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1. INTRODUCTION

This document describes the results from the tests carried out at RAL to validate the AVM system. This was done by executing the nominal Short Functional Test sequence as specified in SPIRE_RAL_PRC_2492_Issue2.1 document.

1.1 Purpose

The main purpose of this document is to provide a set of results that verify the functionality of the AVM system (hardware + software) in its current configuration prior to delivery.

1.2 Scope

The validation performed is only applicable to the AVM (hardware + software) system only.

1.3 Change Record

Issue 1.0   Document Created

1.4 Reference Documents

RD01 SPIRE Short Functional Test Procedures, Issue 2.1, SPIRE-RAL-PRC-002494, 22/07/2005

1.5 Constrains

- The procedures to switch ON/OFF the DPU used during these tests are the nominal switch ON/OFF procedures used for ILT testing.
- The CCS templates to be used during the execution of the SFT procedures specified in RD01 cannot be executed directly in the SPIRE ILT environment. Instead the TCL commands contained in the templates have been extracted and are these which are used for instrument commanding.
- **When the DRCU Simulator is still OFF and the DPU is ON and generating HK all get HK command responses are set to 0xFFFF which triggers hard out of limits alarms due to the out of limit check implemented in the MIB. This feature only happens for the AVM configuration.**

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2. TEST CONFIGURATION

The configuration for the current test:

Hardware Configuration:

- DPU AVM2 + 28V external power supply.
- DRCU Simulator PC + DPU-DRCU interconnection harnesses.
- SCOS workstation.
- CDMS Simulator PC.
- Database server.

Software Configuration:

- On Board Software v2.2.D
- DPU AVM2 Boot software 2.0
- DRCU Simulator application v5.5.1
- SCOS2000 v2.3e Patch 5
- MIB v2.2.D2 (as taken from the vdf.dat MIB file)
- CDMS Simulator v2.5
- HCSS 0.3.3
- Command Sequences extracted from SPIRE_IST_TEMPLATES_0.tar

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2.1   DETAILED TEST RESULTS

2.1.1   Procedure SPIRE-IST-DPU-ON

Version: 1.0
Date: 12th June 2006
Purpose: To switch on the SPIRE DPU and start generating housekeeping
Duration: 2 minutes

Preconditions:
- Procedure to supply 28V Power Supply from the satellite to the SPIRE DPU is available
- SPIRE MIB is imported in the CCS database.
- CCS is up and running (SCOS, TOPE and the CDMU Simulator)
- SFT PARAMETERS display is selected on the CCS

Initial Configuration: SPIRE Warm Electronics (DPU and DRCU) are switched off

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/ Fail
1	**Power ON SPIRE AVM2 DPU**	—	—	—	**Pass**
2	Execute TCL script SPIRE-IST-DPU-START.tcl	MODE	-/-/DPU_ON	-/-/******* **Note:** Current version of the MIB does not contain converted DPU_ON MODE value for raw value 0.	
3	Check that THSK parameter is refreshing every second	—	—	Incrementing every second	**Pass**
4	Check that TM2N parameter is incrementing every second	—	—	Incrementing every second	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: SPIRE is in DPU_ON mode

Important Note:
When the SPIRE DPU is started and the DRCU Simulator application is still OFF all susbsytems GetHK command responses are set to 0xFFFF which means that some OOL checks will be triggered and some HK parameters will show hard out of limits alarms. All bits are set to low when the DRCU Simulator application is started in the next procedure.

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2.1.2   Procedure SPIRE-IST-DRCU-ON

Version: 1.1
Date: 22nd August 2006
Purpose: To switch on the SPIRE DRCU and start generating housekeeping
Duration: 4 minutes

Preconditions: SPIRE FM is electrically integrated with the Herschel Satellite

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched off
- FUNCTIONAL TEST PARAMETERS display is selected on the CCS.

