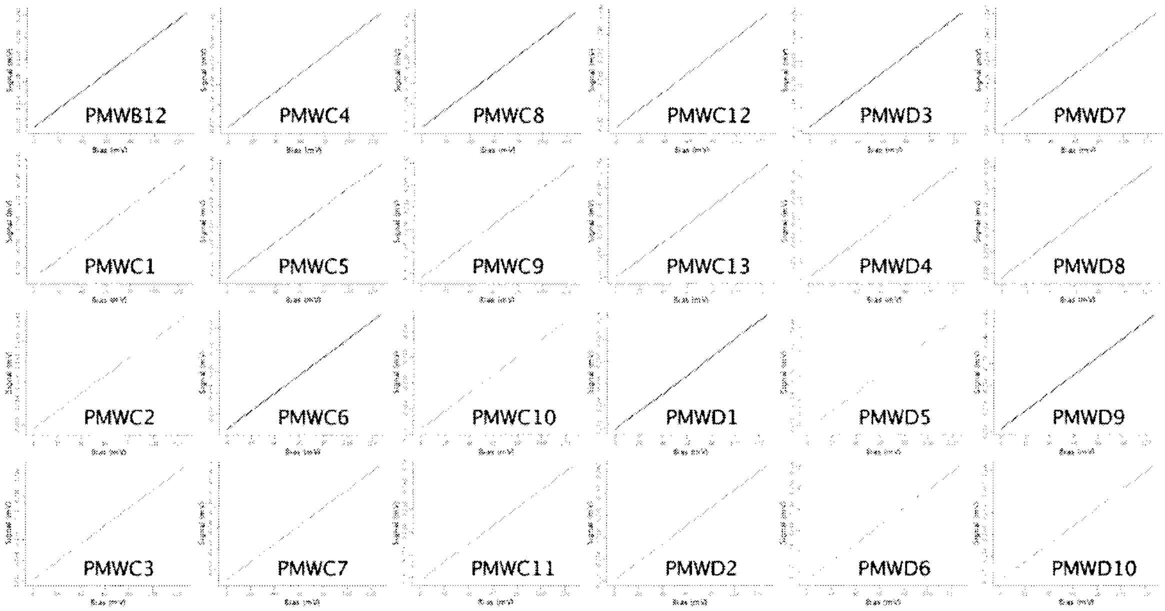


Figure 8. PMW Detectors (2)

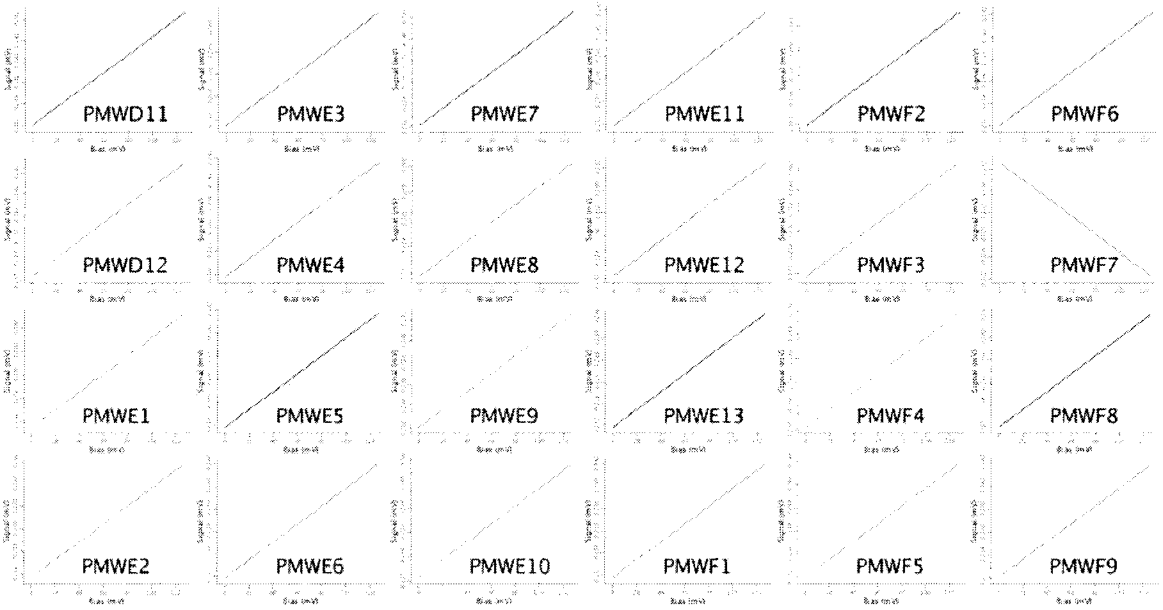


Figure 9. PMW Detectors (3)

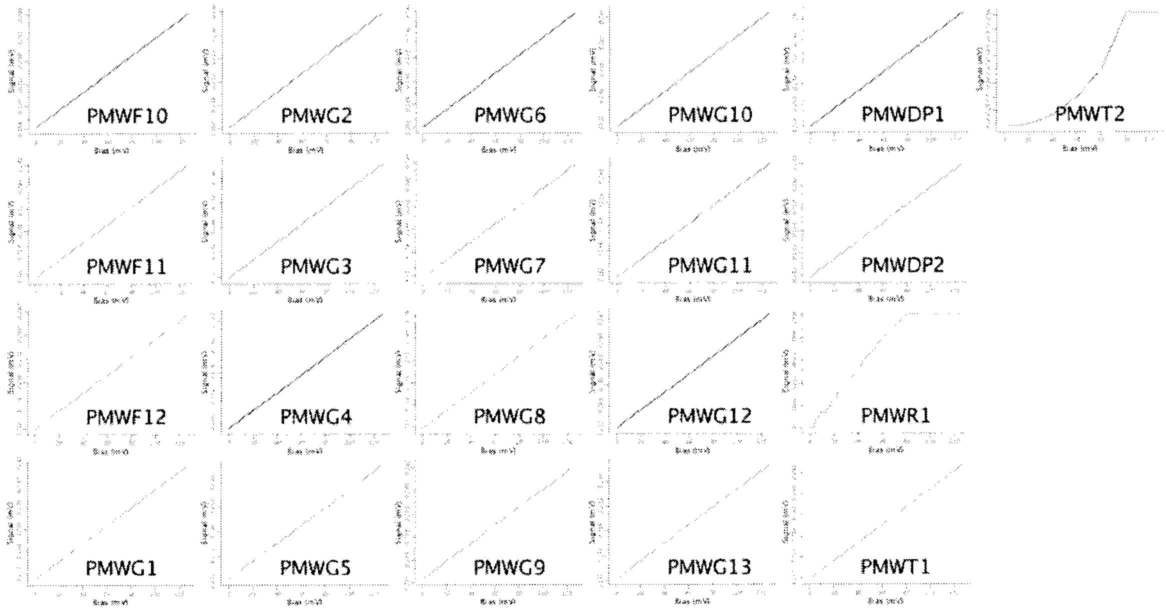


Figure 10. PMW Detectors (4)

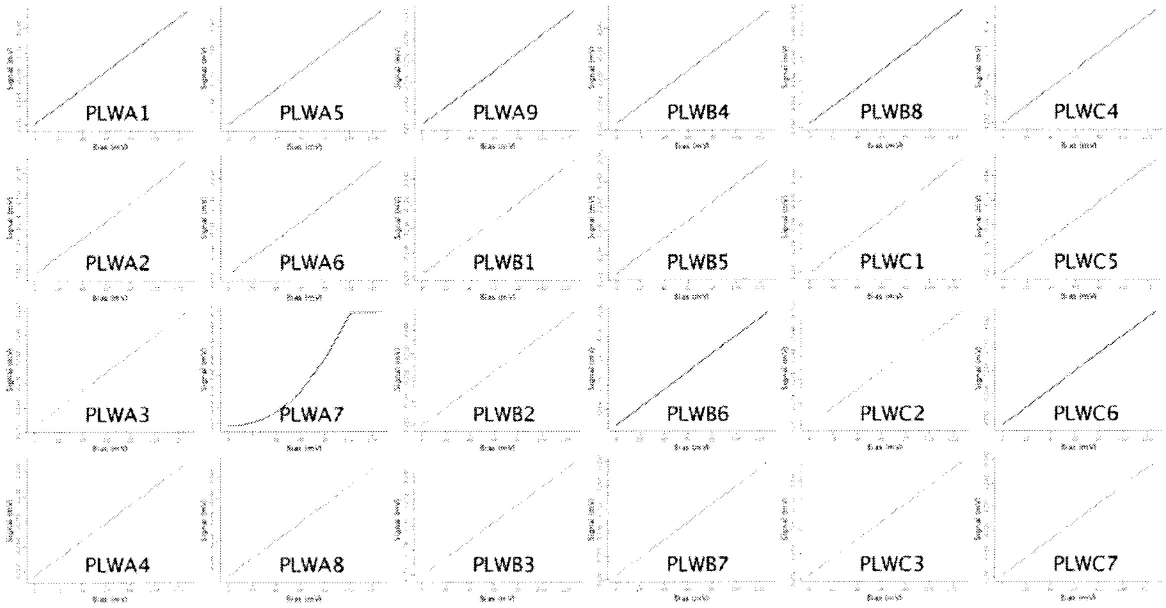


Figure 11. PLW Detectors (1)

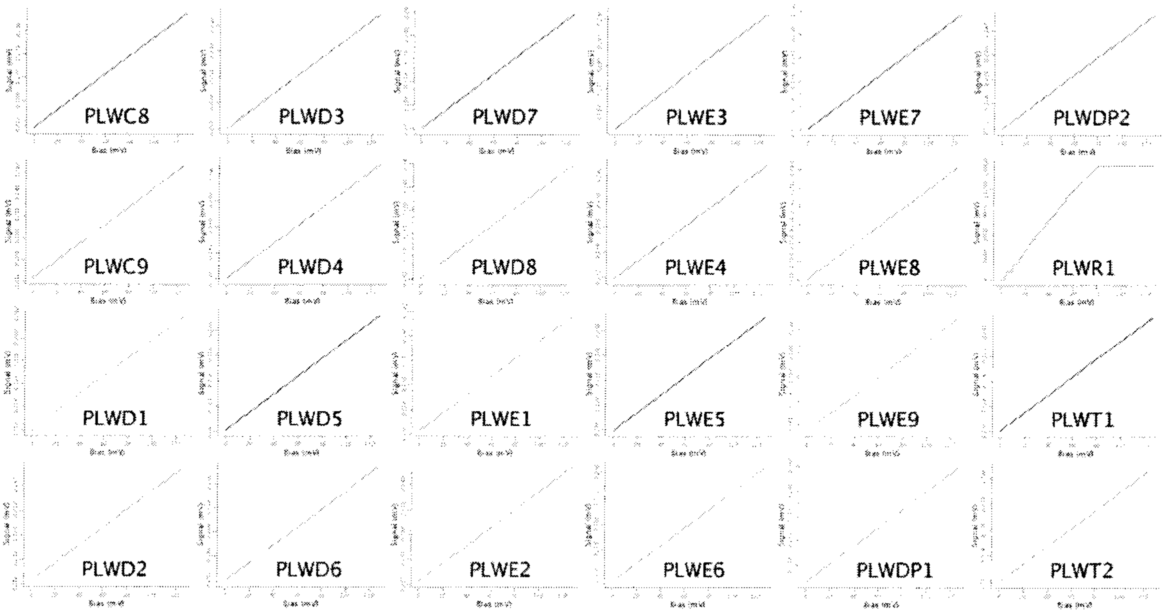
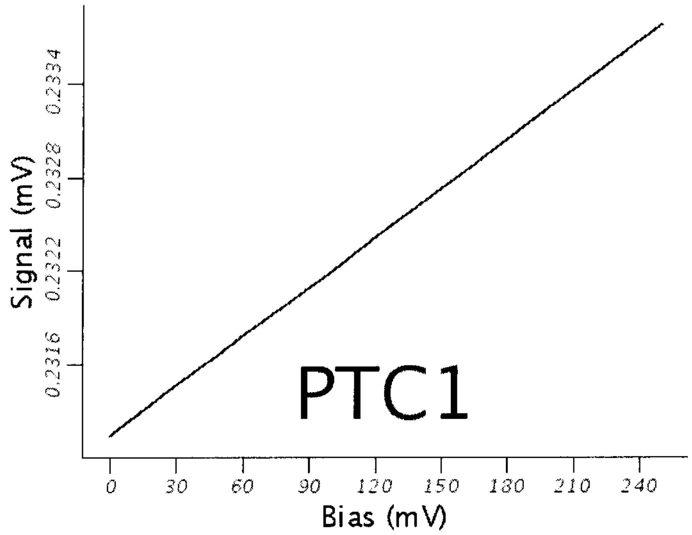
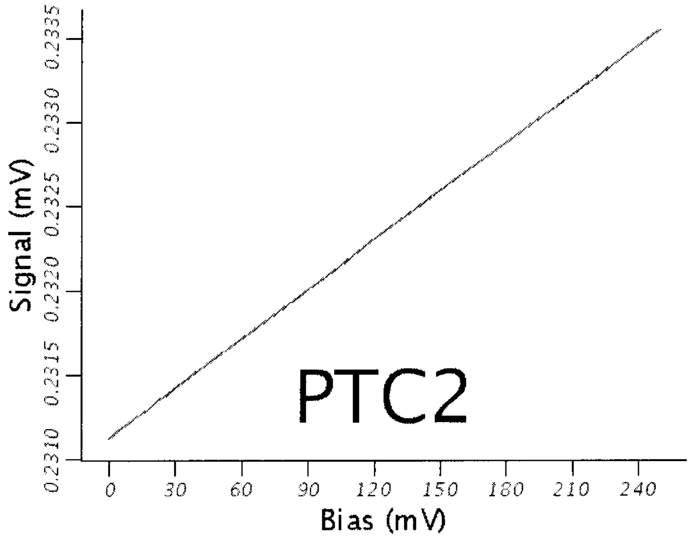


