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Test Report

Herschel

Title: Test Report For SPIRE FM Warm SFT

CI-No: 125 200

Prepared by:	A. Koppe	Date:	10.04.2008
Checked by:	S. Idler		11.04.2008
Checked by:	J. Kroeker		11.4.2008
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Project Management:	W. Fricke		22/04/08

Distribution: See Distribution List (last page)

Issue	Date	Sheet	Description of Change	Release
1	10.04.08	All	Formal Issue	

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0 Test Summary

0.1 Unit tested

SPIRE FM

0.2 Applied Procedures:

SPIRE FM Short Functional Test (Warm or Cold) HP-2-ASED-TP-0212, Issue 1

0.3 Procedure Execution Summary:

Several NCR´s have been raised or reoccurred during this run of the SPIRE warm SFT.

NC-3954: DRCU current higher than expected

NC-3955: Out of Limit reported on 2 SPIRE parameters

NC-3661: not fully implemented

NC-3698: recurrence

NC-3725: not fully corrected

NC-3633: unknown TM

NC-3631: recurrence

This test has been run with the HERSCHEL S/C in vertical position (X - axis vertical, precision ±0.5°).

The LPU could not be tested since the current parameter was not present in the CDMS software as expected (see NCR 3661 above).

The test duration for the primary side was 1 hour 30 min and for the secondary side 1 hour 20 min. Therefore, the total test duration is in the order of 3 hours for a complete SPIRE SFT.

The following protocols have been written documenting the SPIRE warm SFT status:

TRR for SPIRE wSFT	08.02.2008, H-P-2-TAS-MN-1480
SPIRE Warm SFT Wrap-up Meeting	11.02.2008, H-P-2-TAS-MN-10131
PTR for SPIRE FM wSFT prior cool-down	12.02.08, HP-2-ASED-MN-1483

Location: ESTEC, Noordwijk, NL

Test Session Name (prime): 2008_02_11_08_20_hercdmu_hpws22_REALTIME

Environment: TP_0212_SPIRE_WSFT_END_001

OBSW: CDMS 3.1.3, ACMS 3.7

HPSDB: HPSDB 3.3.1.28, R_TM_HERSCH_FM9_C_712121745_M, LI-1441 issue 6 + patch for NC-3949

HPCCS Release: Hpccs_2_0_1166 + patch libPKT.so.gz

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 observations were made during the test**:**

Time (UTC)	Test Procedure / Step / Script / Command / Event / Anomaly	Remarks / Cause of anomaly / Corrective action	Item Affected	NCR/SPR ref. (PA)	Affects Test Objective
08:30:00	Power on SVM				
08:52:00	TM parameter ZE009999 got out-of-limits and back in-limits again				
08:55:00	SVM Powered				
09:42:00	Start section 7.2.2 of SPIRE SFT Nominal				
10:39:00	Section 7.2.3.13 DCUFRAMECNT = 100, 700 expected	SPIRE script error. Corrected for Prime & Redundant and confirmed OK for Redundant		SPR-162	
	Section 7.2.5 LPU Nominal skipped PVS1	NCR-3661 to be updated			
11:15:00	Nominal SFT complete				
13:22:00	Start Redundant SFT				
14:25:00	Section 7.2.7.16 OOL reported on SLIAP5V value = 5.25V	Limit in MIB is 5.25V so appears minimal excursion possibly due to significant decimal places		NCR-3955	
	Section 7.2.9 LPU Redundant skipped PVS1	NCR-3661 to be updated			
14:40:00	Redundant SFT complete				

Table 1: SPIRE FM Warm SFT Summary

0.4 Summary Conclusion

The SPIRE FM Warm Short Functional Test (SFT) has been performed using version SPIRE_MIB_FM_2.2.G5_PR_2 integrated into the HPSDB version 3.3.1.28.

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 is updated with the current parameter (NCR-3661)

0.6 Requirements Verified

With the above test the requirement for the SPIRE SFT according to chapter 4.5.2 of “Test Specification for HERSCHEL Instruments FM tests performed at satellite level”, ref. H-P-2-ASP-TS-1083, has been verified.

1 Scope

This document reports on the Warm SFT performed on the SPIRE FM Instrument to check correct operation, after transport of the HERSCHEL satellite from the ASED Integration Facility to ESTEC cleanrooms. The tests were executed with the S/C in vertical position using the Herschel CCS & I-EGSE.

1.1 Objective

The objectives of the Warm SFT 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 Warm SFT test flow was structured to reflect nominal and redundant 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 to REDY (Standby) mode (ref. to test steps chapter 7.2.2 of test procedure [AD1])
3. Perform SPIRE Short 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. Power on SPIRE redundant DPU and DRCU (ref. to test steps chapter 7.2.6 of test procedure [AD1])
7. Perform SPIRE Short Functional tests - redundant (ref. to test steps chapter 7.2.7 of test procedure [AD1])
8. Switch OFF SPIRE redundant DPU and DRCU (ref. to test steps chapter 7.2.8 of test procedure [AD1])
9. Skip LPU test (ref. to test step chapter 7.2.9 of test procedure [AD1])
10. 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 Short Functional Test (Warm or Cold)	HP-2-ASED-TP-0212, iss.1

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 NCR Summary

NC3204: DPU Prime EEPROM Failure

This 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.

NC-3725: Channel PWM-B6 is still swapped, all others are repaired – NCR update required

NC-3954: DRCU current higher than expected

NC-3955: Out of Limit reported on 2 SPIRE parameters

NC-3661: not fully implemented– NCR update required

NC-3698: recurrence– NCR update required

NC-3725: not fully corrected– NCR update required

NC-3633: unknown TM – to be closed

NC-3631: recurrence – procedures include warning

3.2 Procedure Changes

Updates and clarifications in the SFT procedure 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 Short Functional Test under warm conditions was successfully performed apart from the LPU prime/redundant tests:

- The SPIRE SFT 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.

The detailed evaluation of the test results has been performed by RAL, the SPIRE instrument supplier, in a separate test report, ref. SPIRE-RAL-REP-003081, issue 1, which is attached as annex 3. Initial results have been found satisfactory.

5 Appendix 1: SPIRE FM WFT As-Run Procedure

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Test Procedure **Herschel**

MASTER "AS RUN" COPY INRED

7/02/08

Title: **SPIRE FM Short Functional Test (Warm or Cold)**

CI-No: 125200

Prepared by:	S. Hamer/ TERMA AS	Date:	30th Jan 2008
Checked by:	S. Idler		31.01.2008
Product Assurance:	R. Stritter		01.02.08
Configuration Control:	W. Wietbrock		04.02.08
Project Management:	W. Fricke		04/02/2008
TAS-F	D. Montet		

Distribution: See Distribution List (last page)

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1	30.01.08	All	First Formal Issue	0

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1 Scope

This document describes the set of Short Functional Tests (SFTs) to be performed on the fully integrated SPIRE FM Instrument to check correct operation using the Herschel CCS without the need of connection to I-EGSE.

Specifically this procedure is part of the overall Satellite SFT which will be performed after shipment to ESTEC (SFT1) and also at the end of Environment Testing (SFT2). It can be peformed in either Warm or Cold (HeI or HeII) conditions (TBC). Both redundancies are tested within this procedure.

Constraints

- Before carrying out the next procedure within the test sequence always ask for the go ahead by the SPIRE staff.
- SMEC (TBD)
- 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 if required
2. Power on and configure SVM for test
3. Power on SPIRE Prime and enable Mil1553B-bus interface
4. Run Nominal SFT Procedures as per table 1.2-1
5. Disable Mil1553B-bus interface and Power off SPIRE Prime
6. Power on SPIRE Redundant and enable Mil1553B-bus interface
7. Run Redundant SFT Procedures as per table 1.2-2
8. Disable Mil1553B-bus interface and Power off SPIRE Redundant
9. Power off SVM
10. Switch off all EGSE

Step #	Procedure Name	Purpose	Duration
1.	SPIRE-FM-SFT-FUNC-SCU-01-P	SCU Nominal Science Packet Generation Check PRIME	3 min
2.	SPIRE-FM-SFT-FUNC-SCU-03-P	SCU DC Thermometry check PRIME	8 min
3.	SPIRE-FM-SFT-FUNC-SCU-06-P	SCU AC Thermometry check PRIME	2 min
4.	SPIRE-FM-SFT-FUNC-SCU-07-P	Sorption Cooler Heaters Check PRIME	5 min
5.	SPIRE-FM-SFT-FUNC-SCU-04-P	Photometer Calibrator Check PRIME	3 min
6.	SPIRE-FM-SFT-FUNC-SCU-05-P	Spectrometer Calibrator Check PRIME	5 min
7.	SPIRE-FM-SFT-FUNC-MCU-01-P	MCU Boot Check PRIME	5 min
8.	SPIRE-FM-SFT-FUNC-MCU-02-P	MCU Nominal Science Packet Generation Check PRIME	5 min
9.	SPIRE-FM-SFT-FUNC-BSM-01-P	BSM Chop/Jiggle Sensors check PRIME	3 min
10.	SPIRE-FM-SFT-BSM-0FF-P	BSM switch OFF PRIME	3 min
11.	SPIRE-FM-SFT-FUNC-SMEC-01-P	SMEC Encoder and LVDT check PRIME	3 min
12.	SPIRE-FM-SFT-SMEC-OFF-P	SMEC switch OFF	3 min
13.	SPIRE-FM-FUNC-DCU-01-P	DCU Science Packet Generation Check PRIME	5 min
14.	SPIRE-FM-SFT-FUNC-DCU-04-PHOT-P	Photometer LIAs Check PRIME	5 min
15.	SPIRE-FM-SFT-PLIA-OFF-P	Photometer LIAs Switch OFF PRIME	2 min
16.	SPIRE-FM-SFT-FUNC-DCU-04-SPEC-P	Spectrometer LIAs Check PRIME	5 min
17.	SPIRE-FM-SFT-SLIA-OFF-P	Spectrometer LIAs Switch OFF PRIME	2 min
18.	SPIRE-FM-SFT-FUNC-MCU-OFF-P	MCU switch OFF PRIME	2 min
19.	SPIRE-FM-SFT-FUNC-SCU-OFF-P	SCU Switch OFF PRIME	2 min
20.	SPIRE-FM-SFT-LPU-01-P	Checkout of LPU PRIME	5 min

Table 1.2-1 SPIRE Prime Functional Procedures

Step #	Procedure Name	Purpose	Duration
1.	SPIRE-FM-SFT-FUNC-SCU-01-R	SCU Nominal Science Packet Generation Check REDUNDANT	3 min
2.	SPIRE-FM-SFT-FUNC-SCU-03-R	SCU DC Thermometry Check REDUNDANT	8 min
3.	SPIRE-FM-SFT-FUNC-SCU-06-R	SCU AC Thermometry Check REDUNDANT	2 min
4.	SPIRE-FM-SFT-FUNC-SCU-07-R	Sorption Cooler Heaters Check REDUNDANT	5 min
5.	SPIRE-FM-SFT-FUNC-SCU-04-R	Photometer Calibrator Check REDUNDANT	3 min
6.	SPIRE-FM-SFT-FUNC-SCU-05-R	Spectrometer Calibrator Check REDUNDANT	5 min
7.	SPIRE-FM-SFT-FUNC-MCU-01-R	MCU Boot Check REDUNDANT	5 min
8.	SPIRE-FM-SFT-FUNC-MCU-02-R	MCU Nominal Science Packet Generation Check REDUNDANT	5 min
9.	SPIRE-FM-SFT-FUNC-BSM-01-R	BSM Chop/Jiggle Sensors check REDUNDANT	3 min
10.	SPIRE-FM-SFT-BSM-0FF-R	BSM Switch OFF REDUNDANT	3 min

11.	SPIRE-FM-SFT-FUNC-SMEC-01-R	SMEC Encoder and LVDT check REDUNDANT	3 min
12.	SPIRE-FM-SFT-SMEC-OFF-R	SMEC Switch OFF	3 min
13.	SPIRE-FM-FUNC-DCU-01-R	DCU Science Packet Generation Check REDUNDANT	5 min
14.	SPIRE-FM-SFT-FUNC-DCU-04-PHOT-R	Photometer LIAs Check REDUNDANT	5 min
15.	SPIRE-FM-SFT-PLIA-OFF-R	Photometer LIAs Switch OFF REDUNDANT	2 min
16.	SPIRE-FM-SFT-FUNC-DCU-04-SPEC-R	Spectrometer LIAs Check REDUNDANT	5 min
17.	SPIRE-FM-SFT-SLIA-OFF-R	Spectrometer LIAs Switch OFF REDUNDANT	2 min
18.	SPIRE-FM-SFT-FUNC-MCU-OFF-R	MCU Switch OFF REDUNDANT	2 min
19.	SPIRE-FM-SFT-FUNC-SCU-OFF-R	SCU Switch OFF REDUNDANT	2 min
20.	SPIRE-FM-SFT-LPU-01-R	Checkout of LPU REDUNDANT	5 min

Table 1.2-2: SPIRE Redundant Functional Procedures

2 Documents/Drawings

2.1 Applicable Documents

AD 1	FM SPIRE PFM Final Electrical Integration Procedure	HP-2-ASED-TP-0166
AD 2	Herschel PCDU & CDMS Nominal Switch On/Off Procedure, Issue 1	HP-2-ASED-PR-0070
AD 3	Herschel SAT Emergency Switch Off Procedure	HP-2-ASED-PR-0071
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, Issue 2	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 FM Short Functional Test Procedures	SPIRE-RAL-PRC-2494, 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. 1.3	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.

The procedures detailed in this document 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 can be configured and connected to the HPCCS in accordance with AD 5 & AD 8, however it is not mandatory to have the I-EGSE connected for the SFT.