Procedure Steps for IST ONLY:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
1	Execute TCL script SPIRE-IST-DRCU-ON-STEP1.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	—	—		
3	Check that TM2N parameter is not incrementing anymore	—	—		
4	**Start DRCU Simulator application**	—	—		
5	Execute TCL script SPIRE-IST-DRCU-ON-STEP2.tcl	—	—		
6	Check that THSK parameter is again refreshing every 4 seconds	—	—		
7	Check that TM2N parameter is again incrementing every 4 seconds	—	—		
Test Result (Pass/Fail):					

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Procedure Steps for AVM ONLY:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
1	Execute TCL script SPIRE-IST-DRCU-ON-STEP1.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	—	—	Stops incrementing	**Pass**
3	Check that TM2N parameter is not incrementing anymore	—	—	Stops incrementing	**Pass**
4	Start DRCU simulator application software.	—	—	—	
5	Execute TCL script SPIRE-IST-DRCU-ON-STEP2.tcl **Note:** At this moment two HK parameters BIASTEMP and DAQTEMP will go Out Of limits (Hard Limits). This is an inherent feature of the DRCU simulator which cannot be avoided.	BIASTEMP DAQTEMP	**OOL** **OOL**	**OOL** **OOL**	
6	Check that THSK parameter is again refreshing every 4 seconds	—	—	Starts incrementing	**Pass**
7	Check that TM2N parameter is again incrementing every 4 seconds	—	—	Starts incrementing	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration:
- SPIRE DPU and DRCU are both on
- HK generation is on

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2.1.3 Procedure SPIRE-IST-FUNC-SCU-01

Version: 1.0
Date: 12th June 2006
Purpose: SCU science packet generation check
Duration: 2 minutes

Preconditions: None

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- FUNCTIONAL TEST PARAMETERS display is selected on the CCS
- DPU AND OBS PARAMETERS display is selected on the CCS

Procedure Steps:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-SCU-01.tcl	SCUFRAMECNT TM5N	0/31 3FFF/1	0/31 3FFF/1	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: Unchanged

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2.1.4   Procedure SPIRE-IST-FUNC-SCU-03

Version: 1.0
Date: 12th June 2006
Purpose: SCU DC thermometry check
Duration: 6 minutes

Preconditions: SPIRE FM is electrically integrated with the Herschel Satellite
Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Final Configuration: SCU DC thermometry is switched on.

Note: Cold instrument conditions (He I temperatures) were simulated for this test run.

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-SCU-03.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to SCU_DC_Therm**				
3	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0/FFFF/FFFF	**0/FFFF/FFFF**	Pass
4	If the instrument is at He II temperatures check the values of SCU DC thermometry channels.	PUMPHTRTEMP PUMPHSTEMP EVAPHSTEMP SHUNTTEMP EMCFILTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	(All Values TBC) -/~4.6K -/~3.0K -/~3.0K -/~1.7K -/~4.6K -/~1.7K -/~1.7K -/~4.6K -/~4.6K -/~4.5K -/~4.6K -/~4.6K -/~4.6K -/~4.6K -/~4.6K -/~4.5K		

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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.	PUMPHTRTEMP PUMPHSTEMP EVAPHSTEMP SHUNTTEMP EMCFILTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	(All Values TBC) ~4.2K ~4.4K ~4.3K ~4.2K ~4.8K ~4.2K ~4.2K ~4.8K ~4.8K ~4.7K ~4.8K ~4.8K ~4.8K ~4.7K ~4.7K ~4.8K	COLD STATE (HeI Temperatures) simulated : ~ 4.2K all thermometers.	Pass
6	If the instrument is warm, record the values of SCU DC thermometry channels which are open circuit. **Open Circuit Criterion: RAW reading in the range [0, -100]**	PUMPHTRTEMP PUMPHSTEMP EVAPHSTEMP SHUNTTEMP EMCFILTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	— — — — — — — — — — — — — — — —		
Test Result (Pass/Fail): Pass					

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2.1.5   Procedure SPIRE-IST-FUNC-SCU-06

Version: 1.0
Date: 12th June 2006
Purpose: SCU AC thermometry check
Duration: 2 minutes

Preconditions: SPIRE FM is electrically integrated with the Herschel Satellite

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Note: Cold instrument conditions (He I temperatures) were simulated for this test run.

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-SCU-06.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to SCU_AC_Therm**				
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	0/1/1	**0/1/1**	**Pass**
4	If the instrument is at He II temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~1.7K		
5	If the instrument is at He I temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~4K	**4.39K**	**Pass**
6	If the instrument is warm, only record the values of SCU AC thermometry channel if it indicates an open circuit. **Open Circuit Criterion: RAW reading in the range [0, -100]**	SUBKTEMP	—		

Test Result (Pass/Fail): Pass

Final Configuration: SCU AC thermometry is switched on.