Figure 12. PLW Detectors (2)


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


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)
PTC2

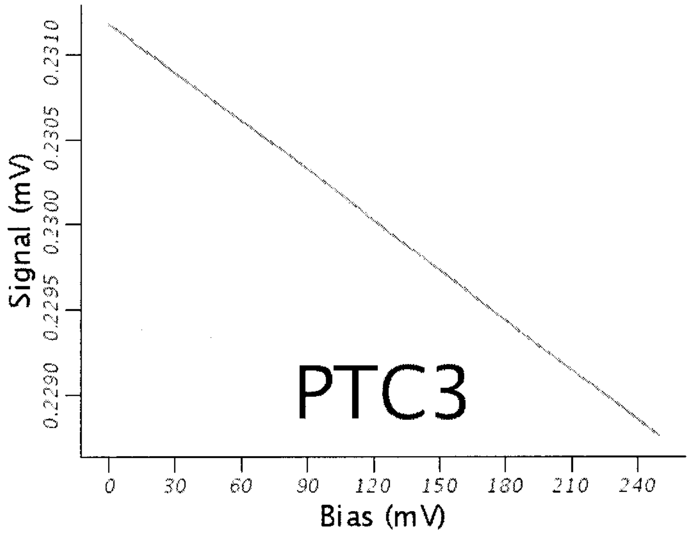

Signal (mV)
0.2290
0.2295
0.2300
0.2305
0.2310
0
30
60
90
120
150
180
210
240
Bias (mV)
PTC3

Figure 13. PTC Detectors (1)

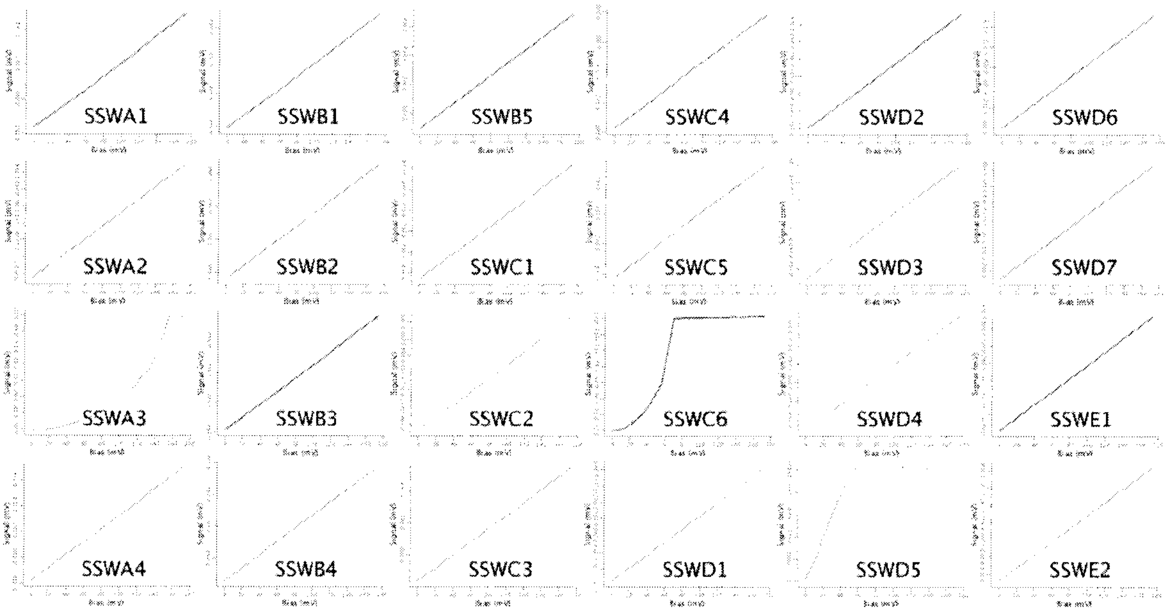


Figure 14. SSW Detectors (1)

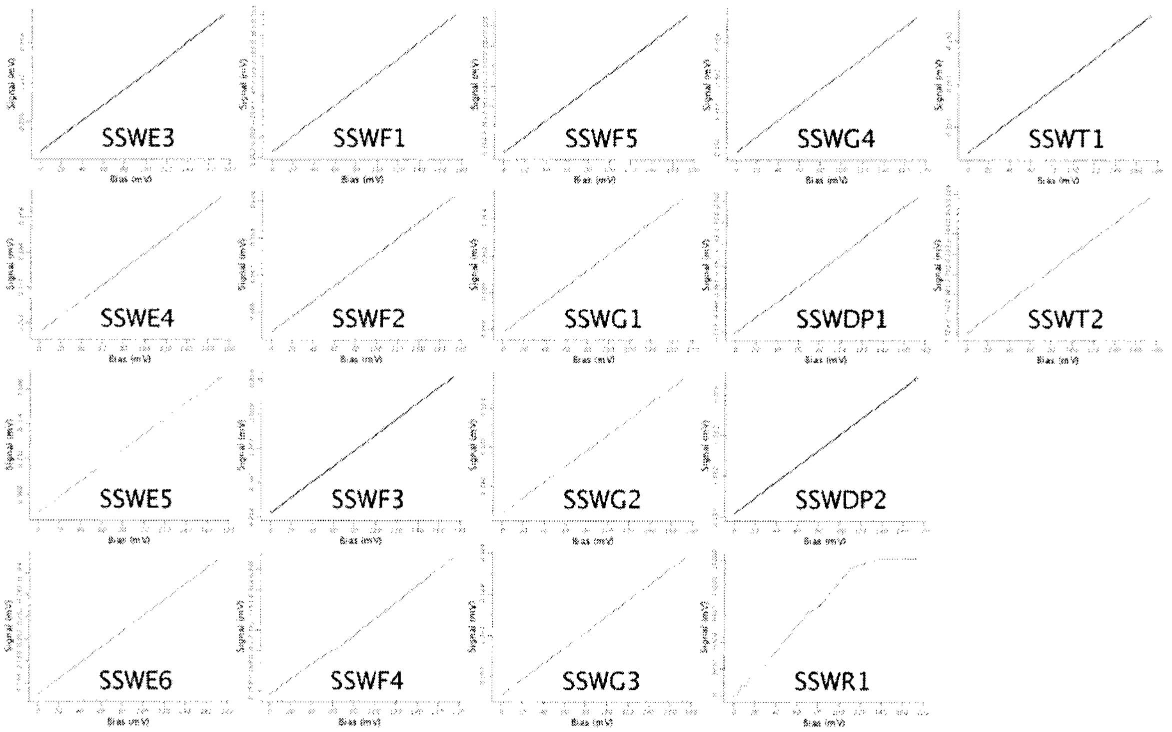


Figure 15. SSW Detectors (2)

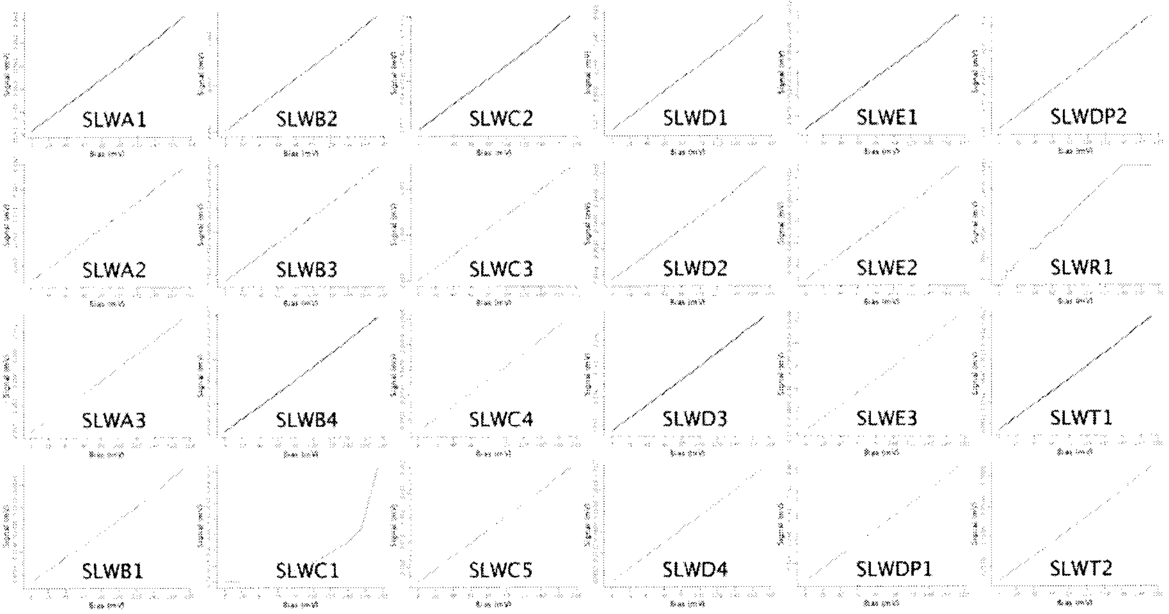


Figure 16. SLW Detectors (1)

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. These tests were performed on 23rd October 2007.

Due to time constraints only the SMEC tests and the Photometer and Spectrometer load curve tests were possible. SMEC tests were performed first, followed by the Photometer and Spectrometer load curves.

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	24th Oct 2007	First version

TABLE OF CONTENTS

2. Functional Tests Configuration

2.1 SPIRE Instrument Configuration (REDUNDANT)

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 (REDUNDANT)

The current EGSE software configuration for the REDUNDANT 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_redundant4 (called redundant4 for parity with prime)
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=-15.64V** **DPUP15V =15.29V** **DPUTEMP = 296.59K**	✓
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 = 5.2271V SCUP9V =9.09V SCUM9V = -9.1V **ALL BIAS VOLTAGES LOOKING GOOD.** BIASP5V = 5.17V BIASP9V = 9.01V BIASM9V= -9.07V BIASTEMP=293.18K	✓
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 REDUNDANT 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: APID = 0x509; Type = 21; Subtype = 1; SID = 0xA20; FrameID = 0x20; Frame length = 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.

APID	Type	Subtype	SID	FrameID	Frame length
0x509	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**			**Not done**

Start time:
OBSID:

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

Comments:

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 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-03	**SCUTEMPSTAT**	**0/0xFFFF**		**N/A**	**Not done**

Start time:
OBSID:

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

Comments:

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 HCSS Test Procedure window on TOPE.	
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**		**N/A**	**Not done**

Start time:
OBSID:

CUS Input Default Parameters:

acparam = 0x1 – Switch on SCU AC thermometry channel (SUBKTEMP)

Comments: OK

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**			**Not done**

Start time:
OBSID:

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

Comments:

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**		**N/A**	**Not done**

Start time:
OBSID:

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

Comments:

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**		**N/A**	**Not done**

Start time:
OBSID:

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**		**N/A**	**Not done**

Start time:
OBSID:

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:

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: 2. The SCU Test Pattern agrees with the reference test pattern. QLA to give go ahead.

APID	**Type**	**Subtype**	**SID**	**FrameID**	**Frame length**
0x509	21	3	0x1121	0x21	0x1E

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**			Not done

Start time:
OBSID:

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

Comments:

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**	- / 5.00V - / 15.50V - / 14.13V - / -14.50 V - / -15.61 V - / 291.6K - / 295.4K - / 295.1 K	N/A	**Success**

Start time: 07:37
OBSID: 0xb00002ee

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

<table>
<tr><th>Test Id:</th><th>FUNC-MCU-02: MCU Nominal Frame Generation Check</th></tr>
<tr><td>Initial Configuration:</td><td>DRCU_ON + AC/DC thermometry ON +MCU ON</td></tr>
<tr><td>Final Configuration:</td><td>DRCU_ON + AC/DC thermometry ON +MCU ON</td></tr>
<tr><td>Success Criteria:</td><td>Test passed if :

MCU produces each type of the frames requested and with the following characteristics.
<table>
<tr><th>Frame</th><th>APID</th><th>Type</th><th>Subtype</th><th>SID</th><th>FrameID</th><th>Frame length</th></tr>
<tr><td>Eng.</td><td>0x509</td><td>21</td><td>3</td><td>0x814</td><td>0x14</td><td>0x15</td></tr>
<tr><td>BSM</td><td>0x509</td><td>21</td><td>1</td><td>0x612</td><td>0x12</td><td>0xD</td></tr>
<tr><td>SMEC</td><td>0x509</td><td>21</td><td>1</td><td>0x410</td><td>0x10</td><td>0xC</td></tr>
<tr><td>BSM +SMEC</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
No events are generated during the different frames generation.
</td></tr>
</table>

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**			**Not done**

Start time:
OBSID:

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

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

<table>
<tr><th>Test Id:</th><th>FUNC-MCU-03: MCU Nominal Contents Check</th></tr>
<tr><td>Initial Configuration:</td><td>DRCU_ON + AC/DC thermometry ON +MCU ON</td></tr>
<tr><td>Final Configuration:</td><td>DRCU_ON + AC/DC thermometry ON +MCU ON</td></tr>
<tr><td>Success Criteria:</td><td>Test passed if :
1. MCU produces 99 frames of each type of frames requested with the following characteristics:
<table>
<tr><td>Frame</td><td>APID</td><td>Type</td><td>Subtype</td><td>SID</td><td>FrameID</td><td>Frame length</td></tr>
<tr><td>Eng.</td><td>0x509</td><td>21</td><td>3</td><td>0x814</td><td>0x14</td><td>0x15</td></tr>
<tr><td>BSM</td><td>0x509</td><td>21</td><td>1</td><td>0x612</td><td>0x12</td><td>0xD</td></tr>
<tr><td>SMEC</td><td>0x509</td><td>21</td><td>1</td><td>0x410</td><td>0x10</td><td>0xC</td></tr>
<tr><td>BSM
+SMEC</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
2. No events are generated during the different frames generation.
3. QLA analysis results are correct.
QLA to give go ahead.</td></tr>
</table>