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 Scripts

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-SFT-DPU-START-P-SP	DPU ON PRIME	
2.	SPIRE-FM-SFT-DRCU-START-P-STEP1	DRCU ON PRIME Step1	
3.	SPIRE-FM-SFT-DRCU-START-P-STEP2	DRCU ON PRIME Step2	
4.	SPIRE-FM-SFT-FUNC-SCU-01-P	SCU science generation check	
5.	SPIRE-FM-SFT-FUNC-SCU-03-P	SCU DC thermometry check	
6.	SPIRE-FM-SFT-FUNC-SCU-06-P	SCU AC thermometry check	
7.	SPIRE-FM-SFT-FUNC-SCU-07-P	Sorption Cooler Heater Check	
8.	SPIRE-FM-SFT-FUNC-SCU-04-P	Photometer Calibration Check	
9.	SPIRE-FM-SFT-FUNC-SCU-05-P	Spectrometer Calibration Check	
10.	SPIRE-FM-SFT-FUNC-MCU-01-P	MCU (Prime) Boot Check	
11.	SPIRE-FM-SFT-FUNC-MCU-02-P	MCU Nominal Frame Generation Check	
12.	SPIRE-FM-SFT-FUNC-BSM-01-P	BSM (Prime) Chop/Jiggle Sensor Check	
13.	SPIRE-FM-SFT-BSM-OFF-P	BSM (Prime) Switch OFF	
14.	SPIRE-FM-SFT-FUNC-DCU-01-P	DCU Nominal Science Packet Generation Check PRIME	
15.	SPIRE-FM-SFT-FUNC-DCU-04-PHOT-P	Photometer LIAs Check PRIME	
16.	SPIRE-FM-SFT-PLIA-OFF-P	Photometer LIAs Switch OFF PRIME	
17.	SPIRE-FM-SFT-FUNC-DCU-04-SPEC-P	Spectrometer LIAs Check PRIME	
18.	SPIRE-FM-SFT-SLIA-OFF-P	Spectrometer LIAs Switch OFF PRIME	
19.	SPIRE-FM-SFT-MCU-OFF-P	MCU Switch OFF PRIME	
20.	SPIRE-FM-SFT-SCU-OFF-P	SCU Switch OFF PRIME	
21.	SPIRE-FM-SFT-DRCU-OFF-P	DRCU Switch OFF PRIME	
22.	SPIRE-FM-SFT-FUNC-SMEC-01-P	SMEC Encoder and LVDT check PRIME	
23.	SPIRE-FM-SFT-SMEC-OFF-P	SMEC Switch OFF PRIME	
	REDUNDANT UNIT SCRIPTS		
24.	SPIRE-FM-SFT-DPU-START-R-PP	DPU ON REDUN	
25.	SPIRE-FM-SFT-DRCU-START-R-STEP1	DRCU ON REDUN Step1	

No.	Tcl Script Name	Comment	Confirmed
26.	SPIRE-FM-SFT-DRCU-START-R-STEP2	DRCU ON REDUN Step2	✓
27.	SPIRE-FM-SFT-FUNC-SCU-01-R	SCU Nominal Science Packet Generation Check REDUN.	✓
28.	SPIRE-FM-SFT-FUNC-SCU-03-R	SCU DC Thermometry Check REDUN.	✓
29.	SPIRE-FM-SFT-FUNC-SCU-06-R	SCU AC Thermometry Check REDUN.	✓
30.	SPIRE-FM-SFT-FUNC-SCU-07-R	Sorption Cooler Heaters Check REDUN.	✓
31.	SPIRE-FM-SFT-FUNC-SCU-04-R	Photometer Calibrator Check REDUN.	✓
32.	SPIRE-FM-SFT-FUNC-SCU-05-R	Spectrometer Calibrator Check REDUN.	✓
33.	SPIRE-FM-SFT-FUNC-MCU-01-R	MCU Boot Check REDUN.	✓
34.	SPIRE-FM-SFT-FUNC-MCU-02-R	MCU Nominal Science Packet Generation Check REDUN.	✓
35.	SPIRE-FM-SFT-FUNC-BSM-01-R	BSM Chop/Jiggle Sensors Check REDUN.	✓
36.	SPIRE-FM-SFT-BSM-0FF-R	BSM Switch OFF REDUN.	✓
37.	SPIRE-FM-SFT-FUNC-DCU-01-R	DCU Nominal Science Packet Generation Check REDUN.	✓
38.	SPIRE-FM-SFT-FUNC-DCU-04-PHOT-R	Photometer LIAs Check REDUN.	✓
39.	SPIRE-FM-SFT-PLIA-OFF-R	Photometer LIAs Switch OFF REDUN.	✓
40.	SPIRE-FM-SFT-FUNC-DCU-04-SPEC-R	Spectrometer LIAs Check REDUN.	✓
41.	SPIRE-FM-SFT-SLIA-OFF-R	Spectrometer LIAs switch OFF REDUN.	✓
42.	SPIRE-FM-SFT-MCU-OFF-R	MCU Switch OFF REDUN.	✓
43.	SPIRE-FM-SFT-SCU-OFF-R	SCU Switch OFF REDUN.	✓
44.	SPIRE-FM-SFT-DRCU-OFF-R	DRCU Switch OFF REDUN	✓
45.	SPIRE-FM-SFT-FUNC-SMEC-01-R	SMEC Encoder and LVDT Check REDUN.	✓
46.	SPIRE-FM-SFT-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	LI-1441	Iss 6 + Patch for NCR-3949	✓

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

I-EGSE Software	Version	Comment
SPIRE MIB version	2.267_PR	
SCOS version	2.3epatch5	

5 Conditions

5.1 Personnel

Responsibility	Name / Organisation
Test Director	B. COLLAUDIN / TAS-F
Test Conductor	A. KUPPE / ASED
EGSE Operator	S. HAMGRS, ELSLEY
Electrical Engineer	N/A
Specialist Engineer	N/A
Element Cognizant	N/A
PA Responsible	R. VASCOTTO / ASED
Instrument Representative	E. SAWYER / RAL
Customer Representative	B. COLLAUDIN / TAS-F
ESA Representative	K. GOODEY / ESA. C. SCHARMBERG / ESA

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	OK	✓	
Temperature	22°C ± 3°C	20,4°	✓	
Rel. Humidity	40 % - 60 %	49,1 %	✓	
Pressure	Ambient	ambient	✓	

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 not mandatory for this test, but if used can 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 short functional check of all SPIRE PFM subsystems in warm or cold 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.

Enter Start Date|Time:	✓	✓	

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

Test Location:	ESTEC
Test Session Id(s): ENVIRONMENT:	2008_02_11_08-20_nercdmu_hpws22_REALTIME
	TP_0212_SPIRE_WSFT_ENO_001

Enter Start Date|Time:	11/02/08	09:00	

7.2.1 EGSE & Satellite Switch On

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	Steps 1.1, 1.3 to 1.7 are not mandatory for test execution	SNH	
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	Confirm that EGSE and Satellite are in the correct configuration as per AD 2	OK		OK.		SNH	
1.4	Switch on & configure SPIRE I-EGSE i.a.w. **AD5 & AD 8**			ok			
1.5	Confirm SPIRE I-EGSE is in the correct configuration as per AD5 & AD 8	OK		OK		SNH	
1.6	From HPCCS Test Conductor console issue command to connect to SPIRE I-EGSE **connect HSPIREEGSE**			OK		SNH	
1.7	Confirm from HPCCS and SPIRE I-EGSE that the connection has been established	OK		CONNECTED		SNH	
	READY FOR START OF SPIRE SFT						

Enter Date/Time:	11/02/08	09:42	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08.	09.43	

7.2.2 *Switch On SPIRE PRIME To REDY (Standby)*

During power on of SPIRE a number of soft/hard OOLs are reported due to the sequential switch on of the units. This is expected and will clear when SPIRE is in REDY mode. When in REDY mode one parameter remains OOL (soft) namely SMD2V505 this is also expected.

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
1.	On HPCCS start Packet History displays for the following APIDs:1280,1282	OK	OK		SWH	
2.	From the HPCCS test conductor console start the test script to power SPIRE Prime to REDY: **S102999SCVT005_ASDSFTSPIR_PWR_ON_P**		ok			
3.	On HPCCS when prompted: "SPIRE Switch ON for SFT related tests in any conditions - Select NO to abort TS if not correct"	YES	YES		SWH	

Enter Start Date|Time:	11/02/08	09:42	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
4.	If in any doubt about the script being executed **NO** should be selected to abort the script. Before restarting consult the relevant instrument support engineer to confirm the correct script to be used for the test in question.		N/A			
5.	If **YES** is selected the test script will go on to automatically power on all SPIRE warm units, force boot the DPU ASW and configure the instrument to REDY (Standby mode).		ok		✓	
6.	On HPCCS when prompted: "Check Telemetry Updating Correctly and OBT is Consistent with CDMU - OK to continue"	OK	OK		SNH	
7.	If I-EGSE connected when prompted on HPCCS, perform check requested: "Check IEGSE Time Consistent - OK to continue when RAL confirm"	OK	OK		SNH	
8.	On HPCCS when prompted: "Check Telemetry No Longer Updating - OK to continue" Check that parameters:			**AND: SA_1_559**		

Enter Date/Time:	11/02/08	09:52	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	09:52.	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
	THSK TM2N	Not refreshing Not incrementing	OK		SWH	
9.	Select OK to continue	OK	OK		SWH	
10.	On HPCCS when prompted: "Check Telemetry Updating Correctly - OK to continue" Check that parameters: THSK TM2N	 Refreshing @ 1Hz Incrementing by 1 @ 1Hz	OK	**AND: SA_1_559**	SWH	
11.	Select OK to continue	OK	OK		SWH	
12.	On HPCCS when all autonomous actions have been completed by the power on script **S102999SCVT005_ASDSFTSPIR_PWR_ON_P** it will prompt: "Set Bus Profile Back to Original Setting?" Select NO	NO	NO		SWH	

Enter Date/Time:	11/02/08	09:54	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	09:54	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
13.	At the prompt: "Bus Profile left unchanged" Select OK to continue	OK	OK		SNH	
14.	Verify HK TM packets are being received on APIDs 1280 & 1282	OK	OK		SNH	
15.	MODE parameter is set to "~~REDY~~" mode (RAW value 0x0200)	SM00M500 = 0x0200 (~~REDY~~)	OK	**AND: SA_1_559**	SNH	
16.	**SPIRE powered and in ~~REDY~~ mode**					

Enter Start Date|Time:	11/02/08 -	09:58	

7.2.3 Short Functional Tests - Nominal

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

Version	2.3
Date	28th August 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
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	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-SFT-FUNC-SCU-01-P.tcl	SCUFRAMECNT TM5N	0/31 0x3FFF/1	31 1	SWA-OK.
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08.	10:01	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:02	

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

Version	2.3
Date	28th August 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:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-FUNC-SCU-03-P.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to**				

Enter Date/Time:	11/02/08.	10:03	Sign Off	TC:	PA:

Enter Start Date|Time:	1/02/08	10:03	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
	SCU_DC_Therm				
3	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0/FFFF/FFFF	0xFFFF	SWA- OK.
4	If the instrument is at He II temperatures check the values of SCU DC thermometry channels.		(All Values TBC)	N/A	
		PUMPHTRTEMP	-/~4.6K		
		PUMPHSTEMP	-/~3.0K		
		EVAPHSTEMP	-/~3.0K		
		SHUNTTEMP	-/~1.7K		
		EMCFILTEMP	-/~4.6K		
		SL0TEMP	-/~1.7K		
		PL0TEMP	-/~1.7K		
		OPTTEMP	-/~4.6K		
		BAFTEMP	-/~4.6K		
		BSMIFTEMP	-/~4.5K		
		SCAL2TEMP	-/~4.6K		
		SCAL4TEMP	-/~4.6K		
		SCALTEMP	-/~4.6K		
		SMECIFTEMP	-/~4.6K		
		SMECTEMP	-/~4.6K		
		BSMTEMP	-/~4.5K		

Enter Date/Time:	1/02/08	10:03	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08		

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
5	If the instrument is at He I temperatures check the values of SCU DC thermometry channels.		(All Values TBC)	N/A	
		PUMPHTRTEMP	~4.2K		
		PUMPHSTEMP	~4.4K		
		EVAPHSTEMP	~4.3K		
		SHUNTTEMP	~4.2K		
		EMCFILTEMP	~4.8K		
		SL0TEMP	~4.2K		
		PL0TEMP	~4.2K		
		OPTTEMP	~4.8K		
		BAFTEMP	~4.8K		
		BSMIFTEMP	~4.7K		
		SCAL2TEMP	~4.8K		
		SCAL4TEMP	~4.8K		
		SCALTEMP	~4.8K		
		SMECIFTEMP	~4.7K		
		SMECTEMP	~4.7K		
		BSMTEMP	~4.8K		
6	If the instrument is warm:	PUMPHTRTEMP	—	~32768	
		PUMPHSTEMP	—		
	Configure the SFT	EVAPHSTEMP	—		
	PARAMETERS display to show	SHUNTTEMP	—		

Enter Date/Time:	11/02/08	V	Sign Off	TC:	PA:

Enter Start Date|Time:			

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
	the RAW values of SCU DC thermometry channels. Record the RAW 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]**	EMCFILTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	— — — — — — — — — — — —	-30460 -32768 +32767 -32768.	OK.
Test Result (Pass/Fail):	V				

Enter Date/Time:	11/02/08	10:08	Sign Off	TC:	PA:

DS: 65535 ID: SA_4_5 Title: SCU PARAMETERS Sample Time: 2008.042.10.17.58.946 Workstation: hpws21

NAME	DESCRIPTION	VALUE	UNIT
SM10N500	OBSID	B0000000	HEX
SM2LN500	BBFULLTYPE	Null	
SMD0N520	SCUFRAMECNT	31	DEC
SMD2N520	SCUSELECTTAB	00000000	HEX
SMD1F520	SCUIFSTAT	00000000	HEX
SMD2F520	SCUIFCTRL	00000007	HEX
SMD0T520	SCUSSDEL	0.07	ms
SM_0F520	SCUSTAT	00000000	HEX
SM_1F520	SCUTEMPSTAT	0000FFFF	HEX
SM_2F520	SCUDCDCSTAT	00000000	HEX
SM_0V520	SCUP5V	5.2390	V
SM_1V520	SCUP9V	9.0872	V
SM_2V520	SCUM9V	-9.0801	V
SMH0A520	SPHSV	0.0790	mV
SMT0A520	EVHSV	0.1087	mV
SMF0A520	TCHTRV	0.0010	V
SMT1A520	SPHTRV	0.0023	V
SMT0K520	CCUTEMP	295.8681	K
SMT1K520	TCUTEMP	296.1733	K
SMW0K520	PSUTEMP1	298.9199	K
SM_0N520	SCUFRAMECONF	00000000	HEX
SM_1N520	SCUFRAMES	0000001F	HEX
SMD3F520	SCUFRAMESTAT	00000000	HEX
SMD4F520	SCUCTRL	00000001	HEX
SMP0V520	PCALV	0.000145	V
SMS0V520	SCAL2V	0.000236	V
SMS1V520	SCAL4V	0.000368	V
SMS2V520	SCUCHT2_5V	2.5289	V
SMS3V520	SCUCHTREF	1.2276	V
SMS4V520	SCUCHTGND	0.0015	V
SMP0A520	PCALCURR	0.000928	mA
SMS0A520	SCAL2CURR	-7.6e-05	mA
SMS1A520	SCAL4CURR	0.000447	mA
SMW1K520	PSUTEMP2	299.2251	K
SMK0F520	SUBKSTAT	00000000	HEX
SMF0K520	PUMPHTRTEMP	-32768	K
SMF1K520	PUMPHSTEMP	-32768	K
SMF2K520	EVAPHSTEMP	-32768	K
SMF3K520	SHUNTTEMP	-32768	K
SMF4K520	EMCFILTEMP	-30458	K
SMF5K520	SL0TEMP	-32768	K
SMF6K520	PL0TEMP	32767	K
SMF7K520	OPTTEMP	-32768	K
SMF8K520	BAFTEMP	-32768	K
SMF9K520	BSMIFTEMP	-32768	K
SMS0K520	SCAL2TEMP	-32768	K
SMS1K520	SCAL4TEMP	-32768	K
SMS2K520	SCALTEMP	-32768	K
SMFAK520	SMECIFTEMP	-32768	K
SMFBK520	SMECTEMP	-32768	K
SMFCK520	BSMTEMP	-32768	K
SMK0K520	SUBKTEMP	32756	K
SMKEV520	SCUTHTREF	1.2298	V
SMKFV520	SCUTHTGND	-0.000612	V
SM_0X520	PLIABITSTAT	00000000	HEX
SM_1X520	SLIABITSTAT	00000000	HEX
SM_2X520	MCUBITSTAT	00000000	HEX

DS: 65535 ID: SA_4_5 Title: SCU PARAMETERS Sample Time: 2008.042.10.17.58.946 Workstation: hpws21