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2.1.6 Procedure SPIRE-IST-FUNC-SCU-07

Version: 1.1
Date: 22nd August 2005
Purpose: SCU cooler heaters check
Duration: 3 minutes
Preconditions: SPIRE FM is electrically integrated with the Herschel Satellite
Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- FUNCTIONAL TEST PARAMETERS display is selected on the CCS

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-SCU-07.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to Cooler_Htr_Chk**	BBFULLTYPE	Cooler_Htr_Chk		
3	Record the value of parameter SPHSV – the Sorption Pump Heat Switch Voltage. *This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.*	SPHSV - mV	0/~323/0	**0/322.95/0**	**Pass**
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	**0/325.52/0**	**Pass**
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	**0/8.98/0**	**Pass**
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	—

Test Result (Pass/Fail): Pass

Final Configuration: Unchanged

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2.1.7 Procedure SPIRE-IST-FUNC-SCU-04

Version: 1.0
Date: 12th June 2006
Purpose: SCU Photometer PCAL check
Duration: 2 minutes

Preconditions: SPIRE FM is electrically integrated with the Herschel Satellite

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Step	Description	Parameter Name - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-SCU-04.tcl	PCALCURR - mA PCALV – V	0.0/0.1/0.0 0.0/0.026/0.0	**0/0.0996** **0.0/0.0204/0.0**	**Pass**
	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.	BBFULLTYPE	PCAL_Check		

Test Result (Pass/Fail): Pass

Final Configuration: Unchanged

2.1.8   Procedure SPIRE-IST-FUNC-SCU-05

Version: 1.0
Date: 21st June 2006
Purpose: SCU Spectrometer SCAL4 and SCAL2 check
Duration: 4 minutes

Preconditions: SPIRE FM is electrically integrated with the Herschel Satellite

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-SCU-05.tcl	—	—	—	—
2	**Wait for the parameter BBFULLTYPE to get set to SCAL4_Check**	BBFULLTYPE	SCAL4_Check	SCAL4_Check	**Pass**
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	0.0/0.10/0.0	**0.099**	**Pass**
		SCAL4V – V	0.0/0.05/0.0	**0.0503**	
4	**Wait for the parameter BBFULLTYPE to get set to SCAL2_Check**	BBFULLTYPE	SCAL2_Check	SCAL2_Check	**Pass**
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	0.0/0.10/0.0	**0.098**	**Pass**
		SCAL2V – V	0.0/0.05/0.0	**0.0508**	

Test Result (Pass/Fail): Pass

Final Configuration: Unchanged

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2.1.9 Procedure SPIRE-IST-FUNC-MCU-01

Version: 1.0
Date: 12th June 2006
Purpose: To boot up the MCU
Duration: 5 minutes

Preconditions:

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the mode parameter is DRCU_ON	MODE	DRCU_ON	DRCU_ON	**Pass**
2	Execute TCL script SPIRE-IST-FUNC-MCU-01.tcl	—	—	—	—
3	Check that the mode parameter is REDY	MODE	REDY	REDY	**Pass**
4	Check that the MCU is booted up successfully	MCUBITSTAT	0/1/1	0/1/1	**Pass**
5	Check MCU HK parameter values and ensure that the values are refreshing	MCUP5V	~5.0V	5.0V	**Pass**
		MCUP14V	~14.5V	14.0V	
		MCUM14V	~-14.5V	-14.0V	
		MCUP15V	~15.5V	15.0V	
		MCUM15V	~-15.5V	-15.0V	
		MCUMACTEMP	~300K	299.98K	
		MCUSMECTEMP	~300K	299.98K	
		MCUBSMTEMP	~300K	299.98K	

Test Result (Pass/Fail): Pass

Final Configuration:
- MCU is switched on and booted up.
- SPIRE is in REDY mode.