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**			**Not done**

Start time:
OBSID:

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)

4.12 FUNC-MCU-04: MCU Test Pattern Check

<table>
<tr><th>Test Id:</th><th>FUNC-MCU-04: MCU Test Pattern Check</th></tr>
<tr><td>Initial Configuration:</td><td>DRCU_ON + AC/DC thermometry ON +MCU ON</td></tr>
<tr><td>Final Configuration:</td><td>DRCU_ON + AC/DC thermometry ON +MCU ON</td></tr>
<tr><td>Success Criteria:</td><td>Test passed if:
1. MCU produces 100 frames of Test Pattern with the following characteristics:
<table>
<tr><td>Frame</td><td>APID</td><td>Type</td><td>Subtype</td><td>SID</td><td>FrameID</td><td>Frame length</td></tr>
<tr><td>Test</td><td>0x509</td><td>21</td><td>3</td><td>0x915</td><td>0x15</td><td>0x15</td></tr>
</table>
2. MCU Test pattern produced is the same as the previous time this test was run.
QLA to give go ahead.</td></tr>
</table>

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**			**Not done**

Start time:
OBSID:

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:

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/0x770 ~0x8000/0x9500 0/1 3/3 0x8000/0x8000 0xBEB/0xF6E ~0x8000/~0x8EFA**		**N/A**	**Not done**

Start time:
OBSID:

CUS Input Default Parameters: None

Comments:

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**			**N/A**	**Not done**

Start time:
OBSID:

CUS Input Default Parameters: None

Comments:

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**			**N/A**	**Not done**

Start time:
OBSID:

CUS Input Default Parameters: None

Comments:

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	Not done

Start time:
OBSID:

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:

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	Not done

Start time:
OBSID:

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:

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**	**Not done**

BSM_INIT
Start time:
OBSID:

BSM-05B
Start time:
OBSID:

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
```

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	**Not done**

Start time:
OBSID:

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:

BSM_OFF:

Start time:

OBSID:

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.
0x505	**21**	**1**	**0x200**	**0**	**PF**	**100**	**100**
0x507	**21**	**1**	**0x201**	**1**	**SF**	**100**	**17**
0x505	**21**	**2**	**0x102**	**2**	**PSW**	**100**	**34**
0x505	**21**	**2**	**0x103**	**3**	**PMW**	**100**	**25**
0x505	**21**	**2**	**0x104**	**4**	**PLW**	**100**	**12**
0x507	**21**	**2**	**0x105**	**5**	**SSW**	**100**	**12**
0x507	**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-05A/05B/06**			**Not done**

Start time:
OBSID:

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

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+700**			**Not done**

Start time:
OBSID:

CUS Input Default Parameters:

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

Comments:

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**			**Not done**

Start time:
OBSID:

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:

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/+5.24V 0/+11.59V 0/-11.58V ~293/warming up		**Success**

Start time: 08:54
OBSID:0xb00002fb

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

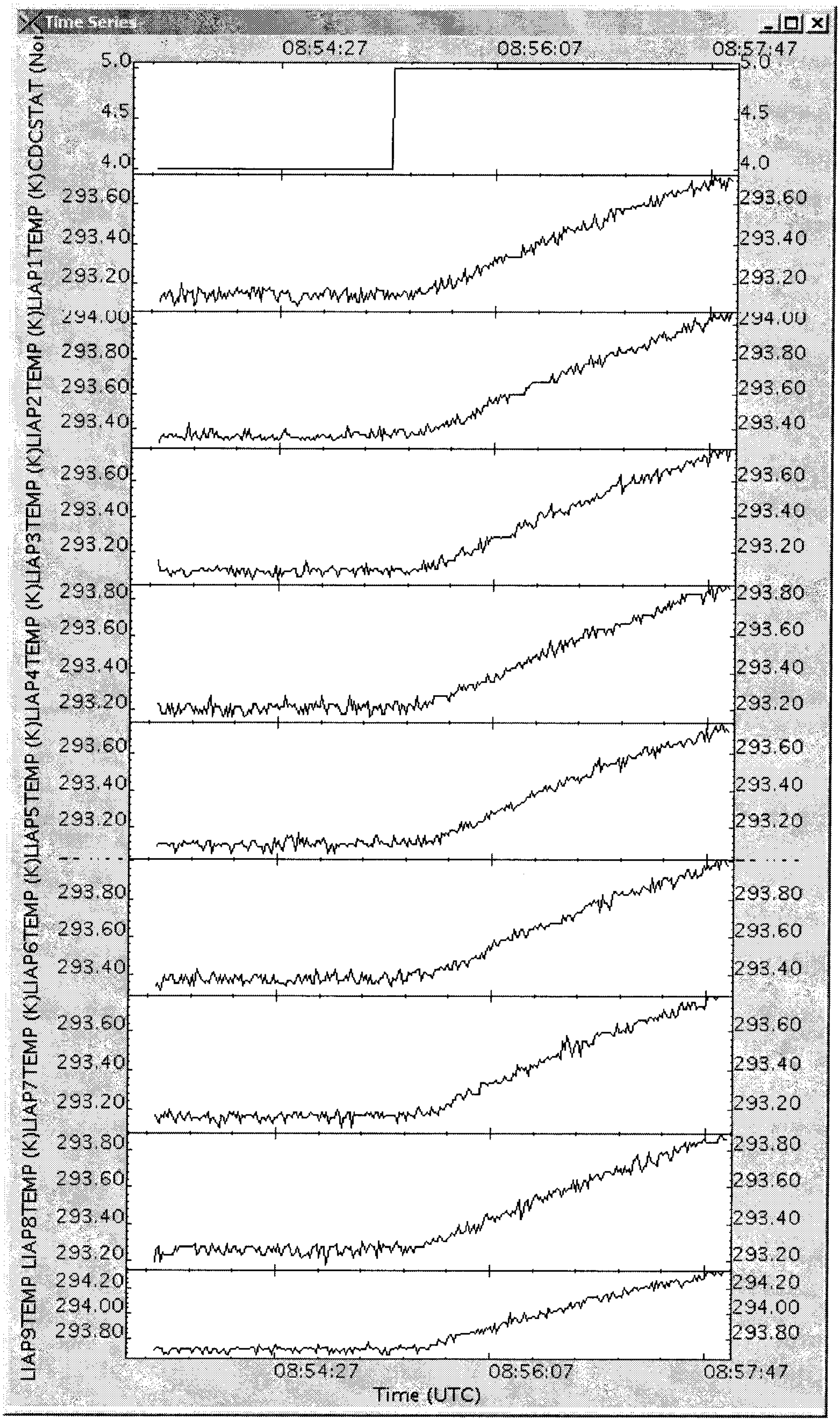
Comments: PLIABITSTAT 0 to 1
Photometer LIAs switched on OK
Output file from QLA script:

```
DCU-04-phot
Start time @: 24-Oct 08:55:10
End time @: 24-Oct 08:55:23
OBSID: 0xB00002FB

PLIABITSTAT:
Start value: OFF
End value: 1.0

                 Before/After
SCUDCDCSTAT     4/5
PLIAP5V         0.01/5.24 V
PLIAP9V         0.01/11.59 V
PLIAM9V         0.01/-11.58 V
```

QLA plots below for Phot LIA temperatures


Time Series
08:54:27
08:56:07
08:57:47
5.0
4.5
4.0
293.60
293.40
293.20
294.00
293.80
293.60
293.40
293.60
293.40
293.20
293.80
293.60
293.40
293.20
293.60
293.40
293.20
293.80
293.60
293.40
293.60
293.40
293.20
293.80
293.60
293.40
293.20
294.20
294.00
293.80
LIAP9TEMP LIAP8TEMP (K)LIAP7TEMP (K)LIAP6TEMP (K)LIAP5TEMP (K)LIAP4TEMP (K)LIAP3TEMP (K)LIAP2TEMP (K)LIAP1TEMP (K)CDCSTAT (No
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/ 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: 08:57
OBSID:0xb00002fc
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_B00002FC.txt:

```
DCU-11-phot
Start time @: 24-Oct 08:58:36
End time @: 24-Oct 09:00:23
OBSID: 0xB00002FC

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

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

PSWJFET1V        -0.00/-1.49 V
PSWJFET2V        -0.00/-1.49 V
PSWJFET3V        -0.00/-1.49 V
PSWJFET4V        -0.00/-1.49 V
PSWJFET5V        -0.00/-1.49 V
PSWJFET6V        -0.00/-1.49 V

PMWJFET1V        -0.00/-1.49 V
PMWJFET2V        -0.00/-1.49 V
PMWJFET3V        -0.00/-1.49 V
PMWJFET4V        -0.00/-1.49 V

PLWJFET1V        -0.00/-1.49 V
PLWJFET2V        -0.00/-1.49 V

TCJFETV           0.00/-1.49 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: 09:01
OBSID:0xb00002fd

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
```

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

- Most pixels look better than or same as for PFM5 ILT, except PSW-D15 and PTC3 which appear to have their polarity reversed. NCR already raised.

QLA load curve plots in Annexe 1.

No time left to do noise test.

PDET_OFF
Start time: 09:15
OBSID:0xb00002fE

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	Not done

Start time:
OBSID:

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

Comments: Not done

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**	**4/6**	4/6		**Success**
	SLIAP5V	**0/~ +5V**	0.11 / **5.25**		
	SLIAP9V	**0/~+11V**	0.016/ 11.59		
	SLIAM9V	**0/~-11V**	0.016/-11.57		
	LIAS1/2/3TEMP	**N/A/ [290-300]K**	/~295K warming up		

Start time: 09:17
OBSID:0xb00002ff

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

Comments: SLIABITSTAT 0 to 1
Spectrometer LIAs switched ON correctly

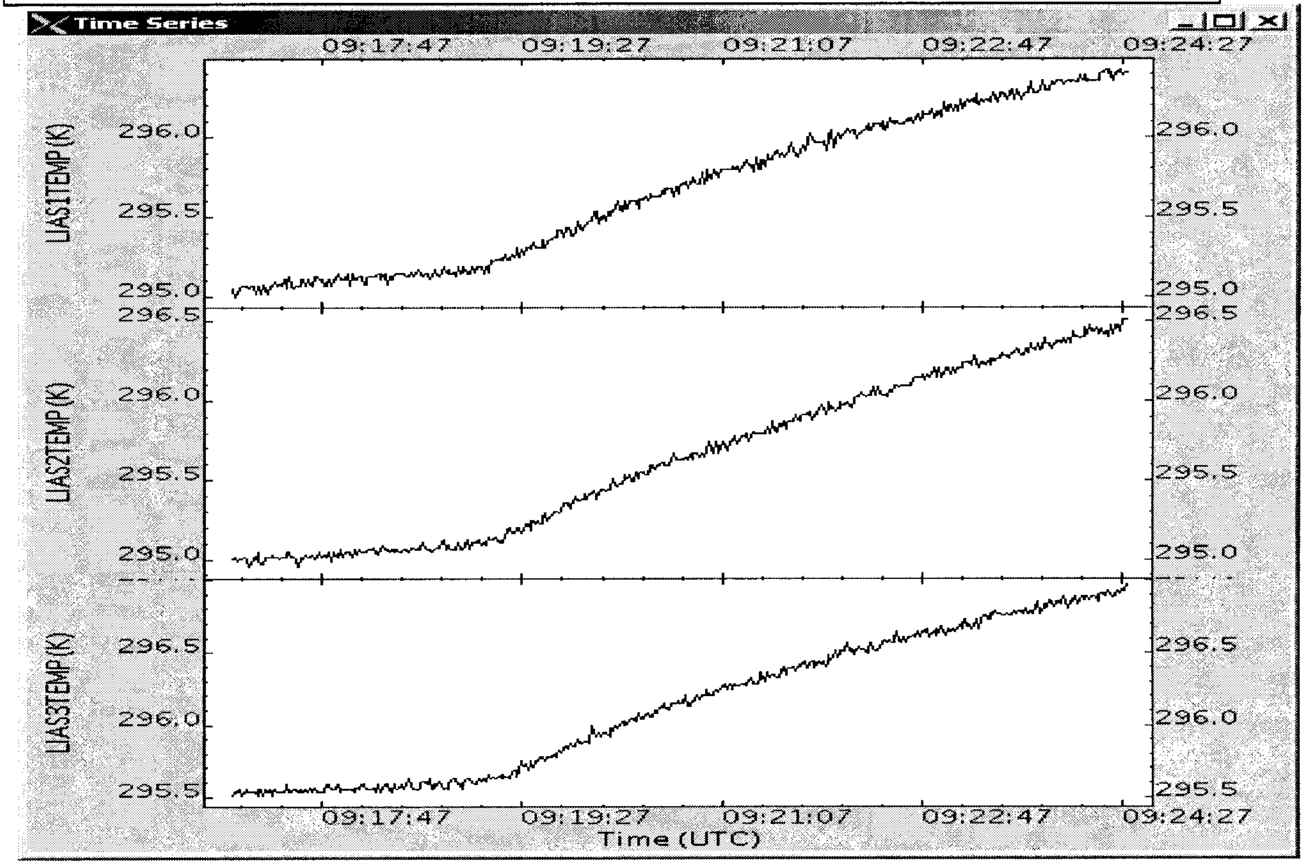
Output file FUNC-DCU-04s_B00002FF.txt from QLA script:

```
DCU-04-spec
Start time @: 24-Oct 09:18:42
End time @: 24-Oct 09:18:56
OBSID: 0xB00002FF

SLIABITSTAT:
Start value: OFF
End value: 1.0

                 Before/After
SCUDCDCSTAT      4/6
SLIAP5V          0.01/5.25 V
SLIAP9V          0.01/11.59 V
SLIAM9V          0.01/-11.57 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, SLIAM9V, 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**	**6/6**	6/6	**N/A**	**Success**
	LIASTAT	**0/0**	0/0		
	SLIAP5V	**0V/ ~ 5V**	/5.25		
	SLIAP9V	**0V/~11V**	/11.59		
	SLIAM9V	**0V/-11V**	/-11.59		
	SPECJFETSTAT	**0/0x7**	0/0x7		
	SSWJFET1/2V	**0V/~-1.5V**	See comments		
	SLWJFET1/2V	**0V/~-1.5V**	below		

Start time: 09:20
OBSID:0xb0000300

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

DCU data were generated
The PSW, PMW and PLW arrays on QLA are all OK
QLA produced file FUNC-DCU-11s_B00002D6.txt:

```
DCU-11-spec
Start time @: 24-Oct 09:21:32
End time @: 24-Oct 09:23:13
OBSID: 0xB0000300

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          -11.57/-11.57 V
SPECJFETSTAT     0x0/0x7
SSWJFET1V        -0.00/-1.49 V
SSWJFET2V        -0.00/-1.49 V
SLWJFET1V        -0.00/-1.49 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: 09:23
OBSID: 0xb0000301

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

Generally all (SSW/SLW) pixels looking responsive. See Annexe 1 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**	**Not done**

Start time:
OBSID:

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

Comments: No time left to do noise test.

Switched off the Spectrometer:
SDET_OFF
Start time: 09:37
OBSID: 0xb0000302

MCU_OFF:
OBSID: 0xb0000303
Start time:09:39

SCU thermometry was not switched on so need to switch it off.

DRCU_OFF:
OBSID: 0xb0000304
Start time:09:40

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.	

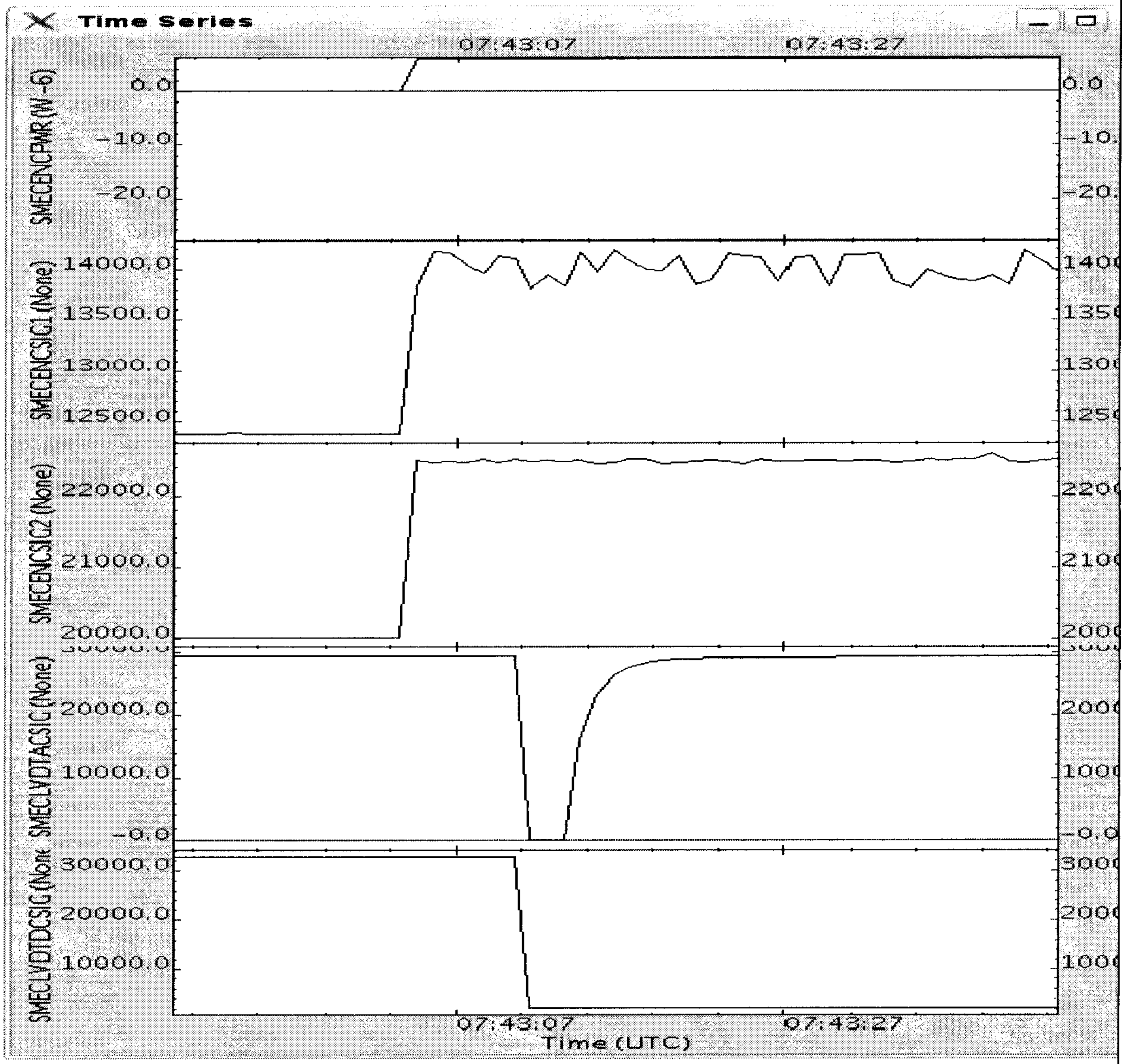
Test Log:

Test Id	**Key Parameter(s)**	**Expected Value Before/ After**	**Actual Value Before/After**	**Nb. of frames received**	**Test Result**
FUNC-SMEC-01	**SMECENCPWR**	**0/6**	0/6	**N/A**	**Success**
	SMECLVDTPWR	**0/1**	0/1		
	SMECENCSIG1	**Changes**	0x3061/~0x3767		
	SMECENCSIG1AMP	**0/0**	0/0		
	SMECENCSIG1OFF	**-/0x38A4**	0xCE20/0x38A4		
	SMECENCSIG2	**Changes**	0x4E2C/~57AF		
	SMECENCSIG2AMP	**0/0**	0/0		
	SMECENCSIG2OFF	**-/0x5BCC**	0xCE20/0x5BCC		

Start time: 07:41
OBSID:0xb00002ef

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

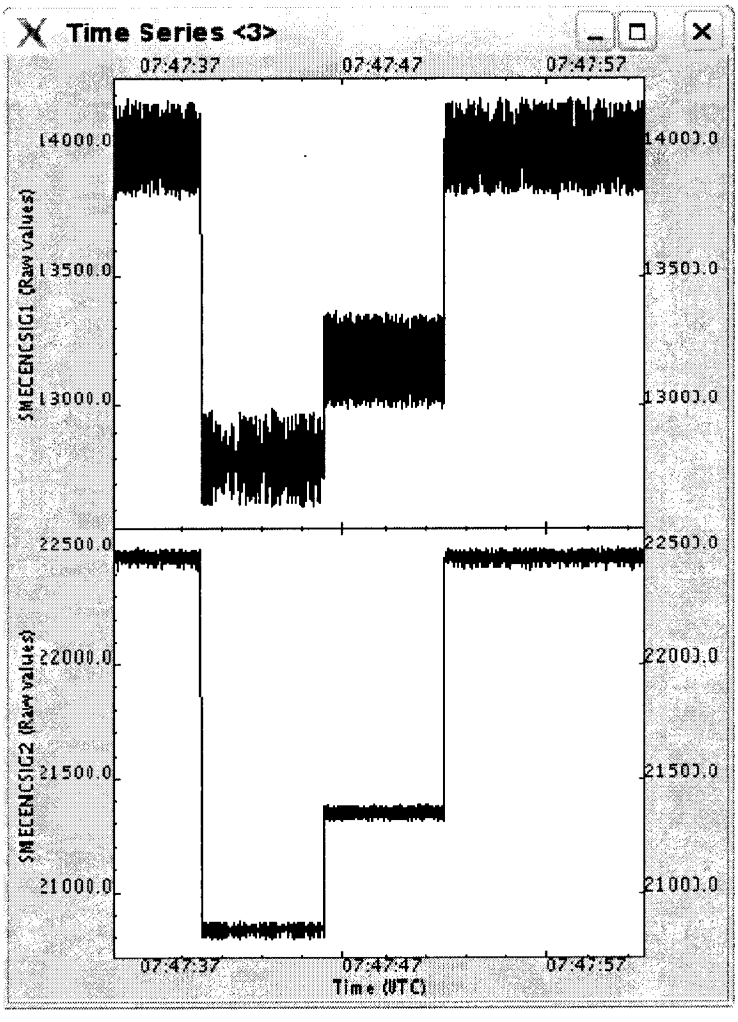
Start time: 07:46
OBSID:0xb00002f0
CUS Input Default Parameters:

```
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	~12800	~20800
5	~13200	~21300
6	~14000	~22400

The QLA plot does not show the SMEC encoder power level, only the encoder signals 1 & 2.



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	Success

Start time:
OBSID:

CUS Input Default Parameters:

```
string ltch = "latch"; // Command SMEC to unlatch
```

Comments: Test performed manually

07:52 - Set the FF offset to 0x7000: 0x90557000 SMECMOTORCURR goes from 0 to ~10+/-1 mA

07:55 – Open the SMEC latch 0x90430002

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:

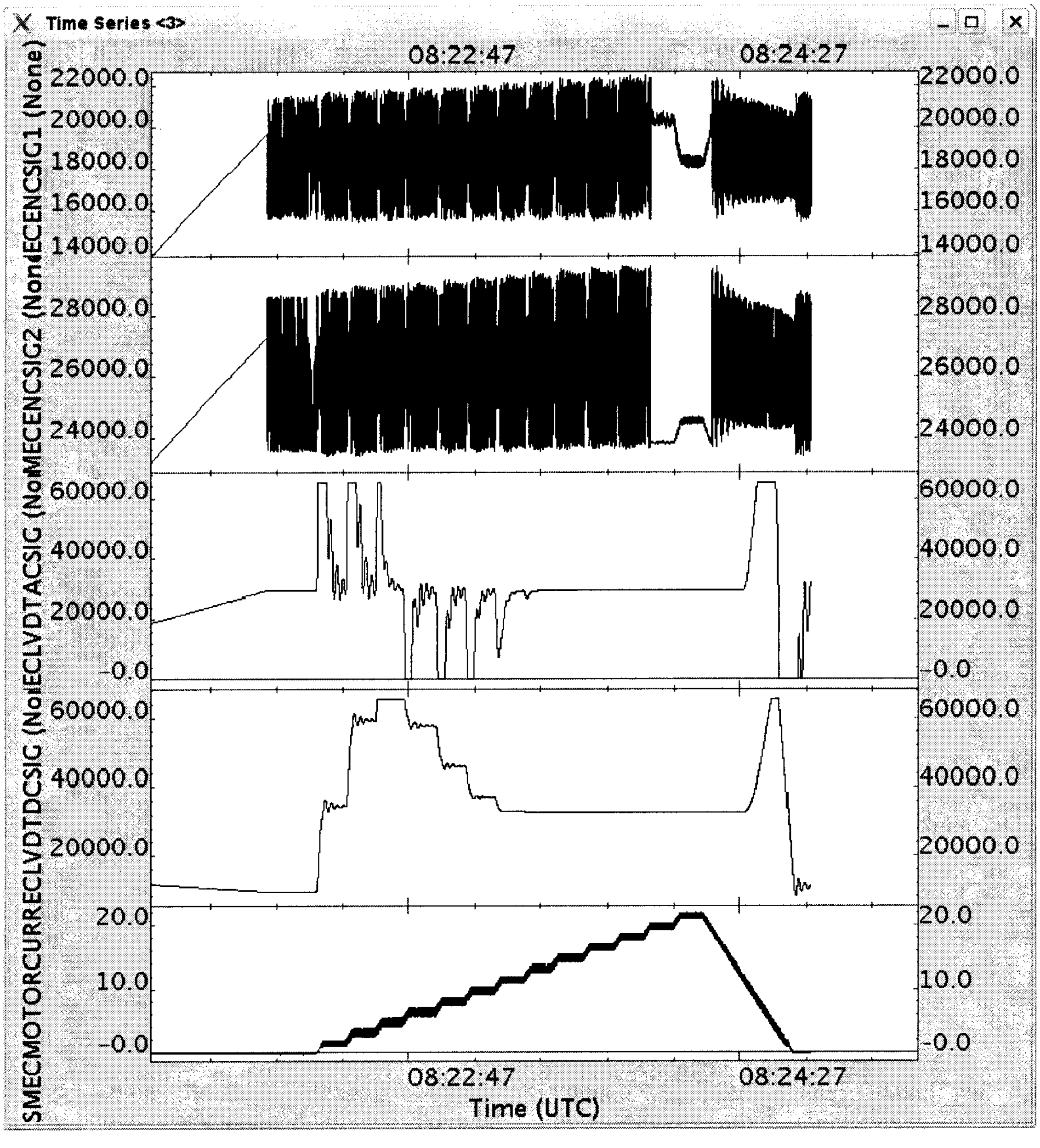
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	Nb. of frames received	Test Result
FUNC-SMEC-04A					Success

Start time: 07:57
OBSID: 0xb00002f1

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 SMEC moved as expected but the encoder signals amplitudes became very small for high motor current.