NAME	DESCRIPTION	VALUE	UNIT
SM10N500	OBSID	B0000163	HEX
SM2LN500	BBFULLTYPE	PCAL_Check	
SMD0N520	SCUFRAMECNT	31	DEC
SMD2N520	SCUSELECTTAB	00000000	HEX
SMD1F520	SCUIFSTAT	00000000	HEX
SMD2F520	SCUIFCTRL	00000007	HEX
SMD0T520	SCUSSDEL	0.07	ms
SM_0F520	SCUSTAT	00000000	HEX
SM_1F520	SCUTEMPSTAT	0000FFFF	HEX
SM_2F520	SCUDCDCSTAT	00000000	HEX
SM_0V520	SCUP5V	5.2388	V
SM_1V520	SCUP9V	9.0872	V
SM_2V520	SCUM9V	-9.0832	V
SMH0A520	SPHSV	0.0790	mV
SMT0A520	EVHSV	0.0832	mV
SMF0A520	TCHTRV	0.0010	V
SMT1A520	SPHTRV	0.0023	V
SMT0K520	CCUTEMP	296.3259	K
SMT1K520	TCUTEMP	296.3259	K
SMW0K520	PSUTEMP1	299.0725	K
SM_0N520	SCUFRAMECONF	00000000	HEX
SM_1N520	SCUFRAMES	0000001F	HEX
SMD3F520	SCUFRAMESTAT	00000000	HEX
SMD4F520	SCUCTRL	00000001	HEX
SMP0V520	PCALV	0.0217	V
SMS0V520	SCAL2V	0.000236	V
SMS1V520	SCAL4V	0.000368	V
SMS2V520	SCUCHT2_5V	2.5285	V
SMS3V520	SCUCHTREF	1.2274	V
SMS4V520	SCUCHTGND	0.0015	V
SMP0A520	PCALCURR	0.1010	mA
SMS0A520	SCAL2CURR	0.000102	mA
SMS1A520	SCAL4CURR	0.000269	mA
SMW1K520	PSUTEMP2	299.5302	K
SMK0F520	SUBKSTAT	00000001	HEX
SMF0K520	PUMPHTRTEMP	-32768	K
SMF1K520	PUMPHSTEMP	-32768	K
SMF2K520	EVAPHSTEMP	-32768	K
SMF3K520	SHUNTTEMP	-32768	K
SMF4K520	EMCFILTEMP	-30458	K
SMF5K520	SL0TEMP	-32768	K
SMF6K520	PL0TEMP	-32768	K
SMF7K520	OPTTEMP	-32768	K
SMF8K520	BAFTEMP	-32768	K
SMF9K520	BSMIFTEMP	-32768	K
SMS0K520	SCAL2TEMP	-32768	K
SMS1K520	SCAL4TEMP	-32768	K
SMS2K520	SCALTEMP	-32768	K
SMFAK520	SMECIFTEMP	-32768	K
SMFBK520	SMECTEMP	-32768	K
SMFCK520	BSMTEMP	-32768	K
SMK0K520	SUBKTEMP	32747	K
SMKEV520	SCUTHTREF	1.2298	V
SMKFV520	SCUTHTGND	-0.000459	V
SM_0X520	PLIABITSTAT	00000000	HEX
SM_1X520	SLIABITSTAT	00000000	HEX
SM_2X520	MCUBITSTAT	00000000	HEX

@ 10:08:05
Changed from
+32767 to -32768.

Enter Start Date|Time:	11/02/08	10:08	

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

Version	2.3
Date	28th August 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

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-FUNC-SCU-06-P.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to SCU_AC_Therm**				ok - LG
3	A few seconds later record the value of parameter	SUBKSTAT	0/1/1	1	OK - SVH

Enter Date/Time:	11/02/08	11:09	Sign Off	TC: LG	PA:

Enter Start Date|Time:	11/02/08	10:09	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
	SUBKSTAT				
4	If the instrument is at He II temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~1.7K	N/A	
5	If the instrument is at He I temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~4K	N/A	
6	If the instrument is warm: **Configure the SFT PARAMETERS display to show the RAW value of SCU AC thermometry channel.** Only record the RAW value of SCU AC thermometry channel if it indicates an open circuit. **Open Circuit Criterion:** **RAW reading in the range [0, -100]**	SUBKTEMP	—	OK. 32749.	OK-SNH
Test Result (Pass/Fail):					

Enter Start Date|Time:	11/02/08	10:11	

7.2.3.4 Procedure SPIRE-FM-SFT-FUNC-SCU-07-P

Version	2.2
Date	2nd January 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
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	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-SFT-FUNC-SCU-07-P.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to Cooler_Htr_Chk**	BBFULLTYPE	Cooler_Htr_Chk	OK	OK - SWH

Enter Date/Time:	11/02/08	10:12	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:12	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
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	324, mV	OK - SNH
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	324, mV	OK - SNH
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	8.854 V	OK - SNH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	10:17	Sign Off	TC:	PA:

Enter Start Date|Time:	11.02.08		

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

Version	2.3
Date	28th August 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
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	3 minutes
Pass/Fail Criteria	PCAL voltage and current agree with expected values

Enter Start Date|Time:	11/02/08	10:17	

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-SFT-FUNC-SCU-04-P.tcl **The expected values during the test should be monitored when parameter BBFULLTYPE in the SFT 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 0.0/0.026/0.0 PCAL_Check	0.1 mA 0.026 V PCAL_Check	
Test Result (Pass/Fail):					

Enter Start Date|Time:	11/02/08	11:26	

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

Version	2.3
Date	28th 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
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	5 minutes
Pass/Fail criteria	SCAL2 and SCAL4 voltage and currents agree with expected 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-SFT-FUNC-SCU-05-P.tcl	—	—	—	
2	**Wait for the parameter BBFULLTYPE to get set to SCAL4_Check**	BBFULLTYPE	SCAL4_Check	OK	OK-SNH

Enter Date/Time:	11.02.08	11:27	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:27	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
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	0.10mA 0.05V.	OK – SNH
4	**Wait for the parameter BBFULLTYPE to get set to SCAL2_Check**	BBFULLTYPE	SCAL2_Check		OK – SNH
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 mA 0.05V.	OK – SNH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	10:28	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:28	

7.2.3.7 Procedure SPIRE-FM-SFT-FUNC-MCU-01-P

Version	2.3
Date	28th August 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.
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	5 minutes
Pass/Fail criteria	MCU voltages and board temperatures 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-SFT-FUNC-MCU-01-P.tcl	—	—	—	—
2	Check that the MCU is booted up successfully	MCUBITSTAT	0/1/1	1/1	OK-SVH

Enter Date/Time:	11/02/08	10:29	Sign Off	TC:	PA:

Enter Start Date|Time:	11.02|08	10:29	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
3	Check MCU HK parameter values and ensure that the values are refreshing	MCUP5V MCUP14V MCUM14V MCUP15V MCUM15V MCUMACTEMP MCUSMECTEMP MCUBSMTEMP	~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V ~ 15.0 ± 0.5V ~ -15.0 ± 0.7V ~300K ~300K ~300K	5.01 V 14.15 V -14.46V 15.54 V -15.63 V 291.66 296.86 296.45	OK-SVH
Test Result (Pass/Fail):					

Enter Start Date|Time:	11/02/08	10:31	

7.2.3.8 Procedure: SPIRE-FM-SFT-FUNC-MCU-02-P

Version	2.2
Date	2nd January 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.
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	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-SFT-FUNC-MCU-02-P.tcl	MCUFRAMECNT	**FM** : 0/297	— 0/297	— OK - SNB
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	10:33	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:33	

7.2.3.9 Procedure SPIRE-FM-SFT-FUNC-BSM-01-P

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT PARAMETERS display is selected on the CCS
Duration	3 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-SFT-FUNC-BSM-01-P.tcl	—	—	—	—
2	Check that the Chop and Jiggle sensors have switched on	CHOPSENSPWR JIGGSENSPWR	0/1/1 0/1/1	1/1 1/1	OK - SWH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	10:34	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:34	

7.2.3.10 Procedure SPIRE-FM-SFT-BSM-OFF-P

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT 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-SFT-BSM-OFF-P.tcl	—	—	—	—
2	Check that the power to the BSM sensors is switched off	CHOPSENSPWR JIGGSENSPWR	1/-/0 1/-/0	1 | 0 1 | 0	OK-SAM
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	10:35	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:35	

7.2.3.11 Procedure SPIRE-FM-SFT-FUNC-SMEC-01-P

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR 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-SFT-FUNC-SMEC-01-P.tcl	—	—	—	—
2	Check that power to the SMEC LED and LVDT sensor is on	SMECENCPWR SMECLVDTPWR	0/-/1 0/-/1	0 / 1 0 / 1	OK - SWA
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	10:36	Sign Off	TC:		PA:	

Enter Start Date|Time:	11/02/08	10:37	

7.2.3.12 Procedure SPIRE-FM-SFT-SMEC-OFF-P

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR 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-SFT-SMEC-OFF-P.tcl	—	—	—	—
2	Check that the power to the SMEC sensors is switched off	SMECENCPWR SMECLVDTPWR	1/-/0 1/-/0	1/0 1/0	OK - CMH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	10:58	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:39	

7.2.3.13 Procedure SPIRE-FM-SFT-FUNC-DCU-01-P

Version	2.2
Date	2nd January 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
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	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-SFT-FUNC-DCU-01-P.tcl	DCUFRAMECNT	0/700	0/100	SPR-162
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	10:42	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:43	

7.2.3.14 Procedure SPIRE-FM-SFT-FUNC-DCU-04-PHOT-P

Version	2.4
Date	10th Sept 2007
Purpose	Photometer LIAs PRIME 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. Photometer LIAs are ON
Constraints	• SPIRE DRCU PRIME is switched ON • Photometer LIAs are OFF • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • DCU PARAMETERS & SFT PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified Photometer LIA HK parameters show expected ON values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-FUNC-DCU-04-PHOT-P.tcl	PLIABITSTAT	0/1/1	0/1	OK – SNH

Enter Date/Time:	11/02/08	✓	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:45	

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
2	Check Photometer LIA HK parameter values and ensure that the values are refreshing	PLIAP5V PLIAP9V PLIAM9V	0.0/-/ 5.2 ± 0.2V 0.0/-/ 11.5 ± 0.5V 0.0/-/-11.5 ± 0.5V	5.23 V 11.58V -11.58V.	OK - SVH
3	**On the DCU PARAMETERS display check that the LIA temperatures are slowly warming up.** At switch-on it is possible that some of the LIA temperatures will be in soft or even hard limits. No action is required.	LIAP1TEMP to LIAP9TEMP	~ 290-300 K	All temps ≈ 294K.	OK - SVH
4	**Wait for ~3 minutes before continuing with the SFTs**	—	—	—	—
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	✓	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	11:49	

7.2.3.15 Procedure SPIRE-FM-SFT-PLIA-OFF-P

Version	2.4
Date	10th Sept 2007
Purpose	Photometer LIAs 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. Photometer LIAs 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. Photometer LIAs are OFF
Constraints	• SPIRE DRCU PRIME is switched ON • Photometer LIAs are 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	Specified Photometer LIA HK parameters show expected OFF values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-PLIA-OFF-P.tcl	PLIABITSTAT	1/-/0	1/0	OK - SNH
2	Check Photometer LIA HK parameter values	PLIAP5V PLIAP9V PLIAM9V	5.2 ± 0.2V/-/0.0 11.5 ± 0.5V/-/0.0 - 11.5 ± 0.5V/-/0.0	0.25 0.016 0.015	OK - SNH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	11:50	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:50	

7.2.3.16 Procedure SPIRE-FM-SFT-FUNC-DCU-04-SPEC-P

Version	2.4
Date	10th Sept 2007
Purpose	Spectrometer LIAs PRIME 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. Spectrometer LIAs are ON
Constraints	• SPIRE DRCU PRIME is switched ON • Spectrometer LIAs are OFF • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • SFT PARAMETERS & DCU PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified Spectrometer LIA HK parameters show expected ON values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-FUNC-DCU-04-SPEC-P.tcl	SLIABITSTAT	0/1/1	0/1	OK - SNH.

Enter Date/Time:	11/02/08	10:51	Sign Off	TC:	PA:

Enter Start Date|Time:	1|02|08	10:51.	

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
2	Check Spectrometer LIA HK parameter values and ensure that the values are refreshing	SLIAP5V SLIAP9V SLIAM9V	0.0/-/ 5.2 ± 0.2V 0.0/-/ 11.5 ± 0.5V 0.0/-/-11.5 ± 0.5V	5.25V 11.58V -11.56V.	OK-SNH,
3	**On the DCU PARAMETERS display check that the LIA temperatures are slowly warming up.** At switch-on it is possible that some of the LIA temperatures will be in soft or even hard limits. No action is required.	LIAS1TEMP to LIAS3TEMP	~ 290-300 K	All temps ≤ 295K	OK-SNH
4	**Wait for ~3 minutes before continuing with the SFTs**	—	—	—	—
Test Result (Pass/Fail):					

Enter Start Date|Time:	11/02/08	10:56	

7.2.3.17 Procedure SPIRE-FM-SFT-SLIA-OFF-P

Version	2.4
Date	10th Sept 2007
Purpose	Spectrometer LIAs 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. Spectrometer LIAs 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. Spectrometer LIAs are OFF
Constraints	• SPIRE DRCU PRIME is switched ON • Spectrometer LIAs are 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	Specified Spectrometer LIA HK parameters show expected OFF values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-SLIA-OFF-P.tcl	SLIABITSTAT	1/-/0	1/0	OK - SNH

Enter Date/Time:	11/02/08	10:56	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:56	

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
2	Check Photometer LIA HK parameter values	SLIAP5V SLIAP9V SLIAM9V	5.2 ± 0.2V/-/0.0 11.5 ± 0.5V/-/0.0 -11.5 ± 0.5V/-/0.0	0.093 V 0.016 V 0.015 V	OK – SW4
Test Result (Pass/Fail): ✓					

Enter Date/Time:	11/02/08	10:58	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	10:57	

7.2.3.18 Procedure SPIRE-FM-SFT-FUNC-MCU-OFF-P

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail criteria	Specified MCU HK Parameter shows expected value.

SNH 6 1

type 5/4 event: ALARM_LSMCU_DEAD is expected

Procedure Steps:

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

SNH 6 1

Enter Date/Time:	11/02/08	10:58	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	11:06	

7.2.3.19 Procedure SPIRE-FM-SFT-FUNC-SCU-OFF-P

Version	2.3
Date	28th August 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
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	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-SFT-FUNC-SCU-OFF-P.tcl	—	—	—	—
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	FFFF/-/0	FFFF / 0	OK - SNH
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0	1 / 0	OK - SNH
Test Result (Pass/Fail):					

SNH 6/1

Enter Date/Time:	11.02.08	12:09	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	11:09	

7.2.4 *Switch Off DRCU & DPU PRIME*

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
1.	From the HPCCS test conductor console start the test script to power OFF SPIRE Prime from REDY: **S102999SCVT007_ASDSFTSPIR_PWR_OFF_P**	OK	OK		SWH	
2.	On HPCCS when prompted: "SPIRE Switch OFF for SFT related tests in any conditions - Select NO to abort TS if not correct"	YES	YES		SWH	
3.	If in any doubt about the script being executed **NO** should be selected to abort the script. Before restarting consult the relevant instrument support engineer to confirm the correct script to be used for the test in question.		N/A			
4.	If **YES** is selected the test script will go on to automatically power off all SPIRE warm units.		ok		✓	

Enter Date/Time:	11/02/08	11:10	Sign Off	TC: ✓	PA:

Enter Start Date|Time:	11/02/08	11:10	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
5.	During Switch OFF of SPIRE the following (5,1) and (5,4) event messages on APID 1280 are expected and do not indicate a problem: a) EVID 1313 No_MCU_Response_Error b) EVID 21773 ALARM_LSMCU_DEAD		ok		✓	
6.	On HPCCS when prompted: "Check Telemetry No Longer Updating - OK to continue" Check that parameters: THSK TM2N	 Not refreshing Not incrementing	 OK	**AND: SA_1_559**	 SWH	
7.	Select OK to continue	OK	OK		SWH	
8.	On HPCCS when all autonomous actions have been completed by the power on script **S102999SCVT007_ASDSFTSPIR_PWR_OFF_P** it will prompt: "Bus profile left as SPIRE PRIME, change manually after if required - OK to continue"		ok		✓	

Enter Date/Time:	11/02/08	11:15	Sign Off	TC: ✓	PA:

Enter Start Date|Time:	11/02/08	11:15	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
9.	Select OK to continue	OK	OK		SMH	
10.	On HPCCS stop Packet History displays for the following APIDs:1280,1282	OK	OK		SMH	
11.	**SPIRE OFF**		OK		✓	

Enter Date/Time:	11/02/08	11:15	Sign Off	TC: ✓	PA:

Enter Start Date|Time:			

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

PVSA: signed due to unavailability in DB

Enter Date/Time:			Sign Off	TC:	PA:

Enter Start Date|Time:			

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
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):					

Enter Start Date|Time:	11/02/08	13:22	

7.2.6 *Switch On SPIRE REDUNDANT DPU & DRCU*

During power on of SPIRE a number of soft/hard OOLs are reported due to the sequential switch on of the units. This is expected and will clear when SPIRE is in REDY mode. When in REDY mode one parameter remains OOL (soft) namely SMD2V505 this is also expected.