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2.1.10 Procedure: SPIRE-IST-FUNC-MCU-02

Version: 1.0
Date: 12th June 2006
Purpose: MCU science data generation check
Duration: 5 minutes

Preconditions:
- **SPIRE is in REDY mode**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- FUNCTIONAL TEST PARAMETERS display is selected on the CCS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the mode parameter is REDY	MODE	REDY	REDY	**Pass**
2	Execute TCL script SPIRE-IST-FUNC-MCU-02.tcl	—	—	—	—
3	Record the values of MCUFRAMECNT at the start and end of the test	MCUFRAMECNT	—	0/2933	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: Unchanged

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2.1.11 Procedure SPIRE-IST-FUNC-BSM-01

Version: 1.0
Date: 12th June 2006
Purpose: BSM switch on check
Duration: 3 minutes

Preconditions:
- **SPIRE FM is electrically integrated with the Herschel Satellite**
- **SPIRE is in REDY mode**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SPIRE FUNCTIONAL PARAMETERS display is selected on the CCS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the mode parameter is REDY	MODE	REDY	REDY	**Pass**
2	Execute TCL script SPIRE-IST-FUNC-BSM-01.tcl	—	—	—	—
3	Check that the Chop and Jiggle sensors have switched on	CHOPSENSPWR JIGGSENSPWR	0/1/1 0/1/1	0/1/1 0/1/1	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: BSM is switched on.

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2.1.12 Procedure SPIRE-IST-BSM-OFF

Version: 1.0
Date: 12th June 2006
Purpose: Switch off the BSM
Duration: 2 minutes

Preconditions:
- **SPIRE FM is electrically integrated with the Herschel Satellite**
- **SPIRE is in REDY mode**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SPIRE FUNCTIONAL PARAMETERS display is selected on the CCS

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the mode parameter is REDY	MODE	REDY	REDY	
2	Execute SPIRE-IST-BSM-OFF.tcl	—	—	—	—
3	Check that the power to the BSM sensors is switched off	CHOPSENSPWR JIGGSENSPWR	1/-/0 1/-/0	1/-/0 1/-/0	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: BSM is switched off.

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2.1.13 Procedure SPIRE-IST-FUNC-SMEC-01

Version: 1.0
Date: 12th June 2006
Purpose: SMECm switch on check
Duration: 5 minutes

Preconditions:
- **SPIRE FM is electrically integrated with the Herschel Satellite**
- **SPIRE is in REDY mode**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SPIRE FUNCTIONAL PARAMETERS display is selected on the CCS.

Note: Cold instrument conditions (He I temperatures) were simulated for this test run.

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the mode parameter is REDY	MODE	REDY	REDY	
2	Execute TCL script SPIRE-IST-FUNC-SMEC-01.tcl	—	—	—	—
3	Check that power to the SMEC LED and LVDT sensor is on	SMECENCPWR SMECLVDTPWR	0/-/4 0/1/1	0/-/4 0/1/1	**Pass**
Test Result (Pass/Fail): Pass					

Final Configuration: SMECm is switched on.

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2.1.14 Procedure SPIRE-IST-SMEC-OFF

Version: 1.0
Date: 12th June 2006
Purpose: Switch off the SMEC
Duration: 2 minutes

Preconditions:
- **SPIRE FM is electrically integrated with the Herschel Satellite**
- **SPIRE is in REDY mode**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SPIRE FUNCTIONAL PARAMETERS display is selected on the CCS

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the mode parameter is REDY	MODE	REDY	REDY	
2	Execute SPIRE-IST-SMEC-OFF.tcl	—	—	—	—
3	Check that the power to the SMEC sensors is switched off	SMECENCPWR SMECLVDTPWR	4/-/0 1/-/0	4/-/0 1/-/0	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: SMECm is switched off.

2.1.15 Procedure SPIRE-IST-FUNC-DCU-01

Version: 1.0
Date: 12th June 2006
Purpose: DCU science packet generation check for all Photometer and Spectrometer packet types (PF, PSW, PMW, PLW, SF, SSW and SLW)
Duration: 5 minutes

Preconditions:

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-IST-FUNC-DCU-01.tcl	DCUFRAMECNT	0/700	0/700	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: Unchanged

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2.1.16 Procedure SPIRE-IST-FUNC-DCU-04-P

Version: 1.1
Date: 22nd August 2006
Purpose: Photometer LIAs switch on
Duration: 5 minutes

Preconditions: The Photometer LIAs are switched off

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Procedure Steps for IST ONLY:

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Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-DCU-04-P.tcl	PLIABITSTAT	0/1/1		
2	Check Photometer LIA HK parameter values and ensure that the values are refreshing	PLIAP5V PLIAP9V PLIAM9V	-/~5.2V -/~11.5V -/~-11.5V		

Test Result (Pass/Fail):

Procedure Steps for AVM ONLY:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-DCU-04-P.tcl	PLIABITSTAT	0/1/1	0/1/1	**Pass**
2	**Note:** When the command to switch ON Photometer LIAs is sent to the DRCU simulator ALL photometer LIA related HK parameters will go Out of Limits (Hard Limits). This is an inherent feature of the DRCU simulator which cannot be avoided.	PLIAP5V PLIAP9V PLIAM9V LIAP9TEMP LIAP8TEMP LIAP7TEMP LIAP6TEMP LIAP5TEMP LIAP4TEMP LIAP3TEMP LIAP2TEMP LIAP1TEMP	OOL OOL OOL OOL OOL OOL OOL OOL OOL OOL OOL OOL	OOL OOL OOL OOL OOL OOL OOL OOL OOL OOL OOL **OOL**	

Test Result (Pass/Fail): Pass

Final Configuration: The Photometer LIAs are on.

2.1.17 Procedure SPIRE-IST-PLIA-OFF

Version: 1.1
Date: 22nd August 2006
Purpose: Photometer LIAs switch off
Duration: 5 minutes

Preconditions:
- **SPIRE is in REDY mode**
- **The Photometer LIAs are switched on**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Procedure Steps for IST ONLY:

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Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Check that SPIRE is in REDY mode	MODE	REDY	**REDY**	
2	Execute TCL script SPIRE-IST-PLIA-OFF.tcl	PLIABITSTAT	1/-/0		
3	Check Photometer LIA HK parameter values	PLIAP5V	~5.2/-/0.0V		
		PLIAP9V	~11.5/-/0.0V		
		PLIAM9V	~-11.5/-/0.0V		

Test Result (Pass/Fail):

Procedure Steps for AVM ONLY:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Check that SPIRE is in REDY mode	MODE	REDY	**REDY**	
2	Execute TCL script SPIRE-IST-PLIA-OFF.tcl	PLIABITSTAT	1/-/0	**1/-/0**	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: The Photometer LIAs are off.

2

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2.1.18 Procedure SPIRE-IST-FUNC-DCU-04-S

Version: 1.1
Date: 22nd August 2006
Purpose: Spectrometer LIAs switch on
Duration: 5 minutes

Preconditions: The Spectrometer LIAs are switched off

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Procedure Steps for IST ONLY:

	Spire Report		
		Ref:	SPIRE-RAL-REP-2711
		Issue:	1.0
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Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-DCU-04-S.tcl	SLIABITSTAT	0/1/1		
2	Check Spectrometer LIA HK parameter values and ensure that the values are refreshing	SLIAP5V SLIAP9V SLIAM9V	-/~5.2V -/~11.5V -/~-11.5V		

Test Result (Pass/Fail):

Procedure Steps for AVM ONLY:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-IST-FUNC-DCU-04-S.tcl	SLIABITSTAT	0/1/1	**0/1/1**	**Pass**
2	**Note:** When the command to switch ON Spectrometer LIAs is sent to the DRCU simulator ALL photometer LIA related HK parameters will go Out of Limits (Hard Limits). This is an inherent feature of the DRCU simulator which cannot be avoided.	SLIAP5V SLIAP9V SLIAM9V LIAS3TEMP LIAS2TEMP LIAS1TEMP	OOL OOL OOL OOL OOL OOL	OOL OOL OOL OOL OOL **OOL**	

Test Result (Pass/Fail): Pass

Final Configuration: The Spectrometer LIAs are on.