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:

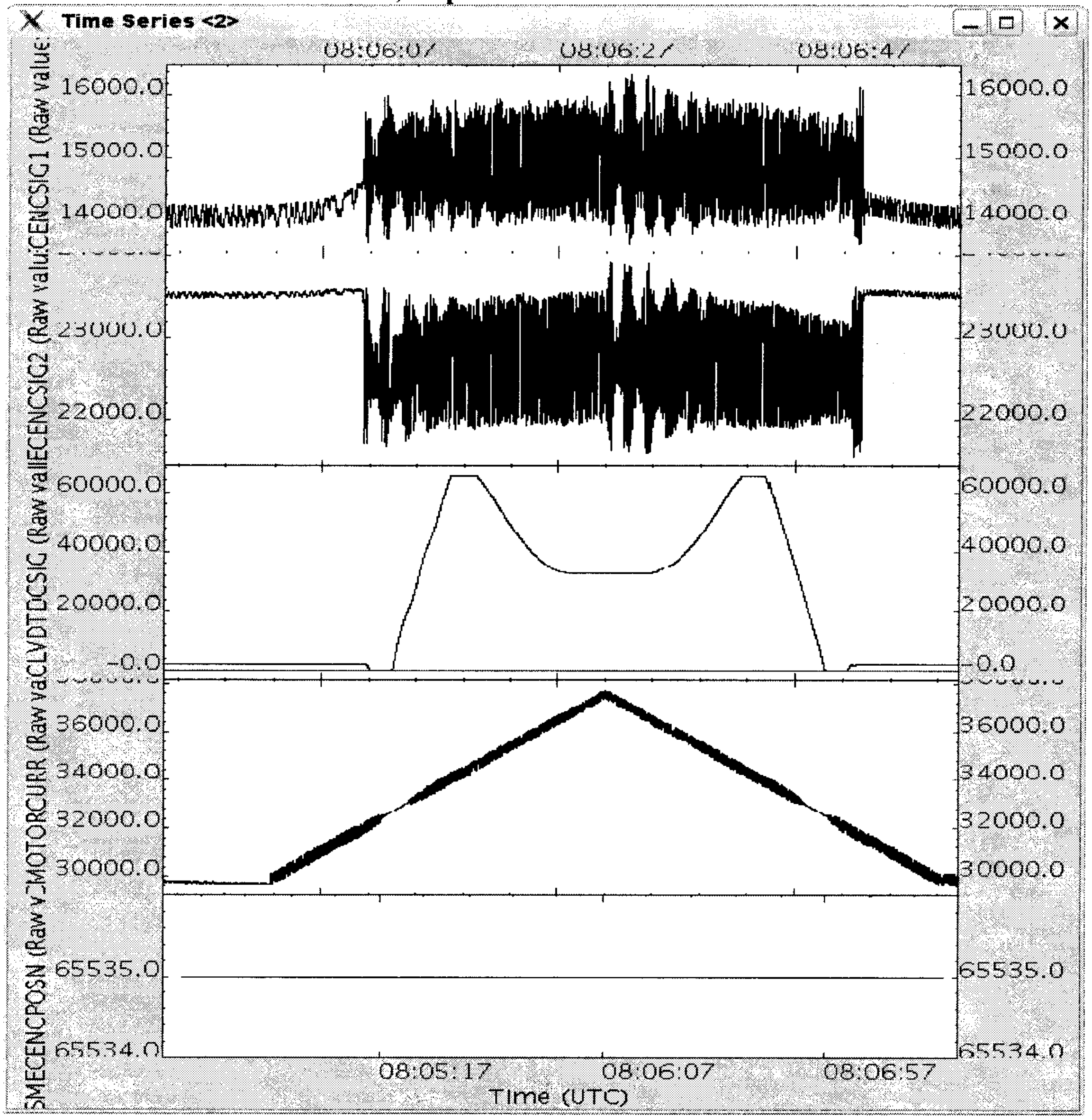
Test Id	Key Parameter(s)	Expected Value Before/After	Actual Value Before/After	No. of frames received	Test Result
FUNC-SMEC-09	**All above mentioned in step 2**	**N/A**	**N/A**	**N/A**	**Success**

SMEC encoder Sig1 & Sig2 offsets were 13523 and 22662 respectively. It was decided not to reset them as they did not appear to be significantly different from the encoder signals 1 & 2.

Start time: 08:04
OBSID: 0xb00002f2

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:
Test OK - as for prime side

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	**Fail**

First run SMEC_INIT:

Start time: 08:09
OBSID: 0xb00002f3

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: 08:11
OBSID: 0xb00002f4

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: [redacted] NCR HP-112000-ASED-NC-3733 has been raised.

(Post Test Comment: The mean encoder signals 1 and 2 were 14600 and 22600 respectively. In retrospect not resetting the encoder Sig1 offset 1 was a mistake!)

08:19 - Increased encoder power level from 6 to 7: 0x90400007

Run SMEC-04A again to find encoder signals 1 &2
FUNC-SMEC-04A-R:
Start time: 08:20
OBSID: 0xb00002f5

Mean encoder Sigs 1 & 2 are: ~18800 & ~26400 respectively
0x4970 & 0x6720

08:27: Set the SMEC encoder Sig1 & 2 offsets:
0x90584970
0x905a6720

Run open loop SMEC scan again
FUNC-SMEC-09-R:
Start time: 08:28
OBSID: 0xb00002f6

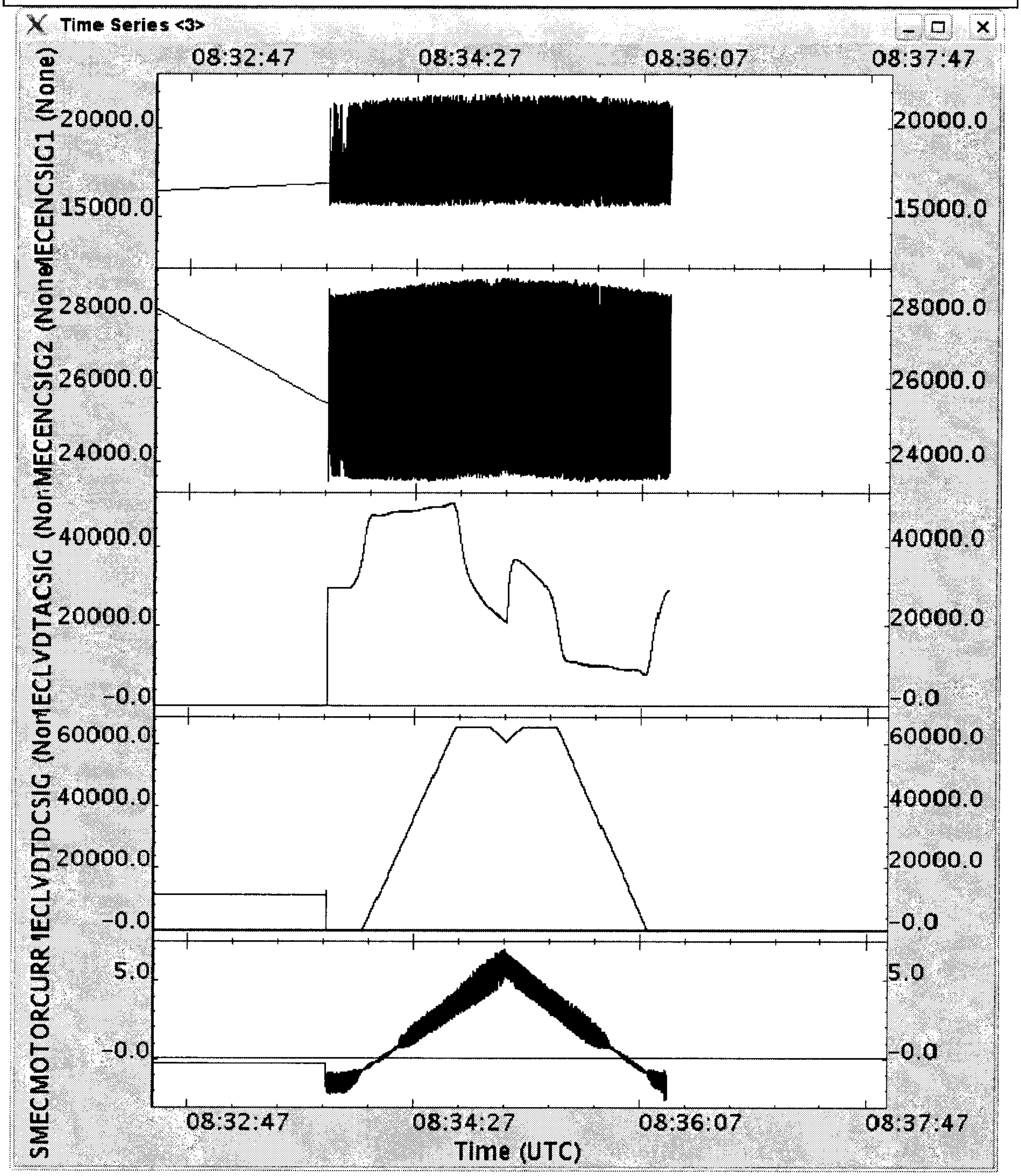
Encoder signal amplitudes decreased significantly in the middle of the scan.

Initialise the SMEC again
SMEC_INIT:
Start time: 08:30
OBSID: 0xb00002f7

FUNC-SMEC-07:
Start time: 08:32
OBSID: 0xb00002f8

Stayed in closed loop.

QLA plot below shows the SMEC scanning in closed loop.



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:
OBSID:

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

Comments: Test performed manually to by-pass OBS implementation problems of the SMEC Latch/Unlatch commands.

Put the SMEC in open loop and stop trajectory generation:

08:40
0x90440006
0x90490000

08:43 Set SMEC FF offset to 0x6000
0x90556000 – SMECFFOFFSET goes from 0x7000 to 0x6000
SMECMOTORCURR goes to ~19+/-1mA

08:44 Engage the SMEC latch
0x90430001 – No TM parameter can be monitored

After engaging the SMEC latch an attempt is now made to move the SMEC to see if the SMEC is truly latched.

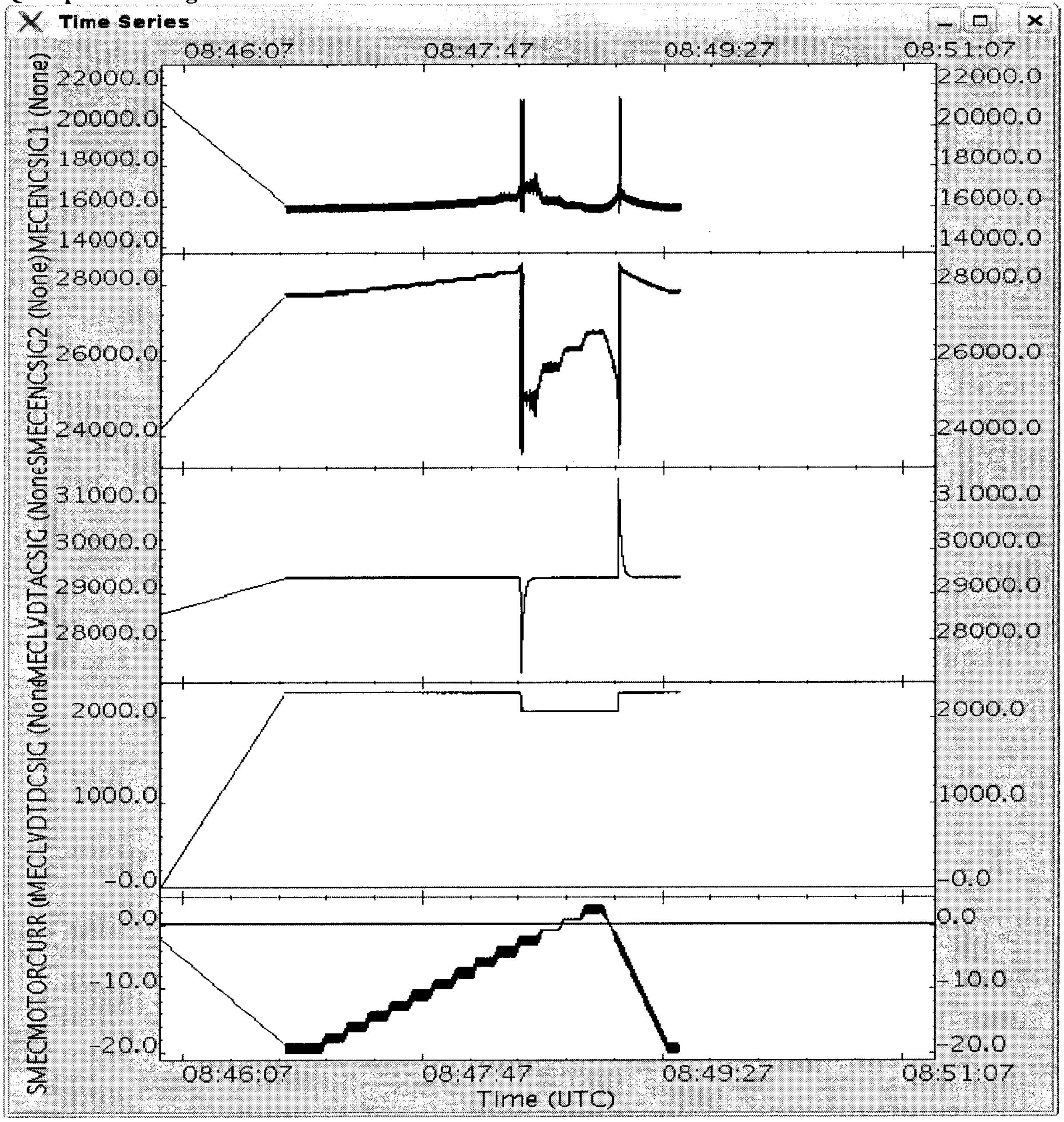
FUNC-SMEC-04A-R: Test to see if the SMEC is really latched.
Start time: 08:45
OBSID: 0xb00002f9

The SMEC looks to be latched, as shown by the QLA plot below.