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
1.	On HPCCS start Packet History displays for the following APIDs:1281,1283	OK	OK	~~OK~~	SWH	
2.	From the HPCCS test conductor console start the test script to power SPIRE Prime to REDY: **S102999SCVT006_ASDSFTSPIR_PWR_ON_R**		ok		LG	
3.	On HPCCS when prompted: "SPIRE Switch ON for ~~IST Debug only in warm~~ conditions - Select NO to abort TS if not correct"	YES	YES		SWH	

SWH LG

SFT related tests in engineering

Enter Date/Time:	11/02/08	1324	Sign Off	TC: LG	PA:

Enter Start Date|Time:	11/02/08	13:24	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
4.	If in any doubt about the script being executed **NO** should be selected to abort the script. Before restarting consult the relevant instrument support engineer to confirm the correct script to be used for the test in question.		N/A		SWH.	
5.	If **YES** is selected the test script will go on to automatically power on all SPIRE warm units, force boot the DPU ASW and configure the instrument to REDY (Standby mode).		ok		[illegible]	
6.	On HPCCS when prompted: "Check Telemetry Updating Correctly and OBT is Consistent with CDMU - OK to continue"	OK	OK		SWH	
7.	If I-EGSE connected when prompted on HPCCS, perform check requested: "Check IEGSE Time Consistent - OK to continue when RAL confirm"	OK	OK		SWH	
8.	On HPCCS when prompted: "Check Telemetry No Longer Updating - OK to continue" Check that parameters:			**AND: SA_1_559**		

Enter Date/Time:	11/02/08		Sign Off	TC: [illegible]	PA: [illegible]

Enter Start Date|Time:	11/02/08	13:31	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
	THSK TM2N	Not refreshing Not incrementing	OK		SVH	
9.	Select OK to continue	OK	OK		SVH	
10.	On HPCCS when prompted: "Check Telemetry Updating Correctly - OK to continue" Check that parameters: THSK TM2N	 Refreshing @ 1Hz Incrementing by 1 @ 1Hz	OK	**AND: SA_1_559**	SVH	
11.	Select OK to continue	OK	OK.		SVH	
12.	On HPCCS when all autonomous actions have been completed by the power on script **S102999SCVT006_ASDSFTSPIR_PWR_ON_R** it will prompt: "Set Bus Profile Back to Original Setting?" Select NO	NO	NO		SVH	

Enter Date/Time:	11/02/08		Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/09.	13:36	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
13.	At the prompt: "Bus Profile left unchanged" Select OK to continue	OK	OK		SWH	
14.	Verify HK TM packets are being received on APIDs 1281 & 1283		ok		lo	
15.	MODE parameter is set to "~~REDY~~" mode (RAW value 0x0200) DECU ON	SM00M500 = 0x0200 (~~REDY~~) DECU ON	DECU ON	**AND: SA_1_559**	SWH	
16.	**SPIRE powered and in ~~REDY~~ mode** DECU ON.		ok		lo	

SWH lo

Enter Start Date|Time:	11/02/08 -	13:37	

7.2.7 *Short Functional Tests - Redundant*

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

Version	2.3
Date	28th August 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
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	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-SFT-FUNC-SCU-01-R.tcl	SCUFRAMECNT TM5N	0/31 0x3FFF/1	0/31 3FFF/1	OK - SNH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	13:39	Sign Off	TC: 6	PA:

Enter Start Date|Time:	11.02.08	13:40	

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

Version	2.3
Date	28th August 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-SFT-FUNC-SCU-03-R.tcl	—	—	—	—

Enter Date/Time:			Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	13:340	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
2	**Wait for the parameter BBFULLTYPE to get set to SCU_DC_Therm**				ok - LC
3	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0/FFFF/FFFF	0/FFFF	OK - SNM
4	If the instrument is at He II temperatures check the values of SCU DC thermometry channels.		(All Values TBC)	N/A	
		PUMPHTRTEMP	-/~4.6K		
		PUMPHSTEMP	-/~3.0K		
		EVAPHSTEMP	-/~3.0K		
		SHUNTTEMP	-/~1.7K		
		EMCFILTEMP	-/~4.6K		
		SL0TEMP	-/~1.7K		
		PL0TEMP	-/~1.7K		
		OPTTEMP	-/~4.6K		
		BAFTEMP	-/~4.6K		
		BSMIFTEMP	-/~4.5K		
		SCAL2TEMP	-/~4.6K		
		SCAL4TEMP	-/~4.6K		
		SCALTEMP	-/~4.6K		
		SMECIFTEMP	-/~4.6K		
		SMECTEMP	-/~4.6K		

Enter Date/Time:			Sign Off	TC: LC	PA:

Enter Start Date|Time:	11/02/08	13:41	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
		BSMTEMP	-/~4.5K	N/A	
5	If the instrument is at He I temperatures check the values of SCU DC thermometry channels.		(All Values TBC)	N/A	
		PUMPHTRTEMP	~4.2K		
		PUMPHSTEMP	~4.4K		
		EVAPHSTEMP	~4.3K		
		SHUNTTEMP	~4.2K		
		EMCFILTEMP	~4.8K		
		SL0TEMP	~4.2K		
		PL0TEMP	~4.2K		
		OPTTEMP	~4.8K		
		BAFTEMP	~4.8K		
		BSMIFTEMP	~4.7K		
		SCAL2TEMP	~4.8K		
		SCAL4TEMP	~4.8K		
		SCALTEMP	~4.8K		
		SMECIFTEMP	~4.7K		
		SMECTEMP	~4.7K		
		BSMTEMP	~4.8K		
6	If the instrument is warm:	PUMPHTRTEMP	—		
		PUMPHSTEMP	—		

Enter Date/Time:	11/02/08	13:41.	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	13:41	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
	Configure the SFT PARAMETERS display to show the RAW values of SCU DC thermometry channels. Record the RAW 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]**	EVAPHSTEMP SHUNTTEMP EMCFILTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	— — — — — — — — — — — — — —	All = -32768 except EMCFILTEMP -30429	Ok - SWH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	13:43	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	13:48	

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

Version	2.3
Date	28th August 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

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-FUNC-SCU-06-R.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to SCU_AC_Therm**				ok - lb

Enter Date/Time:	11/02/08		Sign Off	TC: lb	PA:

Enter Start Date|Time:	11/02/08	13:48	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	0/1/1	0 / 1	OK - SVH
4	If the instrument is at He II temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~1.7K	N/A	
5	If the instrument is at He I temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~4K	N/A	
6	If the instrument is warm: **Configure the SFT PARAMETERS display to show the RAW value of SCU AC thermometry channel.** Only record the RAW value of SCU AC thermometry channel if it indicates an open circuit. **Open Circuit Criterion:** **RAW reading in the range [0, -100]**	SUBKTEMP	— OK 32767		OK - SVH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08		Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	13:49	

7.2.7.4 Procedure SPIRE-FM-SFT-FUNC-SCU-07-R

Version	2.2
Date	2nd January 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
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	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

Enter Date/Time:	11/02/08	13:49	Sign Off	TC:	PA:

Enter Start Date|Time:	11\02\08	13:49	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-FUNC-SCU-07-R.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to Cooler_Htr_Chk**	BBFULLTYPE	Cooler_Htr_Chk		OK - SNH
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	0/324mV	OK - SNH
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	0/325mV	OK - SNH
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	0/8.85V.	OK - SNH
Test Result (Pass/Fail):					

Enter Start Date|Time:	11/02/08	13:53	

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

Version	2.3
Date	28th August 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
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	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-SFT-FUNC-SCU-04-R.tcl **The expected values during the test should be monitored when parameter BBFULLTYPE in the SFT 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 0.0/0.026/0.0 PCAL_Check	0/0.1/0 mA 0/0.02/0 V OK	OK-SNA OK-SNA
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	13:54	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	13:54	

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

Version	2.2
Date	2nd January 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
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	5 minutes
Pass/Fail criteria	SCAL2 and SCAL4 voltage and currents agree with expected 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-SFT-FUNC-SCU-05-R.tcl	—	—	—	
2	**Wait for the parameter BBFULLTYPE to get set to SCAL4_Check**	BBFULLTYPE	SCAL4_Check	SCAL4 Check	OK - SN4

Enter Date/Time:	4/02/08	13:55	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	13:55	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
3	A few seconds later record the value of parameters SCAL4CURR and SCAL4V *These parameters are set back to 0 after ~30 seconds*	SCAL4CURR – mA SCAL4V – V	0.0/0.10/0.0 0.0/0.05/0.0	0/0.1/0.00 0/0.05/0.00	OK - SN A
4	**Wait for the parameter BBFULLTYPE to get set to SCAL2_Check**	BBFULLTYPE	SCAL2_Check	SCAL2 - Check.	OK - SN A
5	A few seconds later record the values of parameters SCAL2CURR and SCAL2V *These parameters are set back to 0 after ~30 seconds*	SCAL2CURR – mA SCAL2V – V	0.0/0.10/0.0 0.0/0.05/0.0	0/0.1/0 0/0.05/0	OK - SN 4
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	13:57	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	13:57	

7.2.7.7 Procedure SPIRE-FM-SFT-FUNC-MCU-01-R

Version	2.3
Date	28th August 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.
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	5 minutes
Pass/Fail criteria	MCU voltages and board temperatures 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-SFT-FUNC-MCU-01-R.tcl	—	—	—	—
2	Check that the MCU is booted up successfully	MCUBITSTAT	0/1/1	0/1	OK- SNH

Enter Date/Time:	11/02/08	13:58	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	13:58	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
3	Check MCU HK parameter values and ensure that the values are refreshing	MCUP5V MCUP14V MCUM14V MCUP15V MCUM15V MCUMACTEMP MCUSMECTEMP MCUBSMTEMP	~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V ~ 15.0 ± 0.5V ~ -15.0 ± 0.7V ~300K ~300K ~300K	5.00 V 14.13 V -14.19V 15.50 V -15.61 V -292 K -296 K -296 K	OK-SNH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	14:00	Sign Off	TC:	PA:

Enter Start Date|Time:	4/02/08	14:00	

7.2.7.8 Procedure: SPIRE-FM-SFT-FUNC-MCU-02-R

Version	2.2
Date	2nd January 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.
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	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-SFT-FUNC-MCU-02-R.tcl	MCUFRAMECNT	**FM** : 0/297	— 0/297	— OK - SNH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	14:03	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:03	

7.2.7.9 Procedure SPIRE-FM-SFT-FUNC-BSM-01-R

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT PARAMETERS display is selected on the CCS
Duration	3 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-SFT-FUNC-BSM-01-R.tcl	—	—	—	—
2	Check that the Chop and Jiggle sensors have switched on	CHOPSENSPWR JIGGSENSPWR	0/1/1 0/1/1	0/1 0/1	OK-SWH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	14:07	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:08	

7.2.7.10 Procedure SPIRE-FM-SFT-BSM-OFF-R

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT 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-SFT-BSM-OFF-R.tcl	—	—	—	—
2	Check that the power to the BSM sensors is switched off	CHOPSENSPWR JIGGSENSPWR	1/-/0 1/-/0	1/0 1/0	Ok - SNH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	14:09	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:09	

7.2.7.11 Procedure SPIRE-FM-SFT-FUNC-SMEC-01-R

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR 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-SFT-FUNC-SMEC-01-R.tcl	—	—	—	—
2	Check that power to the SMEC LED and LVDT sensor is on	SMECENCPWR SMECLVDTPWR	0/-/1 0/-/1	0/1 0/1	OK-SVH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	14:11	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:11	

7.2.7.12 Procedure SPIRE-FM-SFT-SMEC-OFF-R

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR 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-SFT-SMEC-OFF-R.tcl	—	—	—	—
2	Check that the power to the SMEC sensors is switched off	SMECENCPWR SMECLVDTPWR	1/-/0 1/-/0	1/0 1/0	OK - SNF
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	14:12	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:13	

7.2.7.13 Procedure SPIRE-FM-SFT-FUNC-DCU-01-R

Version	2.2
Date	2nd January 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
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	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-SFT-FUNC-DCU-01-R.tcl	DCUFRAMECNT	0/700	01.700	ok - SVH
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	14:16	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:16	

7.2.7.14 Procedure SPIRE-FM-SFT-FUNC-DCU-04-PHOT-R

Version	2.4
Date	10th Sept 2007
Purpose	Photometer LIAs REDUNDANT 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. Photometer LIAs are ON
Constraints	• SPIRE DRCU REDUNDANT is switched ON • Photometer LIAs are OFF • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • SFT PARAMETERS & DCU PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified Photometer LIA HK parameters show expected ON values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-FUNC-DCU-04-PHOT-R.tcl	PLIABITSTAT	0/1/1	0/1	Ok-SMH

Enter Date/Time:	11/2/08	14:18	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:18	

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
2	Check Photometer LIA HK parameter values and ensure that the values are refreshing	PLIAP5V PLIAP9V PLIAM9V	0.0-/ 5.2 ± 0.2V 0.0/-/ 11.5 ± 0.5V 0.0/-/-11.5 ± 0.5V	5.24 V 11.59V -11.58V	OK- SN4
3	**On the DCU PARAMETERS display check that the LIA temperatures are slowly warming up.** At switch-on it is possible that some of the LIA temperatures will be in soft or even hard limits. No action is required.	LIAP1TEMP to LIAP9TEMP	~ 290-300 K	All ≥ 294 K.	OK-SN4
4	**Wait for ~3 minutes before continuing with the SFTs**	—	—	—	—
Test Result (Pass/Fail):					

Enter Start Date|Time:	11/02/08	14:21	

7.2.7.15 Procedure SPIRE-FM-SFT-PLIA-OFF-R

Version	2.4
Date	10th Sept 2007
Purpose	Photometer LIAs 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. Photometer LIAs 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. Photometer LIAs are OFF
Constraints	• SPIRE DRCU REDUNDANT is switched ON • Photometer LIAs are 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	Specified Photometer LIA HK parameters show expected OFF values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-PLIA-OFF-R.tcl	PLIABITSTAT	1/-/0	1/0	OK - SNM
2	Check Photometer LIA HK parameter values	PLIAP5V PLIAP9V PLIAM9V	5.2 ± 0.2V/-/0.0 11.5 ± 0.5V/-/0.0 -11.5 ± 0.5V/-/0.0	5.24V 11.59V -11.59V	OK - SNM
Test Result (Pass/Fail):					

Enter Date/Time:	11/02/08	14:23	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:24	

7.2.7.16 Procedure SPIRE-FM-SFT-FUNC-DCU-04-SPEC-R

Version	2.4
Date	10th Sept 2007
Purpose	Spectrometer LIAs REDUNDANT 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. Spectrometer LIAs are ON
Constraints	• SPIRE DRCU REDUNDANT is switched ON • Spectrometer LIAs are OFF • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • SFT PARAMETERS & DCU PARAMETERS displays are selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified Spectrometer LIA HK parameters show expected ON values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-FUNC-DCU-04-SPEC-R.tcl	SLIABITSTAT	0/1/1	0/1	OK-SVH

Enter Date/Time:	11/02/08	14:25	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:25	

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
2	Check Spectrometer LIA HK parameter values and ensure that the values are refreshing	SLIAP5V SLIAP9V SLIAM9V	0.0/-/ 5.2 ± 0.2V 0.0/-/ 11.5 ± 0.5V 0.0/-/-11.5 ± 0.5V	5.25 V 11.59V -11.57V.	OK-SNH
3	**On the DCU PARAMETERS display check that the LIA temperatures are slowly warming up.** At switch-on it is possible that some of the LIA temperatures will be in soft or even hard limits. No action is required.	LIAS1TEMP to LIAS3TEMP	~ 290-300 K	~295 K ~ 295 K ~ 296 K	OK-SNH
4	**Wait for ~3 minutes before continuing with the SFTs**	—	—	—	—
Test Result (Pass/Fail):	pass				

Enter Date/Time:	11/02/08	14:28	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:29	

7.2.7.17 Procedure SPIRE-FM-SFT-SLIA-OFF-R

Version	2.4
Date	10th Sept 2007
Purpose	Spectrometer LIAs 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. Spectrometer LIAs 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. Spectrometer LIAs are OFF
Constraints	• SPIRE DRCU REDUNDANT is switched ON • Spectrometer LIAs are 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	Specified Spectrometer LIA HK parameters show expected OFF values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-SLIA-OFF-R.tcl	SLIABITSTAT	1/-/0	1/0	OK - SNM
2	Check Photometer LIA HK parameter values	SLIAP5V SLIAP9V SLIAM9V	5.2 ± 0.2V/-/0.0 11.5 ± 0.5V/-/0.0 11.5 ± 0.5V/-/0.0	5.25/0.0 11.59/0.0 -11.57/0.0	OK - SNM
Test Result (Pass/Fail): pass					

SNM/60/1

Enter Date/Time:	11/02/08	14:31	Sign Off	TC: 60	PA:

Enter Start Date|Time:	11/02/08	14:31	

7.2.7.18 Procedure SPIRE-FM-SFT-FUNC-MCU-OFF-R

Version	2.3
Date	28th August 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.
Constraints	• 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 • SFT PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail criteria	Specified MCU HK Parameter shows expected value.

Procedure Steps:

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

Enter Date/Time:	11/02/08	14:32	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:32	

7.2.7.19 Procedure SPIRE-FM-SFT-FUNC-SCU-OFF-R

Version	2.3
Date	28th August 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
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	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-SFT-~~FUNC~~-SCU-OFF-R.tcl	—	—	—	—
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	FFFF/-/0	FFFF/0	OK-SNH
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0	1/0	OK-SNH
Test Result (Pass/Fail): pass					

Enter Date/Time:	11/02/08	14:33	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:34	

7.2.8 *Switch Off DRCU & DPU REDUNDANT*

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
1.	From the HPCCS test conductor console start the test script to power OFF SPIRE Prime from REDY: **S102999SCVT00*_ASDSFTSPIR_PWR_OFF_R**	OK	OK		SNH	
2.	On HPCCS when prompted: "SPIRE Switch OFF for SFT related tests in any conditions - Select NO to abort TS if not correct"	YES	YES		SNH	
3.	If in any doubt about the script being executed **NO** should be selected to abort the script. Before restarting consult the relevant instrument support engineer to confirm the correct script to be used for the test in question.		N/A		SNH	
4.	If **YES** is selected the test script will go on to automatically power off all SPIRE warm units.		OK.		SNH	

Enter Date/Time:	11/02/08	14:35	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:35	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
5.	During Switch OFF of SPIRE the following (5,1) and (5,4) event messages on APID 1280 are expected and do not indicate a problem: c) EVID 1313 No_MCU_Response_Error d) EVID 21773 ALARM_LSMCU_DEAD		OK		SNH	
6.	On HPCCS when prompted: "Check Telemetry No Longer Updating - OK to continue" Check that parameters: THSK TM2N	 Not refreshing Not incrementing	 OK	**AND: SA_1_559**	SNH	
7.	Select OK to continue	OK	OK		SNH	
8.	On HPCCS when all autonomous actions have been completed by the power on script **S102999SCVT008_ASDSFTSPIR_PWR_OFF_R** it will prompt: "Bus profile left as SPIRE PRIME, change manually after if required - OK to continue"		OK		SNH	

Enter Date/Time:	11/02/08	14:40	Sign Off	TC:	PA:

Enter Start Date|Time:	11/02/08	14:40	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
9.	Select OK to continue	OK	OK		SVH	
10.	On HPCCS stop Packet History displays for the following APIDs:1281,1283	OK	OK		SVH	
11.	**SPIRE OFF**		ok		to	

Enter Date/Time:	11/02/08	14:41	Sign Off	TC: to	PA:

Enter Start Date|Time:			

7.2.9 Procedure SPIRE-FM-SFT-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

PVSA

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):					

Enter Date/Time:			Sign Off	TC:	PA:

Enter Start Date|Time:			

7.2.10 Satellite & EGSE Switch Off

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remark	P	N
	Satellite & EGSE Switch Off						
	Initial Conditions: Nominal & Redundant SPIRE warm units OFF						
1	From HPCCS Test Conductor console issue command to disconnect from SPIRE I-EGSE **disconnect HSPIREEGSE**	OK			Steps 10.1-10.3 are only necessary if Steps 1.1, 1.3 to 1.7 were executed		
2	Confirm from HPCSS and SPIRE I-EGSE that the disconnection was successful	OK					
3	If required Switch OFF I-EGSE i.a.w. AD 5						
4	Switch OFF Satellite/SVM, HPCCS and SCOEs i.a.w. procedure AD 2 Sections 7.7 to 7.11	OK					
5	Confirm both Satellite and EGSE powered down	OK					
	End Conditions: Satellite and EGSE OFF						
	END OF TEST						

Enter Start Date|Time:			

7.2.11 SPIRE SAFE Switch Off

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

Version	2.3
Date	10th Sept. 2007
Purpose	To switch OFF the SPIRE instrument if an anomaly should occur
Initial configuration	SPIRE can be in ANY configuration - Prime or Redundant - as specified in the procedure steps
Final configuration	SPIRE is OFF
Preconditions	• SPIRE FM DPU is electrically integrated with the Herschel Satellite • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	~5-8 minutes
Pass/Fail Criteria	SPIRE is OFF. All instrument subsystems are completely powered OFF.

Note:
All HK parameters relevant to this procedure can be located on the FUNCTIONAL TEST PARAMETERS CCS display. The exact name of the script to be executed at each step depends on whether the Prime or Redundant instrument is switched on.

Enter Start Date|Time:			

Procedure Steps:

Step	Description	Parameter - Unit	Value	Actual value before/ after
1	**Check to see if the Photometer LIAs are on** If PLIABITSTAT=1 then execute SPIRE-FM-SFT-PLIA-OFF-<P/R>.tcl	PLIABITSTAT	**0 or 1**	
2	**Check to see if the Spectrometer LIAs are on** If SLIABITSTAT=1 then execute SPIRE-FM-SFT-SLIA-OFF-<P/R>.tcl	SLIABITSTAT	**0 or 1**	
3	**Check to see if the BSM is on** If CHOPSENSPWR=1 or JIGGSENSPWR=1, then execute SPIRE-FM-SFT-BSM-OFF-<P/R>.tcl	CHOPSENSPWR JIGGSENSPWR	**0 or 1** **0 or 1**	
4	**Check to see if the SMEC is on** If SMECENCPWR=1 or SMECLVDTPWR=1, then execute SPIRE-FM-SFT-SMEC-OFF-<P/R>.tcl	SMECENCPWR SMECLVDTPWR	**0 or 1** **0 or 1**	
5	**Check to see if the MCU is on** If MCUBITSTAT=1 then execute SPIRE-FM-SFT-MCU-OFF-<P/R>.tcl	MCUBITSTAT	**0 or 1**	

Enter Date/Time:			Sign Off	TC:	PA:

Enter Start Date|Time:			

Step	Description	Parameter - Unit	Value	Actual value before/ after
6	**Check to see if the SCU DC/AC thermometry is on** If SUBKSTAT=1 or SCUTEMPSTAT≠0, then execute SPIRE-FM-SFT-SCU-OFF-<P/R>.tcl	SUBKSTAT SCUTEMPSTAT	**0 or 1** **≠ 0**	
7	If SPIRE PRIME powered execute Section 7.2.4	OK		
8	If SPIRE REDUNDANT powered execute Section 7.2.8	OK		

8 Summary Sheets

8.1 Procedure Variation Summary

	Test Change	Curr. No.: Date 11/02/08 Page 1 of	
Test designation SPIRE SFT (warm)	Test Procedure HP-2-ASED-TP-0212	Issue 1	Rev. —
Test step changed See Below	Reason for Change See Below		
PVS1: omit sections 7.2.5 & 7.2.9, due to unresolved NCR 3661, for LPU/LCU current parameters for WMA07565 & WMA107565. SWA			
Prepared by: S. HAMER	Resp. Test Leader D. Clegg	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.
NCR-3954	DRCU current higher than expected during Switch off	11/02/08	OPEN	
NCR-3955	OOL reported on 2 SPIRE parameters	11/02/08	OPEN	
NCR-3661	Not fully implemented	11/02/08	UPDATE	
NCR-3698	Recurrence	11/02/08	UPDATE	
NCR-3725	Not fully corrected.	11/02/08	UPDATE	
NCR-	Packets containing PCDU currents. for ICL25826 not defined.	12/02/08	OPEN	
NCR-3633	Unknown TM (21,4) Packets	11/02/08	TO BE CLOSED	
NCR-3631.	Will occur - procedures include warning	11/02/08	OPEN	

Table 8.2-1: Non-Conformance Record Sheet

8.3 Sign-off Sheet

	Date	Signature
Test ~~Manager~~ DIRECTOR	11/02/08	
~~Operator~~ TEST CONDUCTOR	11/02/08	
PA Responsible	11/02/08	
ESA Representative		

END OF DOCUMENT

	Name	Dep./Comp.		Name	Dep./Comp.
	Baldock Richard	FAE12	X	Sonn Nico	ASG51
	Barlage Bernhard	AED13		Steininger Eric	AED32
	Bayer Thomas	ASA42		Stiehle Hubert	AET32
	Brune Holger	ASA45	X	Stritter Rene	AED11
	Chen Bing	HE Space		Suess Rudi	OTN/ASA44
	Edelhoff Dirk	AED2		Theunissen Martijn	DSSA
	Fehringer Alexander	ASG13	X	Vascotto Riccardo	HE Space
X	Fricke Wolfgang Dr.	AED 65		Wagner Klaus	ASG23
	Geiger Hermann	ASA42	X	Wietbrock Walter	AET12
	Grasl Andreas	OTN/ASA44		Wöhler Hans	ASG23
	Grasshoff Brigitte	AET12		Wössner Ulrich	ASE252
X	Hamer Simon	Terma		Zumstein Armin	ASQ42
	Hanka, Erhard	FI552			
	Hendrikse Jeffrey	HE Space			
X	Hendry David	Terma			
	Hengstler Reinhold	ASA42			
	Hinger Jürgen	ASG23			
X	Hohn Rüdiger	AED65			
	Hofmann Rolf	ASE252			
	Hopfgarten Michael	AED32			
	Huber Johann	ASA42			
	Hund Walter	ASE252			
	Idler Siegmund	AED312			
	Ivády von András	FAE12			
	Jahn Gerd Dr.	ASG23			
	Jolk Matthias	AET1	X	ESA/ESTEC	ESA
	Klenke Uwe	ASG72	X	Thales Alenia Space Cannes	TAS-F
X	Koelle Markus	ASA43	X	Thales Alenia Space Torino	TAS-I
X	Koppe Axel	AED312			
X	Kroeker Jürgen	AED65		**Instruments:**	
X	La Gioia Valentina	Terma		MPE (PACS)	MPE
	Lang Jürgen	ASE252	X	RAL (SPIRE)	RAL
	Langenstein Rolf	AED15		SRON (HIFI)	SRON
	Langfermann Michael	ASA41			
	Liberatore Danilo	Rhea			
X	Martin Olivier	ASA43		**Subcontractors:**	
X	Maukisch Jan	ASA43		Austrian Aerospace	AAE
X	Much Christoph	ASA43		Austrian Aerospace	AAEM
X	Müller Martin	ASA43		BOC Edwards	BOCE
	Pietroboni Karin	AED65		Dutch Space Solar Arrays	DSSA
	Platzer Wilhelm	AED2		EADS Astrium Sub-Subsyst. & Equipment	ASSE
	Reichle Konrad	ASA42		EADS CASA Espacio	CASA
	Runge Axel	OTN/ASA44		EADS CASA Espacio	ECAS
	Sauer Maximilian Dr.	AED65		European Test Services	ETS
	Schink Dietmar	AED32		Patria New Technologies Oy	PANT
	Schmidt Thomas	AED15		SENER Ingenieria SA	SEN
	Schweickert Gunn	ASG23		Thales Alenia Space, Antwerp	TAS-ETCA

6 Appendix 2: SPIRE FM WFT2 Test Set-up

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APPENDIX 2

Actual **SCOE cable connection (to be confirmed by AIT)**

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	LPS SCOE Cable Plugged ✓	
BDR2 AIT	SK01BJ12	PCDU	LPS SCOE Cable Plugged ✓	
SA Nom Power	SK01AJ01	PCDU	POWER SCOE Cable Plugged ✓	
SA Nom Power	SK01AJ02	PCDU	POWER SCOE Cable Plugged ✓	
SA Nom Power	SK01AJ03	PCDU	POWER SCOE Cable Plugged ✓	
SA Red Power	SK01AJ05	PCDU	POWER SCOE Cable Plugged ✓	
SA Red Power	SK01AJ06	PCDU	POWER SCOE Cable Plugged ✓	
SA Red Power	SK01AJ07	PCDU	POWER 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	Bus Monitor Cable Plugged ✓	
SKIN-02	DMS 1553 Bus_B	J02	CDMU	Bus Monitor Cable Plugged ✓	
SKIN-02	ACMS 1553 Bus_A	J03	ACC	ACMS SCOE Cable Plugged ✓	
SKIN-02	ACMS 1553 Bus_B	J04	ACC	ACMS SCOE Cable Plugged ✓	
SKIN-02	LV1/FCV 20N CMD S/A M	J05	ACC/RCS	ACMS SCOE Cable Plugged ✓	
SKIN-02	LV2/FCV 20N CMD S/A R	J06	ACC/RCS	ACMS SCOE Cable Plugged ✓	
SKIN-02	RCS Press/Tank Temp/PT Pwr	J07	ACC/PT&TH	ACMS SCOE Cable Plugged ✓	
SKIN-02	Thruster Temp M/LV1 Sts	J08	ACC/RCS	ACMS SCOE Cable Plugged ✓	
SKIN-02	CDMU and ACC EEPROM reprogramming input	J09	ACC/CDMU		Flight Cap SK02P09 Plugged ✓
SKIN-02	CDMU and ACC EEPROM reprogramming input	J10	ACC/CDMU		Flight Cap SK02P10 Plugged ✓
SKIN-02	Thruster Temp R/LV2 Sts	J11	ACC/RCS	ACMS SCOE Cable Plugged ✓	
SKIN-02	Thruster C/B Heaters M	J12	ACC/CBH	ACMS SCOE Cable Plugged ✓	
SKIN-02	Thruster C/B Heaters R	J13	ACC/CBH	ACMS SCOE Cable Plugged ✓	
SKIN-02	Str1/2 On/Off Cmd M/Str1 Sts	J14	ACC/STR-1		ACMS Flight Cap SK02P14 Plugged ✓
SKIN-02	Str1/2 On/Off Cmd R/Str2 Sts	J15	ACC/STR-2		ACMS Flight Cap SK02P15 Plugged ✓
SKIN-02	Gyro A On/Off Cmd	J16	ACC/GYRO-E1		ACMS Flight Cap ✓