SMEC tests completed.

SMEC_OFF:
Start time: 08:52
OBSID: 0xb00002fA

QLA plot showing the SMEC is latched:



5. ANNEXE 1 (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 B0000242 for photometer and B0000247 for spectrometer. For all the photometer load curves the first anomalous point has been removed from the plots.

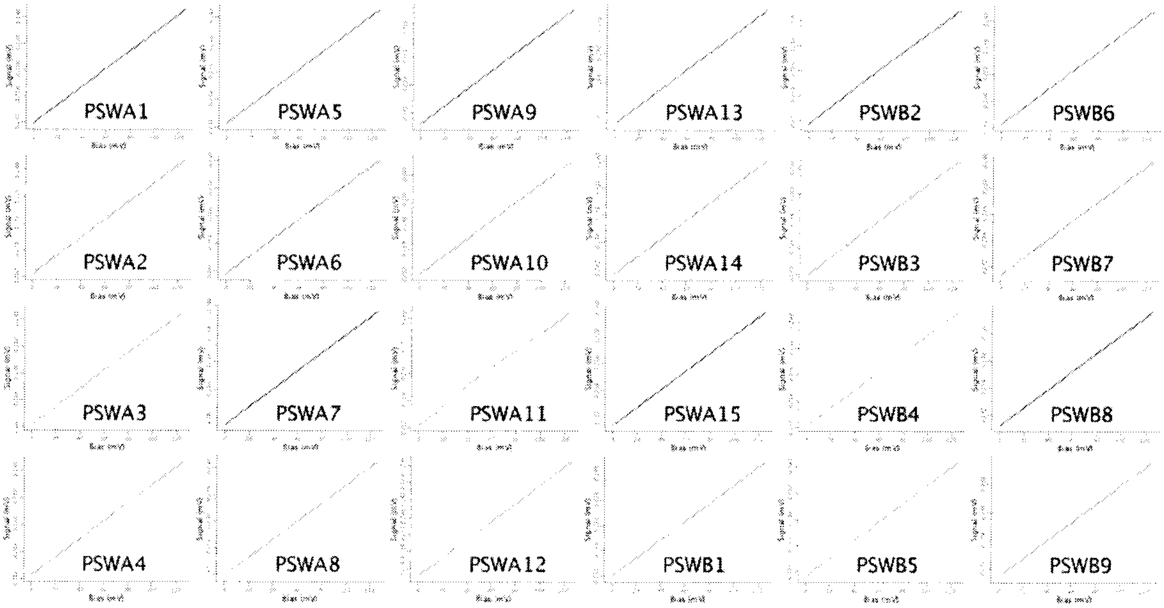


Figure 1. PSW Detectors (1)

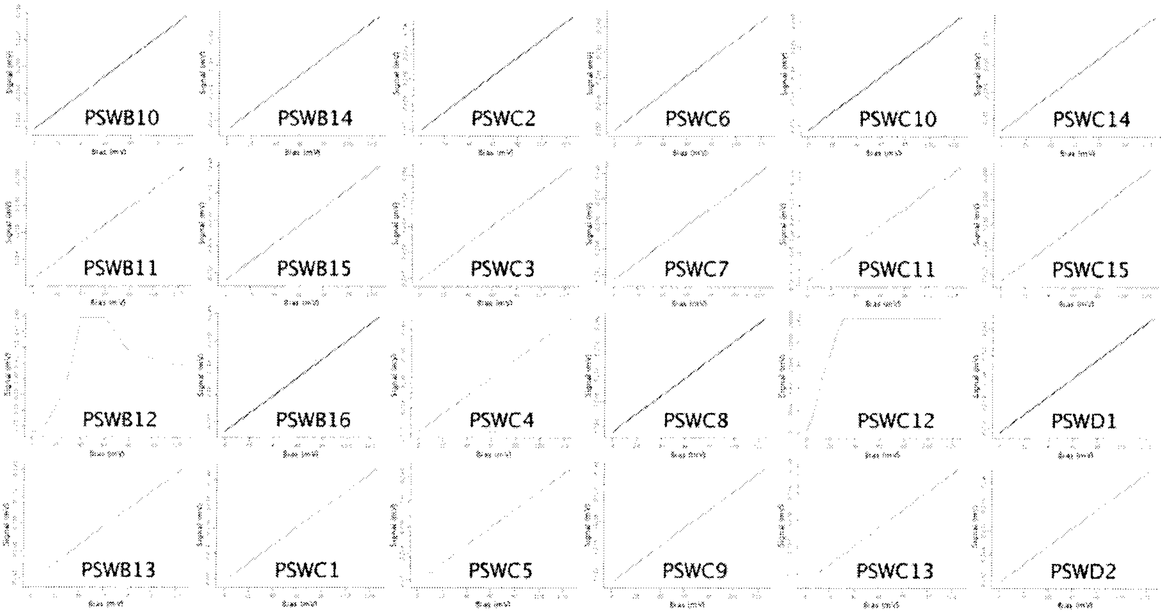


Figure 2. PSW Detectors (2)

Figure 3. PSW Detectors (3)

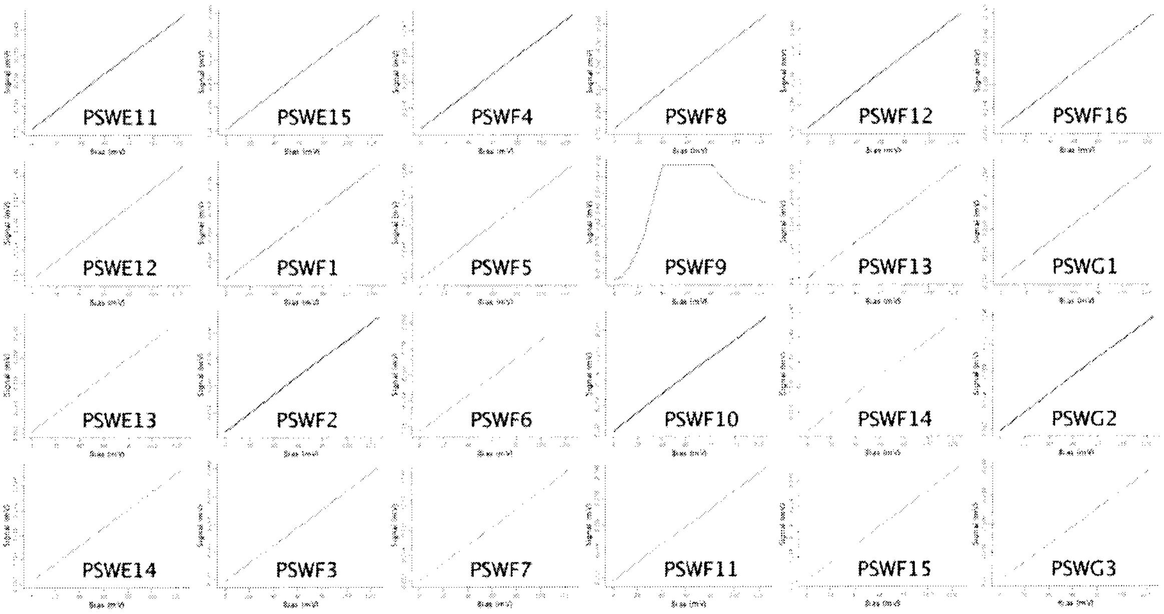


Figure 4. PSW Detectors (4)

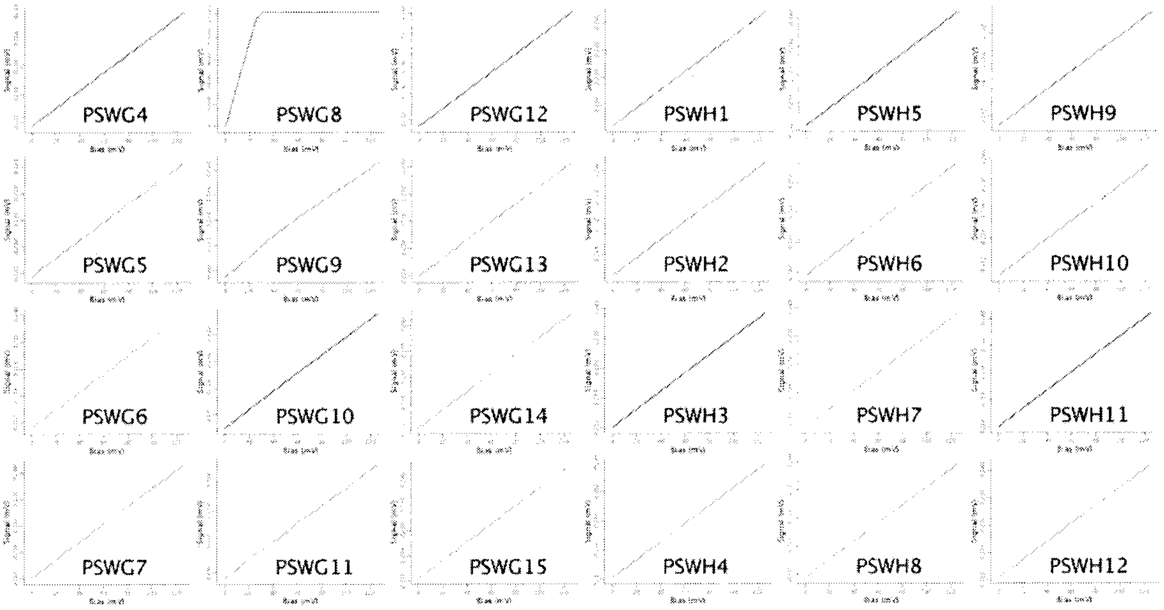


Figure 5. PSW Detectors (5)

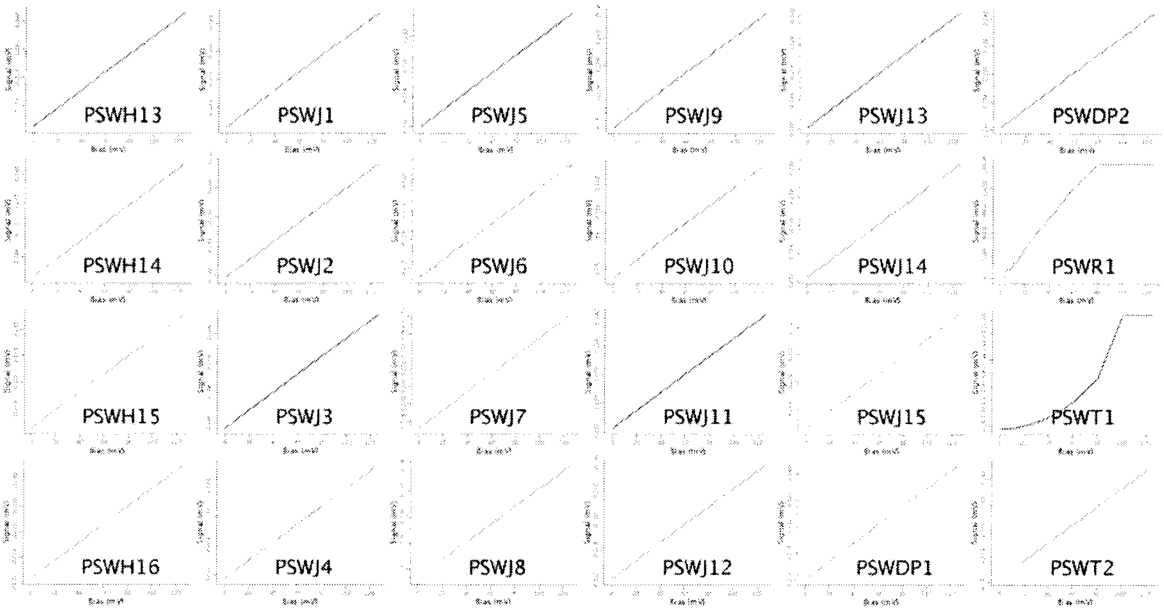


Figure 6. PSW Detectors (6)

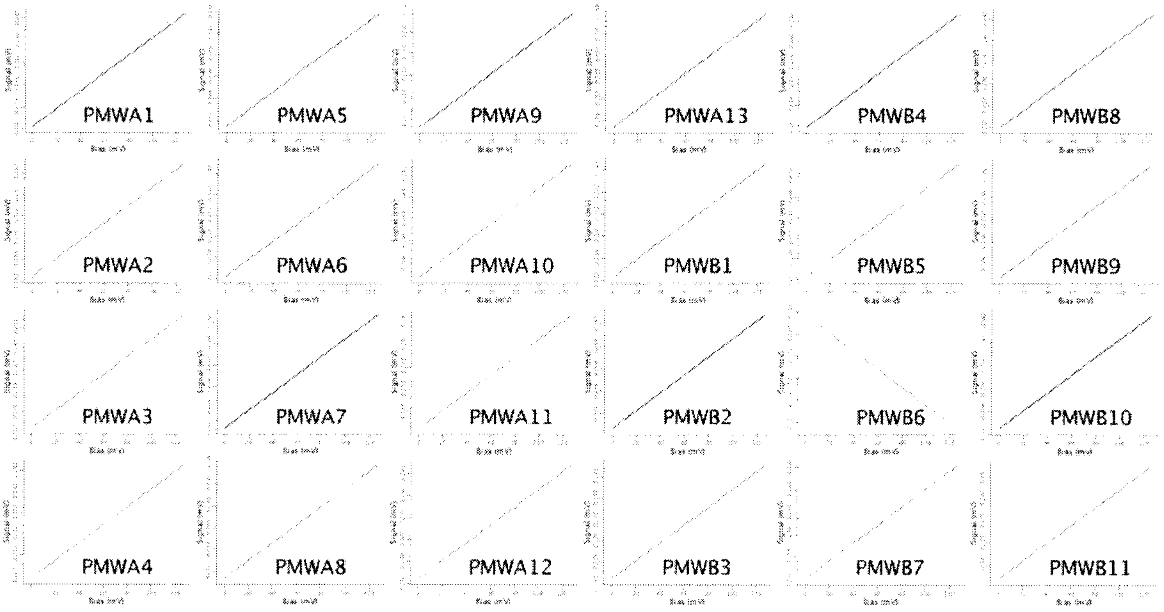


Figure 7. PMW Detectors (1)