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					SK02P16 Plugged
SKIN-02	Gyro B On/Off Cmd	J17	ACC/GYRO-E2		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		Plastic cap (See note1)
SKIN-03	Test point TC + protection jumper EPC2	SK03J02	XPND2/EPC2		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	RF SCOE LGA1 Plugged	LGA1 Anechoic Cap
	RF link for antenna LGA2	N/A	LGA2	RF SCOE LGA2 Plugged	LGA2 Anechoic Cap
	RF link for antenna MGA	N/A	MGA	RF SCOE 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		ACMS Flight Cap SK04P01 Plugged
SKIN-04	RWL2 Sgn	J02	ACC/RWL-2		ACMS Flight Cap SK04P02 Plugged
SKIN-04	RWL3 Sgn	J03	ACC/RWL-3		ACMS Flight Cap SK04P03 Plugged
SKIN-04	RWL4 Sgn	J04	ACC/RWL-4		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		ACMS Flight Cap
SKIN-05	CRS2 AOCS Sgn	J02	CRS-2/ACC		ACMS Flight Cap
SKIN-05	GYRO RS422 / Test	J03	GYRO	ACMS SCOE Cable Plugged	
SKIN-05	CRS 1/2 Stimuli	J04	CRS-1,2	ACMS SCOE Cable Plugged	
SKIN-05	AAD Sgn M	J05	AAD/ACC	ACMS SCOE Cable Plugged	
SKIN-05	SAS1/2 Sgn M	J06	SAS/ACC	ACMS SCOE Cable Plugged	
SKIN-05	SAS1/2 Sgn R	J07	SAS/ACC	ACMS SCOE Cable Plugged	
SKIN-05	AAD Sgn R	J08	AAD/ACC	ACMS SCOE Cable Plugged	
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	
SKIN-06	STR2 Stimuli	J02	STR2	ACMS SCOE Cable Plugged	
	UMBILICAL				
	Connector Function	**Connector**	**S/C unit**	**SCOE CABLE**	
	Power/Data	HUJ01	SYSTEM	SCOEs cable Plugged	
	Power/Data	HUJ02	SYSTEM	SCOEs cable Plugged	

F1.1 11.07.08

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 that the pixel anomalies referred to in HP-112000-ASED-NC-3725, as raised during SPIRE IST WFT2 (see RD10), the correct functioning of each of its subsystems before cool down. The Herschel cryostat chamber was in the vertical configuration following bakeout. All these tests were performed on 11th February 2008.

The conclusion of the tests was that pixels PTC-3 and PSW-D15 were correctly repaired while pixel PMW-B6 still shows reverse polarity, implying that it was not repaired.

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
RD10	SPIRE-RAL-PRC-002991	SPIRE IST Warm Functional Test Report II – Prime Side	Issue 1.1
RD11	HP-2-ASED-SD-0203	SPIRE WFT after repair of pixel anomalies on SVM-SIH connectors based on HP-112000-ASED-NC-3725	Issue 01

1.3 Change Record

Document	Change date	Changes
Issue 1.0		First version
Issue 1.1		Corrected incomplete sentence in the Introduction. Included reference to NCR HP-130000-ASED-NC-3954.

TABLE OF CONTENTS

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.

4.1 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: 15:27
OBSID: 0xb00003ec

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

Comments: PLIABITSTAT 0 to 1

Photometer LIAs switched on OK

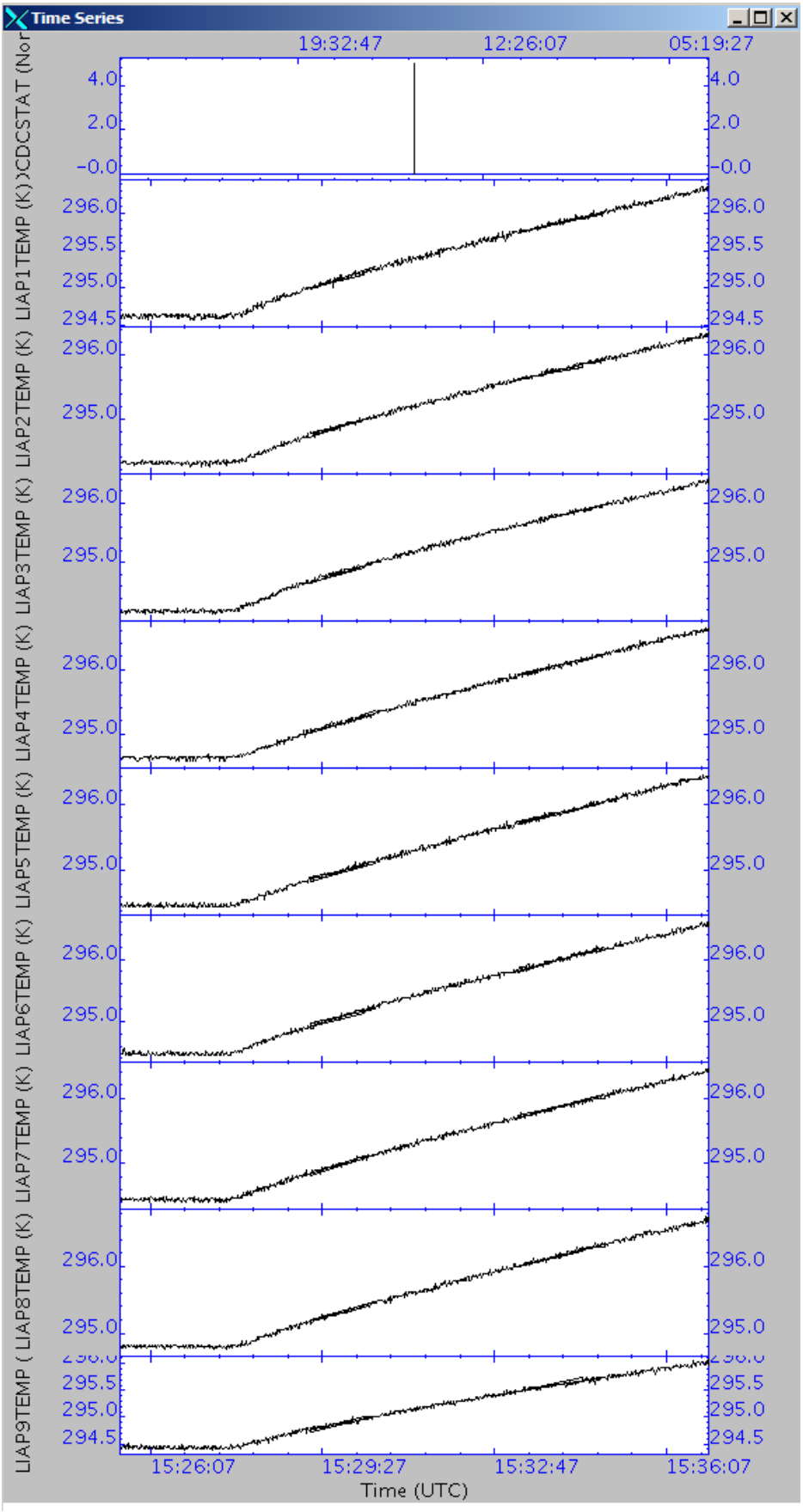
Output file FUNC-DCU-04p_B00003EC.txt from QLA script:

```
DCU-04-phot
Start time @: 11-Feb 15:27:14
End time @: 11-Feb 15:27:27
OBSID: 0xB00003EC

PLIABITSTAT:
Start value: OFF
End value: 1.0

                 Before/After
SCUDCDCSTAT     0/5
PLIAP5V         0.23/5.23 V
PLIAP9V         0.02/11.58 V
PLIAM9V         0.02/-11.57 V
```

QLA plots below for Phot LIA temperatures


Time Series
19:32:47
12:26:07
05:19:27
LIAP9TEMP (LIAP8TEMP (K) LIAP7TEMP (K) LIAP6TEMP (K) LIAP5TEMP (K) LIAP4TEMP (K) LIAP3TEMP (K) LIAP2TEMP (K) LIAP1TEMP (K))CDCSTAT (Nor
4.0
2.0
-0.0
296.0
295.5
295.0
294.5
15:26:07
15:29:27
15:32:47
15:36:07
Time (UTC)

4.2 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: 15:44
OBSID: 0xb00003ee
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_B00003EE.txt:

```
DCU-11-phot
Start time @: 11-Feb 15:44:04
End time @: 11-Feb 15:45:53
OBSID: 0xB00003EE

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
```

4.3 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: 15:48
OBSID: 0xb00003ef

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:

1) Pixels which showed wrong polarity in IST WFT II (see RD10) and which now shows correct polarity are:

PMW-F7
PSW-D15
PTC3

2) Pixels which showed wrong polarity in IST WFT II and which still show wrong polarity are:

PMW-B6

This implies that the proposed pixel harness repairs in RD11 have been only partially completed.

QLA load curve plots in Annexe 1.

Photometer detector settings at the end of the test:

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

4.4 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**

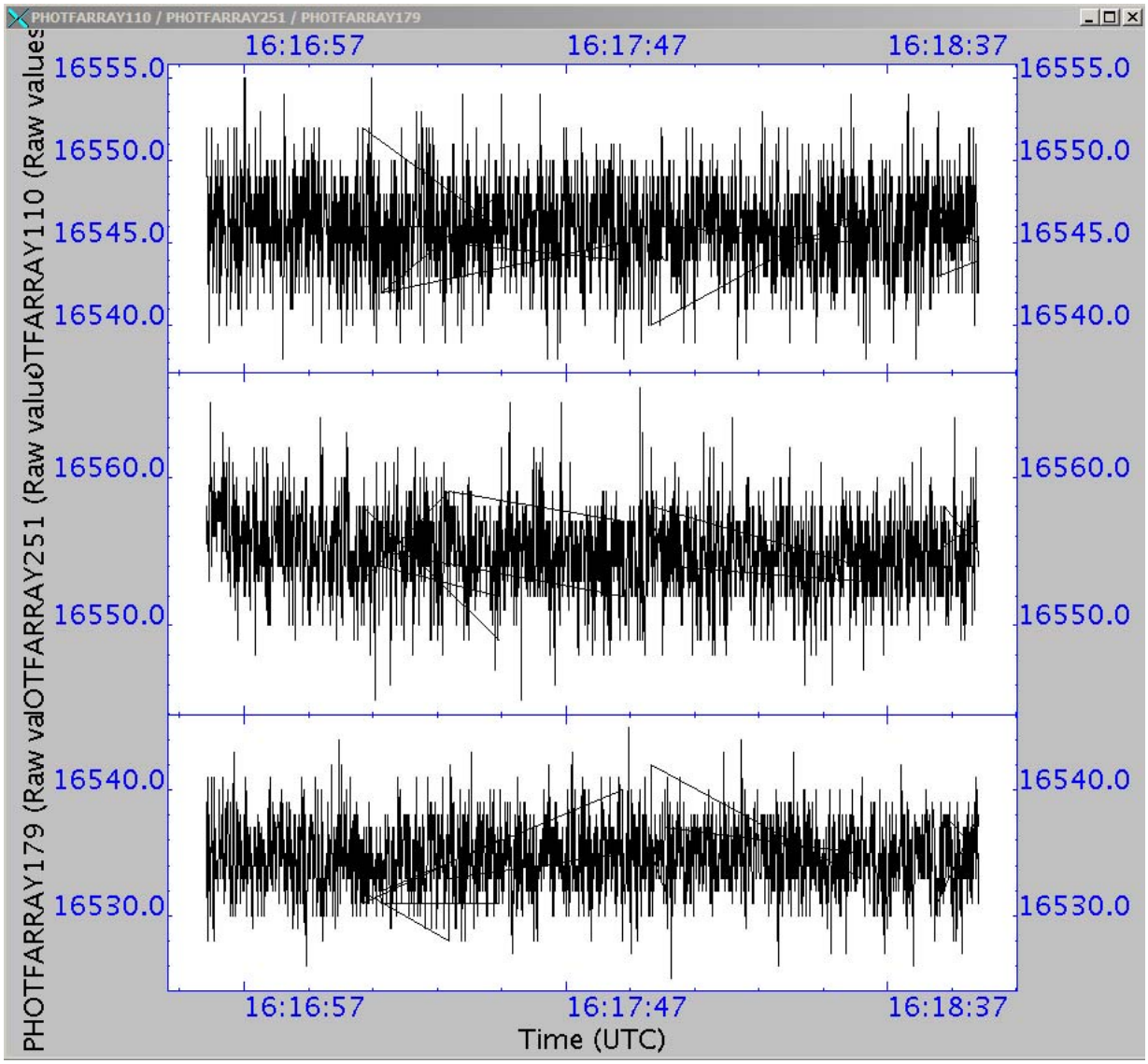
Start time: 16:17
OBSID: 0xb00003f0

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) PSW-E8, PMW-D7, PLW-C5


PHOTFARRAY110 / PHOTFARRAY251 / PHOTFARRAY179
16:16:57
16:17:47
16:18:37
16555.0
16550.0
16545.0
16540.0
16560.0
16550.0
16540.0
16530.0
PHOTFARRAY179 (Raw valOTFARRAY251 (Raw valueOTFARRAY110 (Raw values
Time (UTC)

Switched off the Photometer:

PDET_OFF: 0xb00003f1

Start time: 16:39

Switched off the DRCU:

DRCU_OFF: 0xb00003f2

Start time: 16:42

During power off of the DRCU the CCS reported that the LCL current WM408565 was reading a higher value than expected

(ca. 0.8/0.9A expected 0.38-0.5A). NCR HP-130000-ASED-NC-3954 was raised.

During both nominal and redundant SFTs carried out earlier in the day the current was reading the nominal value.

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. These plots are for OBSIDs B00003EF

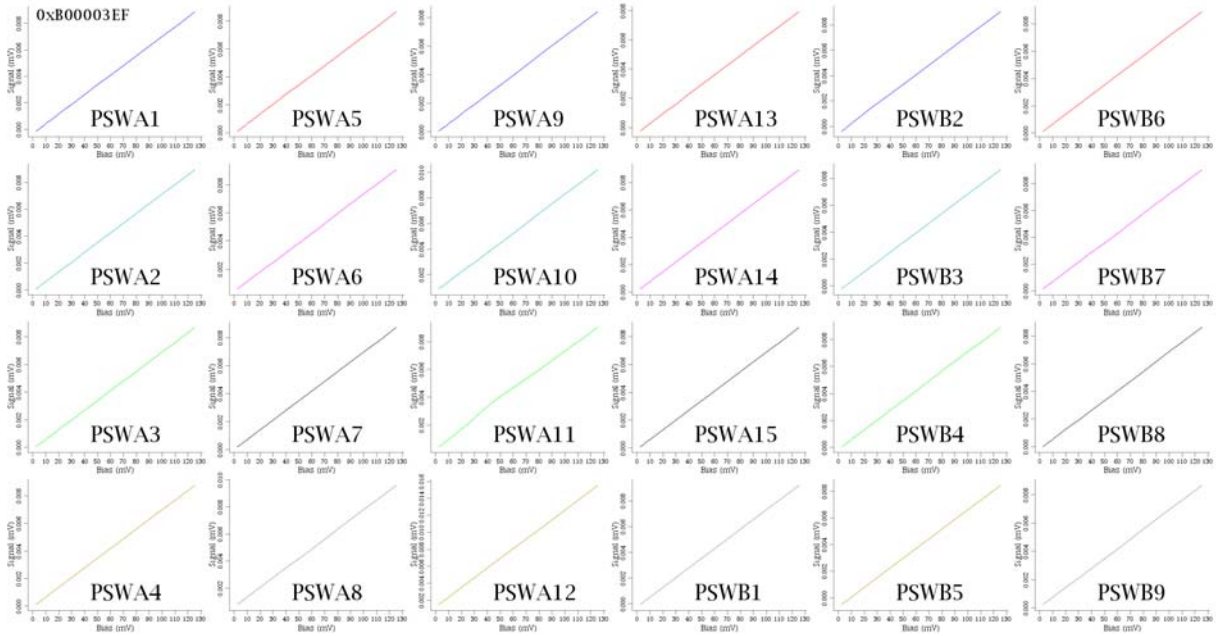


Figure 1. PSW Detectors (1)

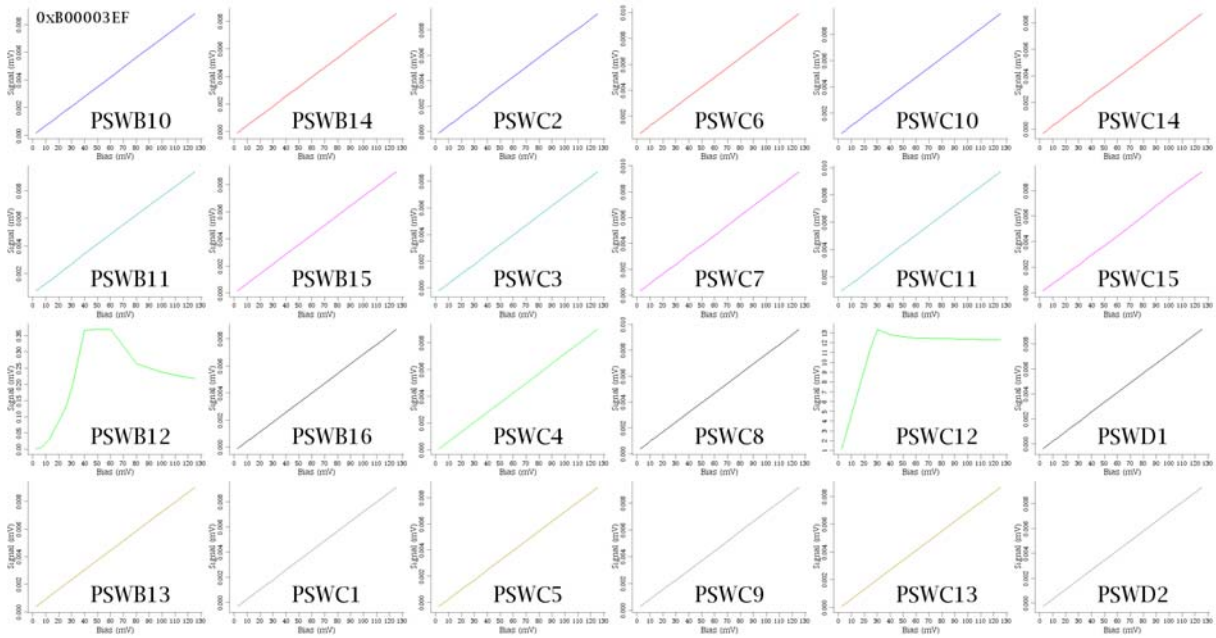


Figure 2. PSW Detectors (2)

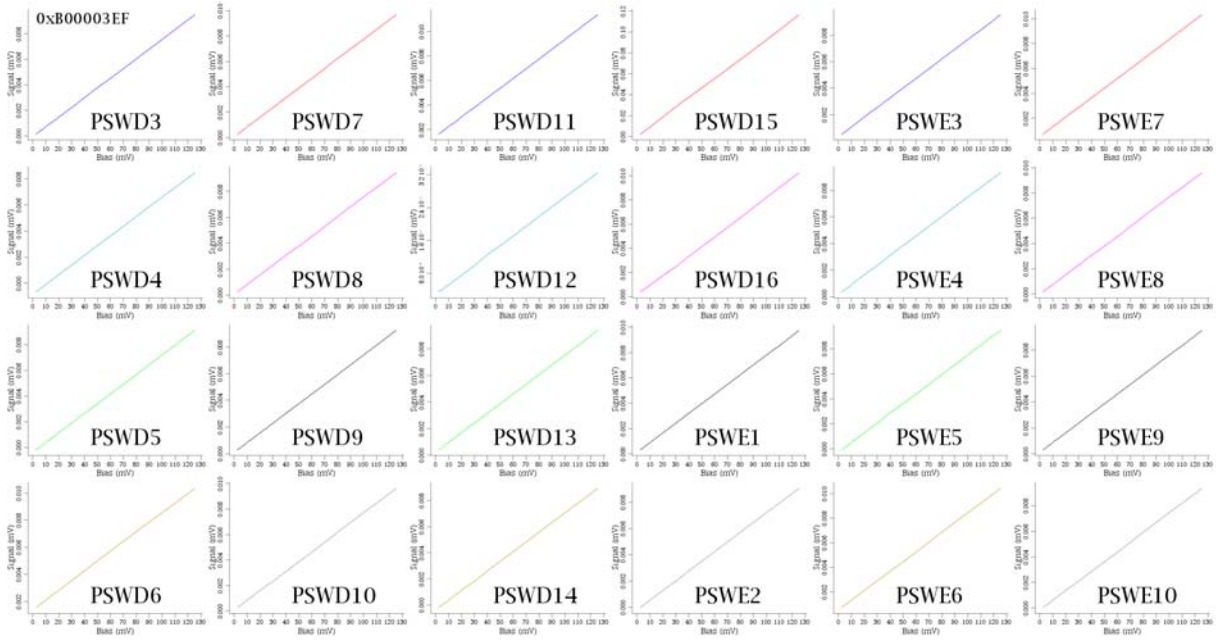


Figure 3. PSW Detectors (3)

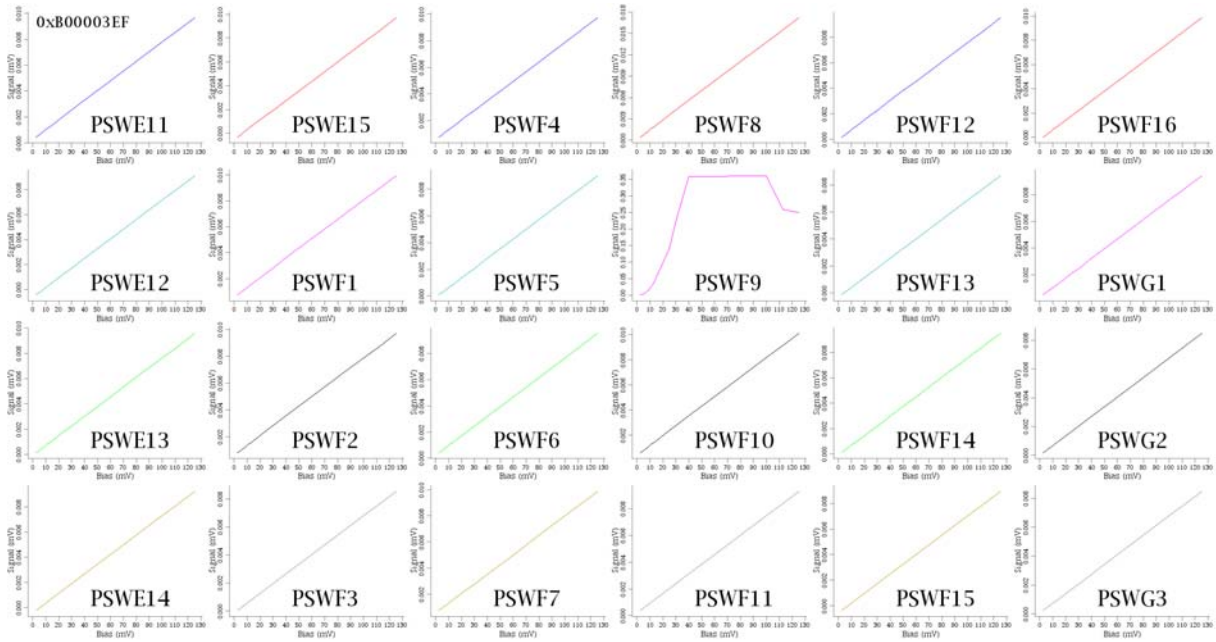


Figure 4. PSW Detectors (4)

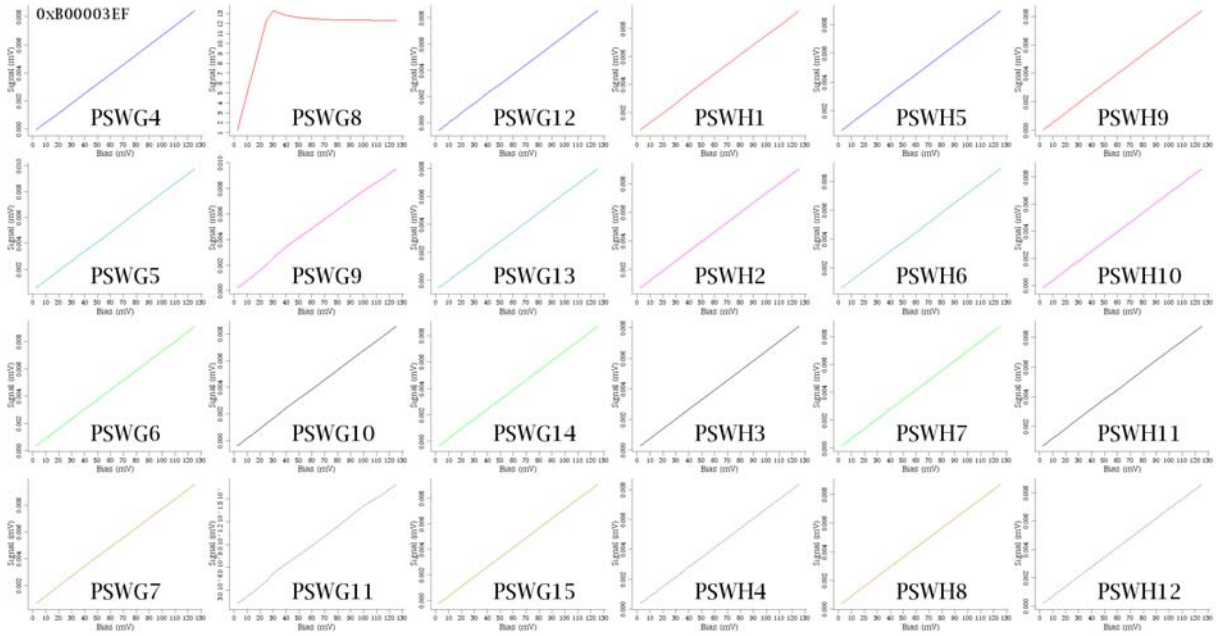


Figure 5. PSW Detectors (5)

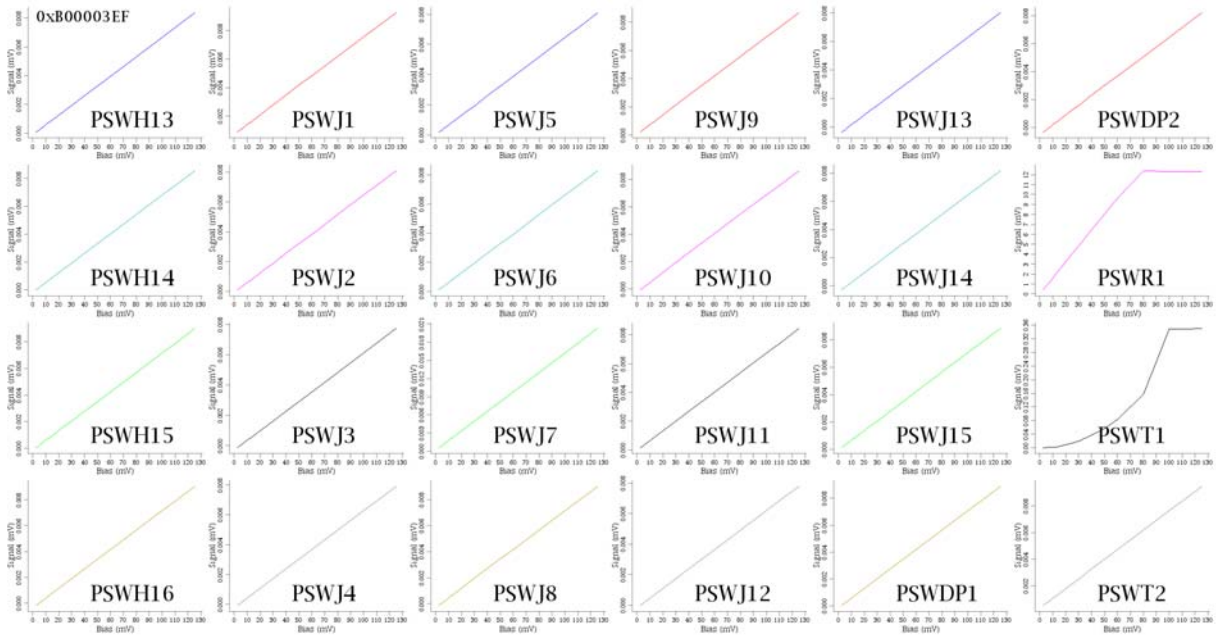


Figure 6. PSW Detectors (6)

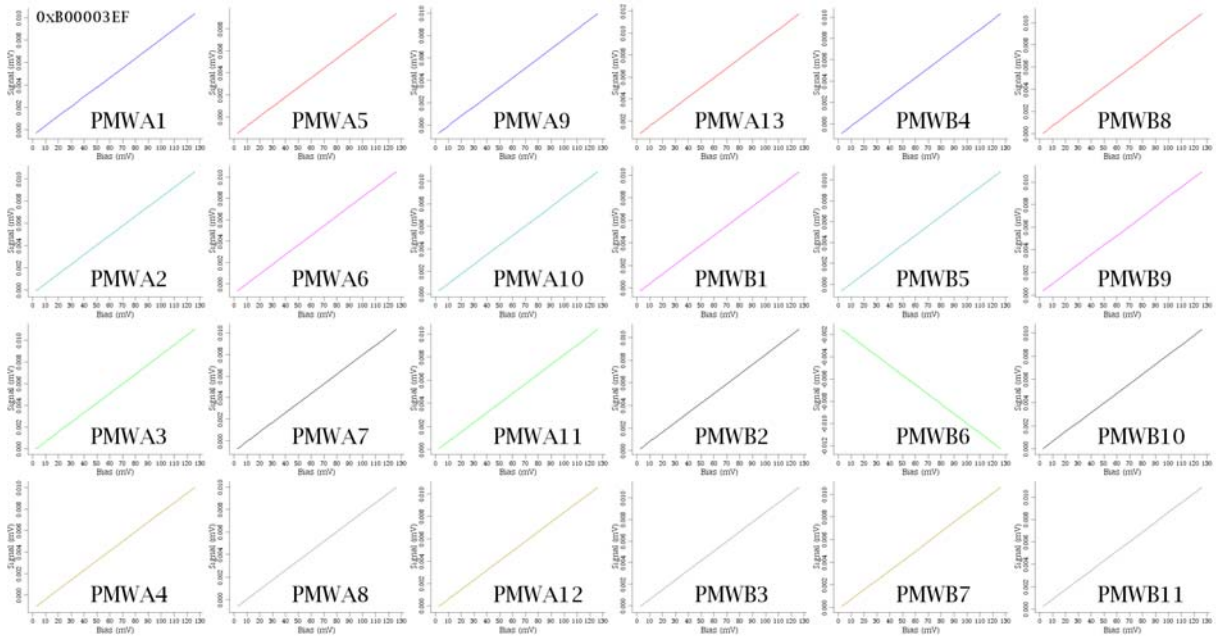


Figure 7. PMW Detectors (1)