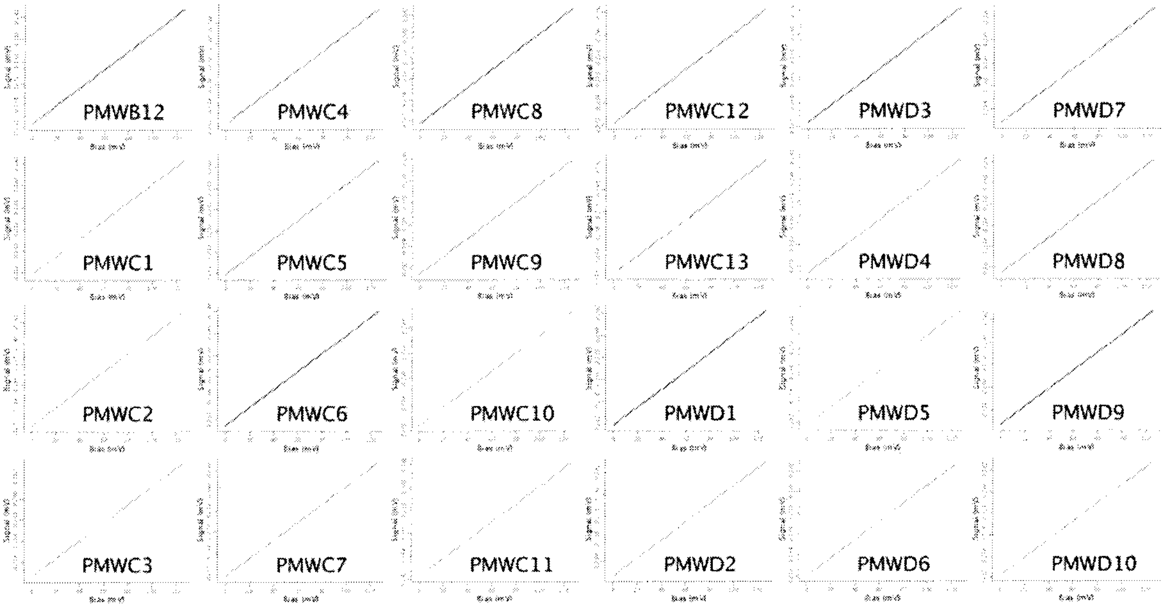


Figure 8. PMW Detectors (2)

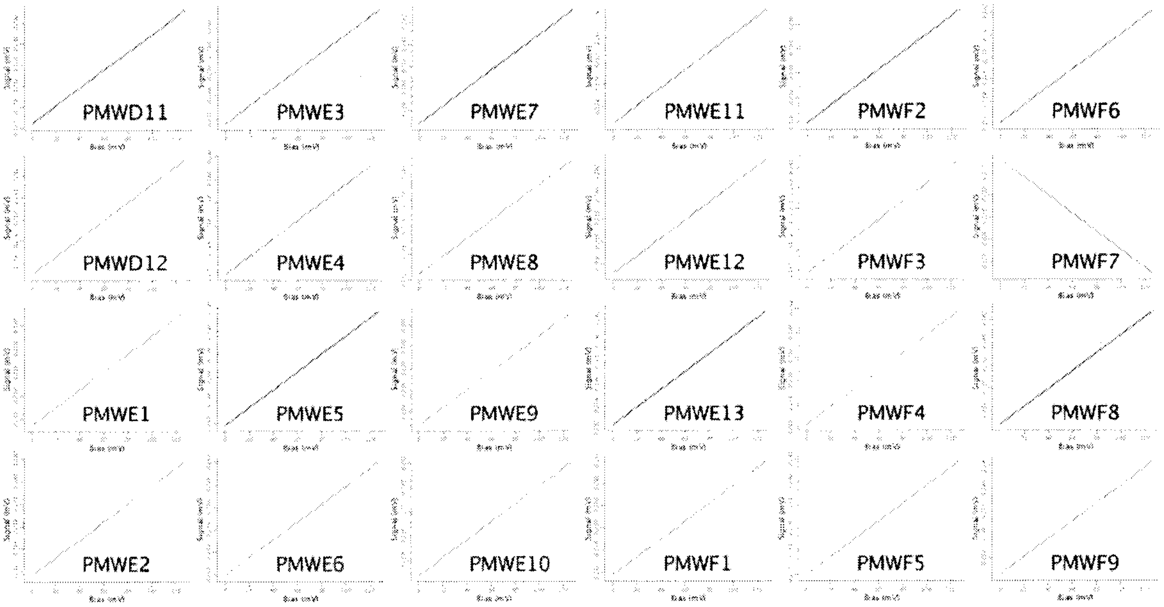


Figure 9. PMW Detectors (3)

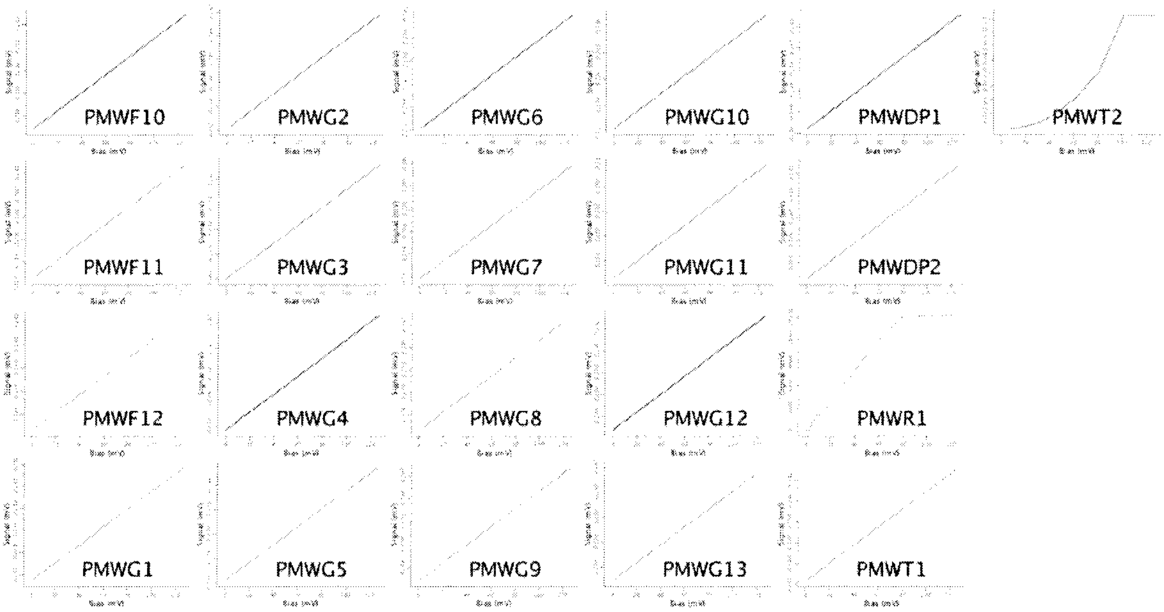


Figure 10. PMW Detectors (4)

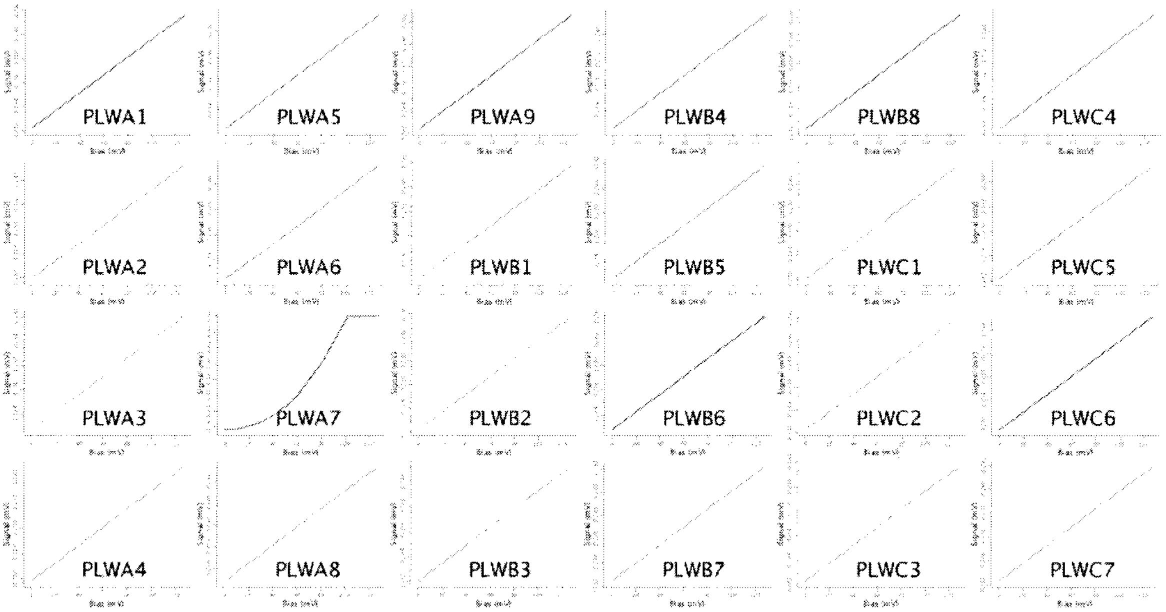


Figure 11. PLW Detectors (1)

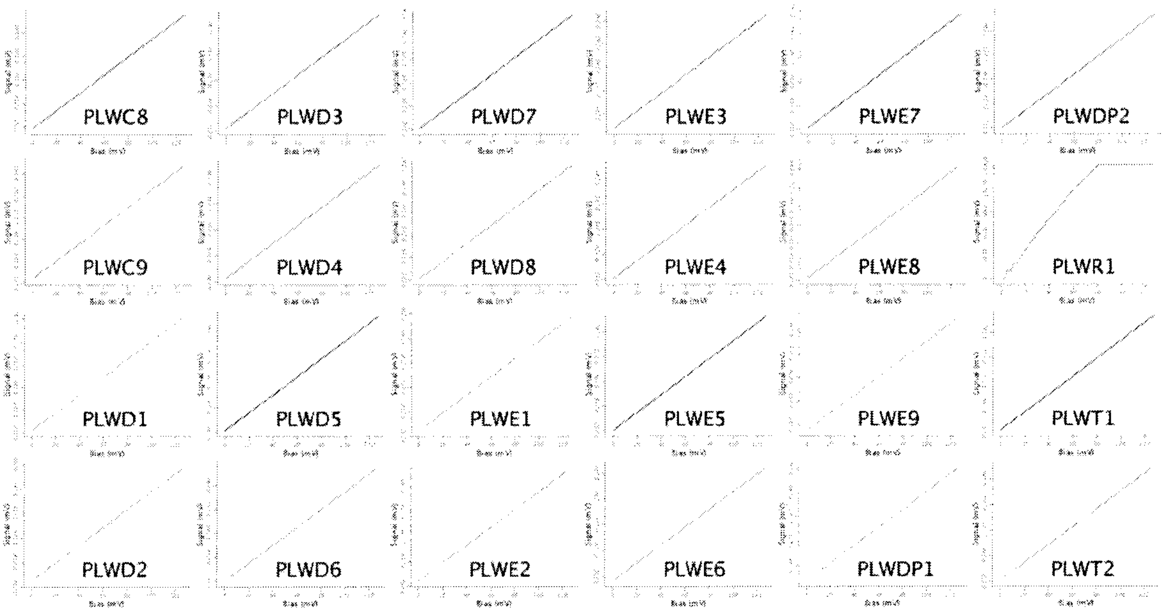
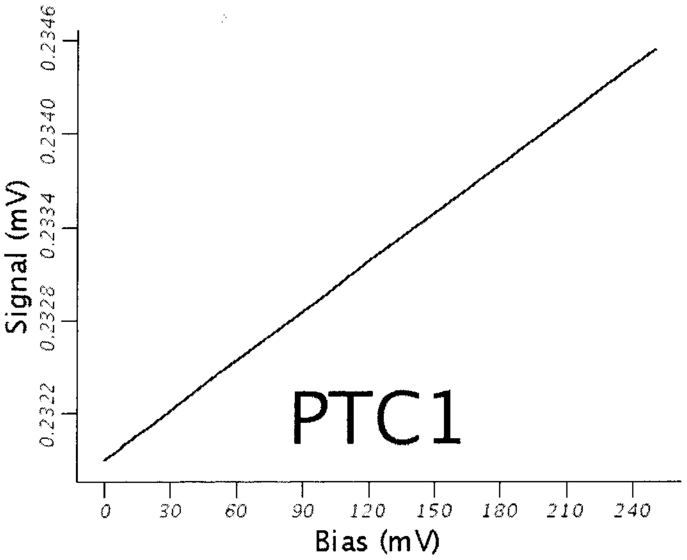
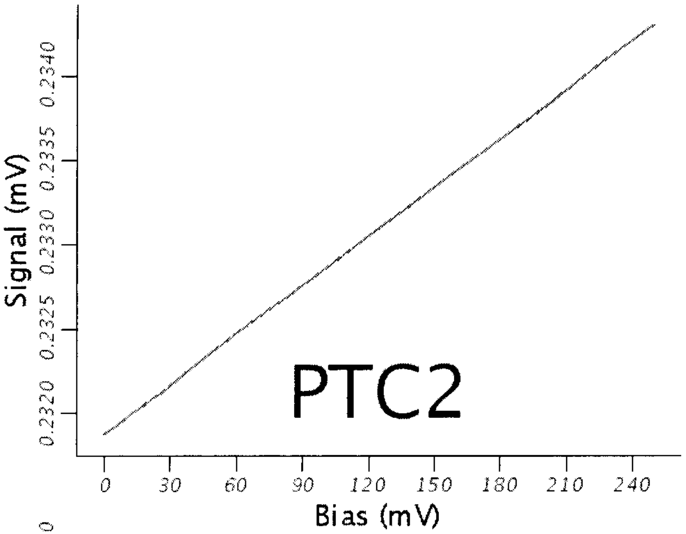