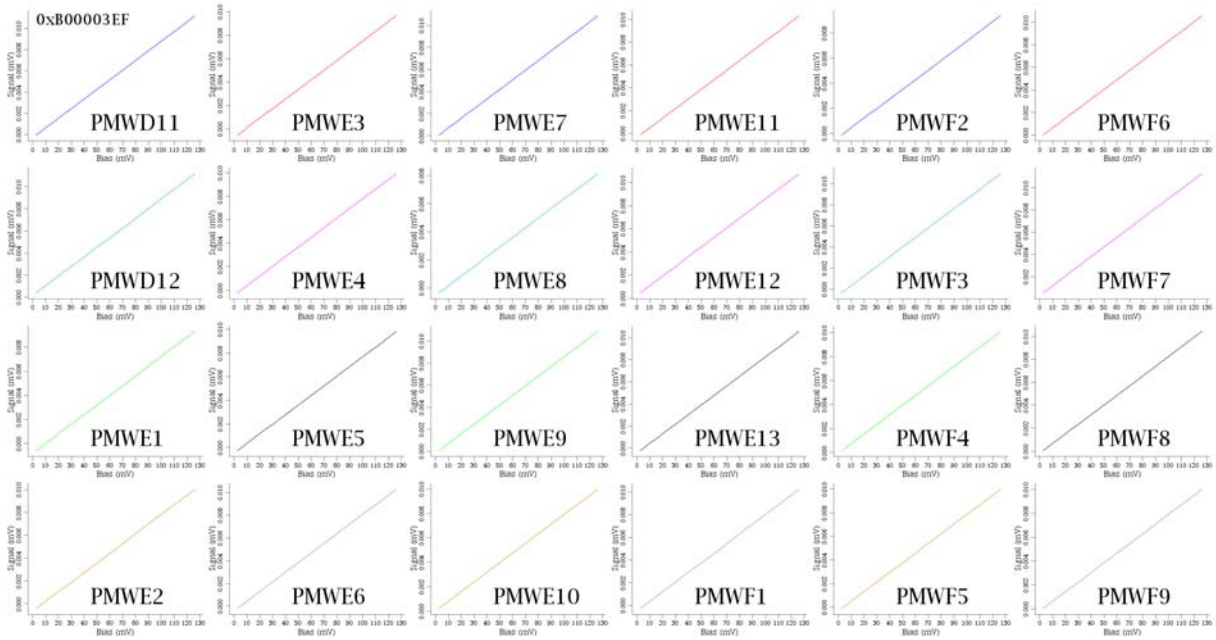


Figure 8. PMW Detectors (2)

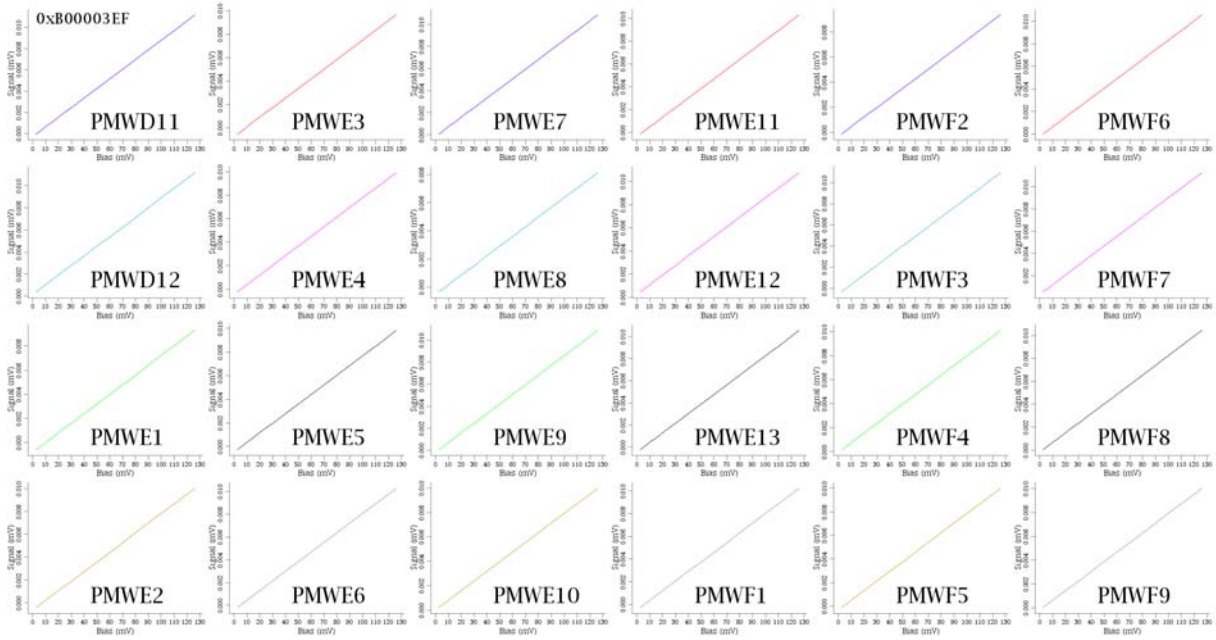


Figure 9. PMW Detectors (3)

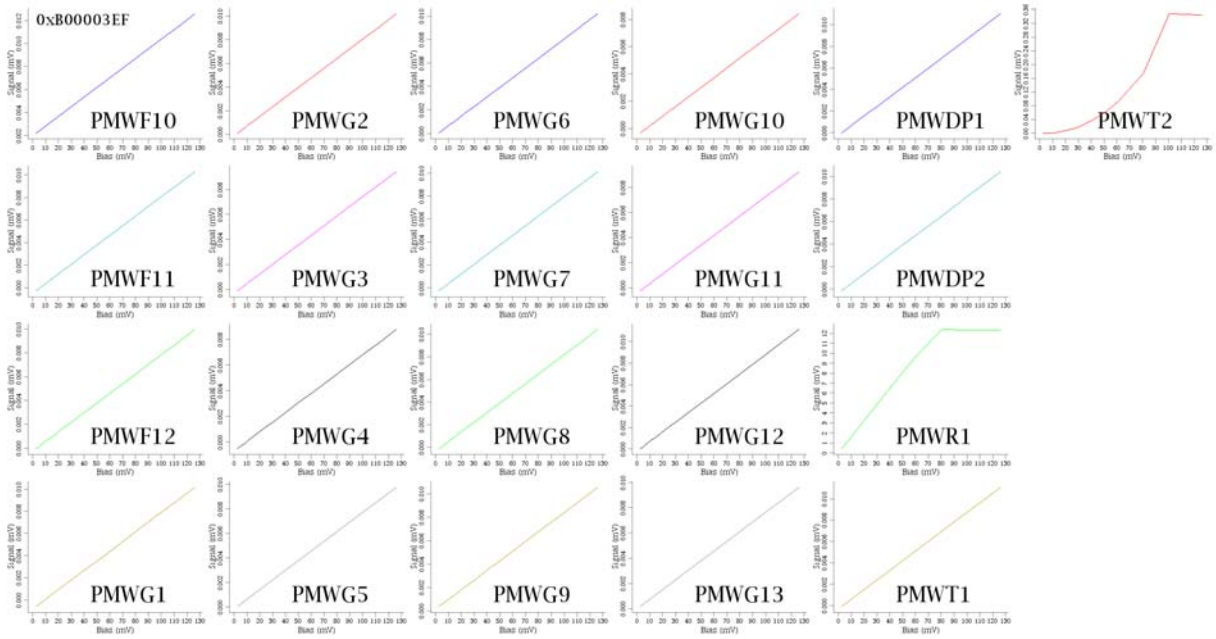


Figure 10. PMW Detectors (4)

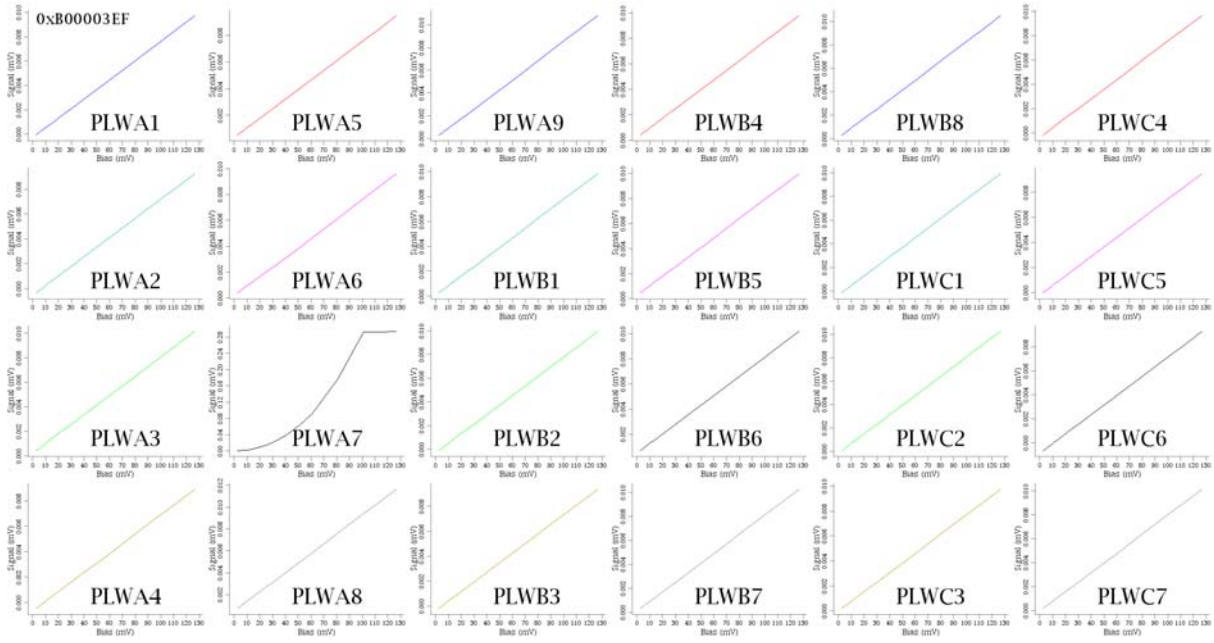


Figure 11. PLW Detectors (1)

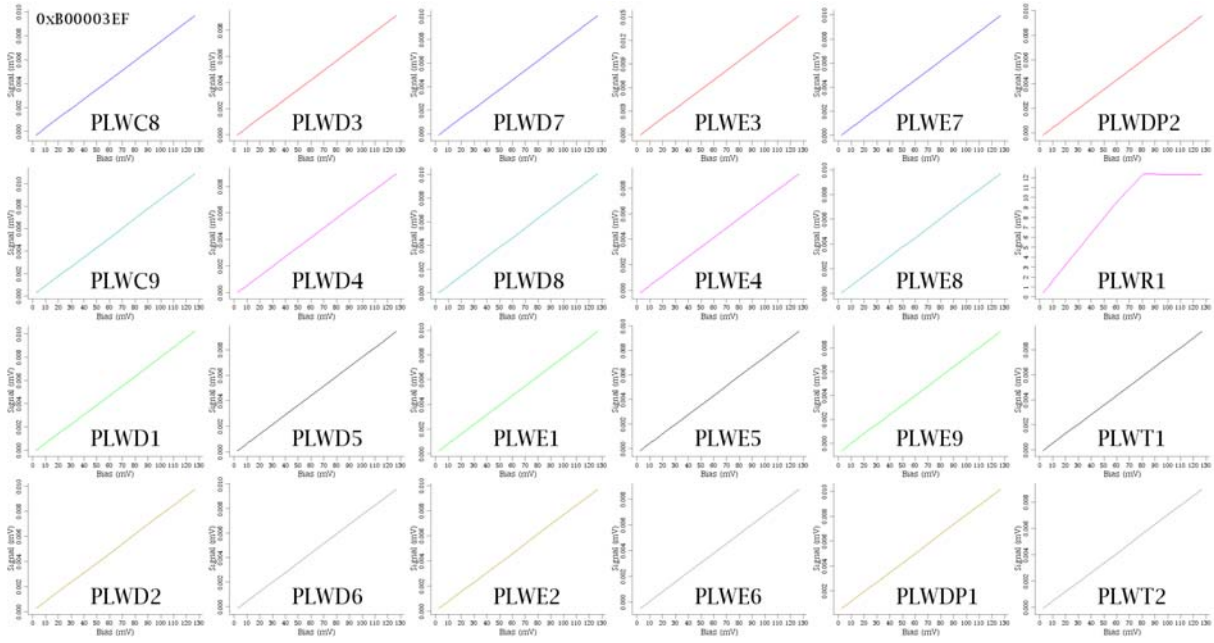


Figure 12. PLW Detectors (2)

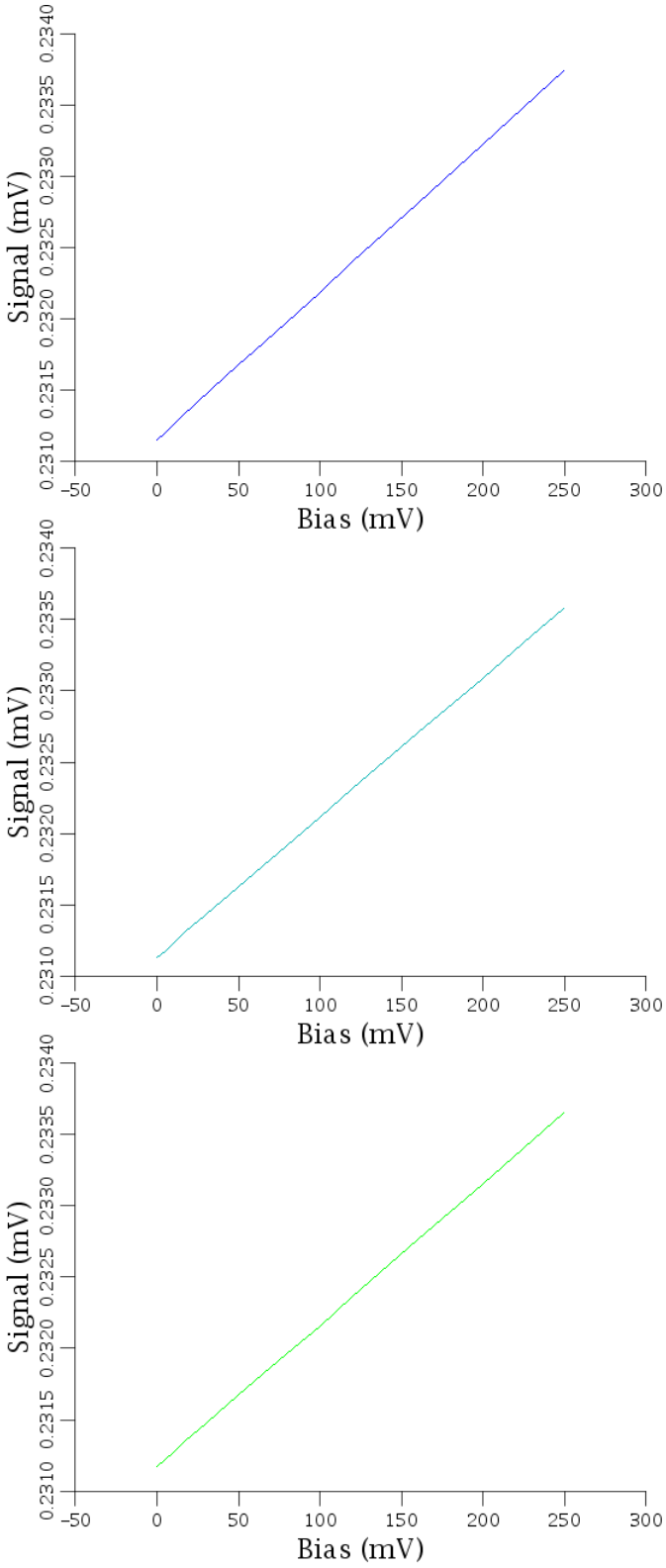


Figure 13. PTC Detectors (1)

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