Figure 12. PLW Detectors (2)


PTC1
Signal (mV)
0.2322
0.2328
0.2334
0.2340
0.2346
0
30
60
90
120
150
180
210
240
Bias (mV)


PTC2
Signal (mV)
0.2320
0.2325
0.2330
0.2335
0.2340
0
30
60
90
120
150
180
210
240
Bias (mV)

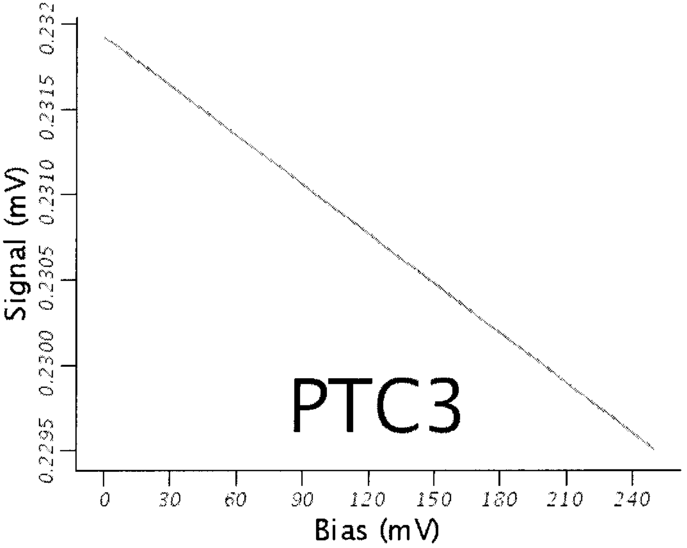

PTC3
Signal (mV)
0.2295
0.2300
0.2305
0.2310
0.2315
0.2320
0
30
60
90
120
150
180
210
240
Bias (mV)

Figure 13. PTC Detectors (1)

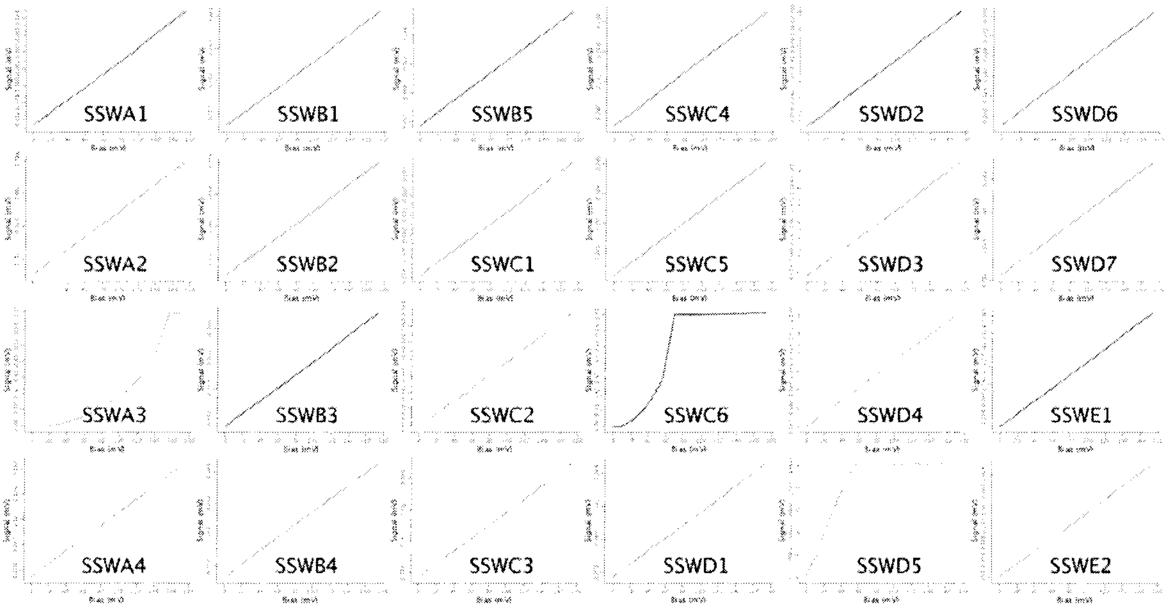


Figure 14. SSW Detectors (1)

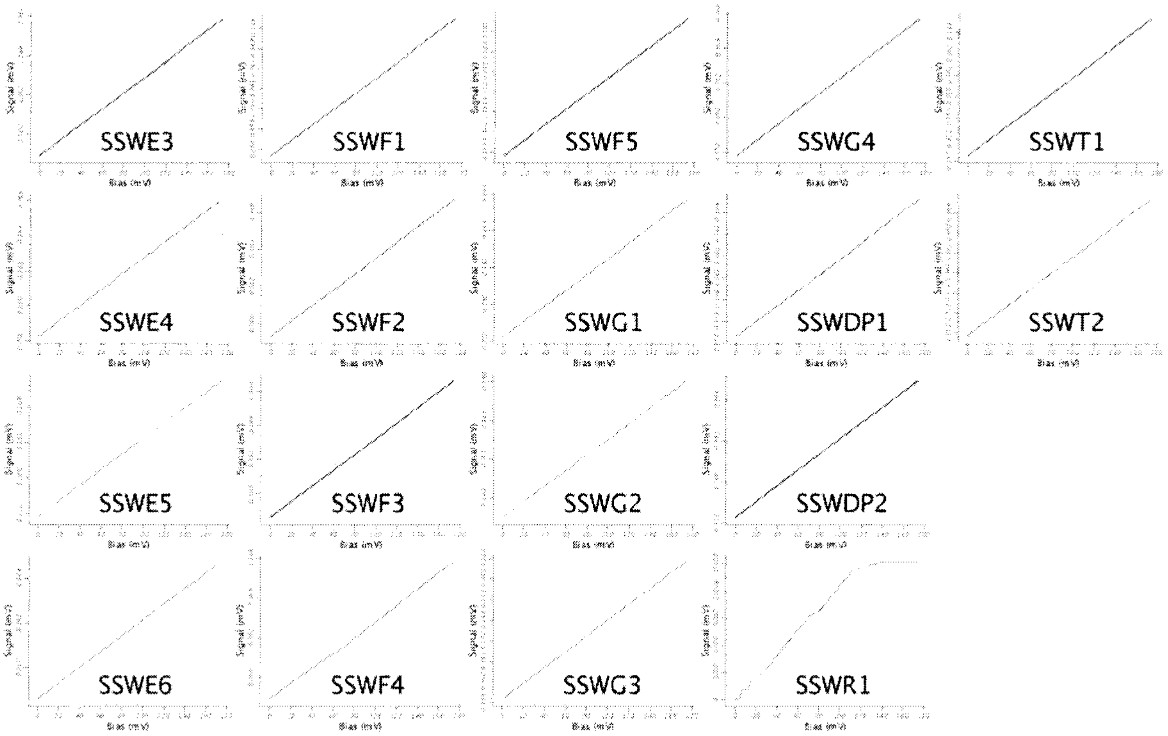


Figure 135. SSW Detectors (2)

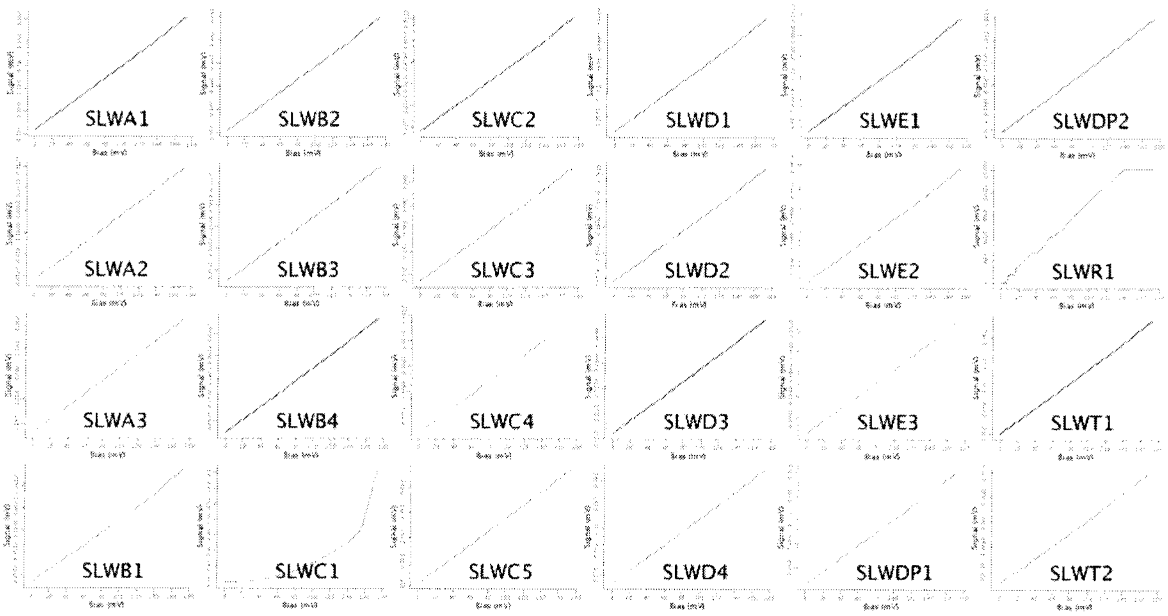


Figure 146. SLW Detectors (1)

END OF DOCUMENT

	Name	Dep./Comp.		Name	Dep./Comp.
X	Alberti von Mathias Dr.	ASG22		Schweickert Gunn	ASG22
	Baldock Richard	FAE12	X	Sonn Nico	ASG51
	Barlage Bernhard	AED13		Steininger Eric	AED32
	Bayer Thomas	ASA42	X	Stritter Rene	AED11
	Brune Holger	ASA45		Suess Rudi	OTN/ASA44
	Edelhoff Dirk	AED2		Wagner Klaus	ASG22
	Fehringer Alexander	ASG13	X	Wietbrock Walter	AET12
X	Fricke Wolfgang Dr.	AED 65		Wöhler Hans	ASG22
	Geiger Hermann	ASA42		Wössner Ulrich	ASE252
	Grasl Andreas	OTN/ASA44	X	Martin Olivier	ASA43
	Grasshoff Brigitte	AET12	X	Theunissen Martijn	DutchSpace
X	Hamer Simon	Terma			
X	Hendry David	Terma			
	Hengstler Reinhold	ASA42			
	Hinger Jürgen	ASG22			
X	Hohn Rüdiger	AED65			
	Hölzle Edgar Dr.	AED32			
	Huber Johann	ASA42			
	Hund Walter	ASE252			
	Idler Siegmund	AED312			
	Ivády von András	FAE12			
	Jahn Gerd Dr.	ASG22			
	Kalde Clemens	ASM2			
	Kameter Rudolf	OTN/ASA42			
	Kettner Bernhard	AET42			
	Knoblauch August	AET32	X	Alcatel Alenia Space Cannes	AAS-F
X	Koelle Markus	ASA43		Alcatel Alenia Space Torino	AAS-I
X	Koppe Axel	AED312	X	ESA/ESTEC	ESA
X	Kroeker Jürgen	AED65			
X	La Gioia Valentina	Terma		**Instruments:**	
	Lang Jürgen	ASE252		MPE (PACS)	MPE
	Langenstein Rolf	AED15	X	RAL (SPIRE)	RAL
	Langfermann Michael	ASA41		SRON (HIFI)	SRON
X	Maukisch Jan	ASA43			
X	Much Christoph	ASA43			
	Müller Jörg	ASA42		**Subcontractors:**	
X	Müller Martin	ASA43		Alcatel Alenia Space Antwerp	ABSP
	Peltz Heinz-Willi	ASG13		Austrian Aerospace	AAE
	Pietroboni Karin	AED65		Austrian Aerospace	AAEM
	Platzer Wilhelm	AED2		BOC Edwards	BOCE
	Reichle Konrad	ASA42		Dutch Space Solar Arrays	DSSA
	Runge Axel	OTN/ASA44		EADS Astrium Sub-Subsyst. & Equipment	ASSE
	Schink Dietmar	AED32		EADS CASA Espacio	CASA
	Schlosser Christian	OTN/ASA44		EADS CASA Espacio	ECAS
	Schmidt Rudolf	FAE12		European Test Services	ETS
	Schmidt Thomas	ASA42		Patria New Technologies Oy	PANT
	Schuler Günter	ASA42		SENER Ingenieria SA	SEN