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2.1.19 Procedure SPIRE-IST-SLIA-OFF

Version: 1.1
Date: 22nd August 2006
Purpose: Spectrometer LIAs switch off
Duration: 5 minutes

Preconditions:
- **SPIRE is in REDY mode**
- **The Spectrometer LIAs are switched on**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Procedure Steps for IST ONLY:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Check that SPIRE is in REDY mode	MODE	REDY		
2	Execute TCL script SPIRE-IST-SLIA-OFF.tcl	SLIABITSTAT	1/-/0		
3	Check Photometer LIA HK parameter values	SLIAP5V SLIAP9V SLIAM9V	~5.2/-/0.0V ~11.5/-/0.0V ~-11.5/-/0.0V		

Test Result (Pass/Fail):

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Procedure Steps for AVM ONLY:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before /After	Success/ Failure
1	Check that SPIRE is in REDY mode	MODE	REDY	**REDY**	**Pass**
2	Execute TCL script SPIRE-IST-SLIA-OFF.tcl	SLIABITSTAT	1/-/0	**1/-/0**	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: The Spectrometer LIAs are off.

	Spire Report	Ref:	SPIRE-RAL-REP-2711
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2.1.20 Procedure SPIRE-IST-MCU-OFF

Version: 1.0
Date: 12th June 2006
Purpose: Switch off the MCU – if necessary
Duration: 2 minutes

Preconditions:
- **SPIRE is in REDY mode**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SPIRE FUNCTIONAL PARAMETERS display is selected on the CCS

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Check that the mode parameter is REDY	MODE	REDY	REDY	Pass
2	Execute SPIRE-IST-MCU-OFF.tcl	—	—	—	—
3	Check that the MCU is switched off	MCUBITSTAT	1/-/0	1/-/0	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: MCU switched off.

	Spire Report	Ref:	SPIRE-RAL-REP-2711
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2.1.21 Procedure SPIRE-IST-SCU-OFF

Version: 1.1
Date: 12th June 2006
Purpose: Switch off SCU DC and AC thermometry – if necessary

Preconditions:

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SFT PARAMETERS display is selected on the CCS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-SCU-OFF.tcl	—	—	—	—
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	FFFF/-/0	**FFFF/-/0**	**Pass**
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0	**1/-/0**	**Pass**
4	Check that SPIRE is in DRCU_ON mode	MODE	REDY/-/DRCU_ON	DRCU_ON	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: SPIRE in DRCU_ON mode.

	Spire Report	Ref:	SPIRE-RAL-REP-2711
		Issue:	1.0
		Date:	30th August 2006
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2.1.22 Procedure SPIRE-IST-DRCU-OFF

Version: 1.1
Date: 22nd August 2006
Purpose: Switch off the DRCU

Preconditions:
- **Procedure SPIRE-IST-SCU-OFF has been successfully executed**
- **SPIRE is electrically integrated with the Herschel FM.**

Initial Configuration:
- SPIRE DPU is on and generating HK
- DRCU is switched ON
- FUNCTIONAL TEST PARAMETERS display is selected on the CCS

Procedure Steps for IST ONLY:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-DRCU-OFF.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	—	—	—	
3	Check that TM2N parameter is not incrementing anymore	—	—	—	
4	**When instructed by the I-EGSE staff Power off the SPIRE DRCU using CCS procedure XXXXXX**	—	—	—	

Test Result (Pass/Fail):

	Spire Report	Ref:	SPIRE-RAL-REP-2711
		Issue:	1.0
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Procedure Steps for AVM ONLY:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-DRCU-OFF.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	—	—	—	**Pass**
3	Check that TM2N parameter is not incrementing anymore	—	—	—	**Pass**
4	IEGSE staff: Stop DRCU Simulator application software	—	—	—	

Test Result (Pass/Fail): Pass

Final Configuration:
- DRCU is switched off
- SPIRE DPU is on but not generating HK

2.1.23 Procedure SPIRE-IST-DPU-OFF

Version: 1.0
Date: 12th June 2006
Purpose: Switch off the DPU

Preconditions: SPIRE-IST-DRCU-OFF has been successfully executed.

Initial Configuration:
- SPIRE DPU is on *but not* generating any HK
- DRCU is switched OFF

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	**Power OFF SPIRE AVM2 DPU**	—	—	—	**Pass**

Test Result (Pass/Fail): Pass

Final Configuration: SPIRE DPU is switched off and the SPIRE instrument is OFF.

3. APPENDIX 1: NOMINAL SPIRE SWITCH-ON SEQUENCE

Version: 1.0
Date: 12th June 2006
Purpose: Switch On SPIRE instrument and put it in REDY mode

Preconditions:
- **Procedure SPIRE instrument is switched off**
- **SPIRE is electrically integrated with the Herschel EQM.**
- **In case of loss of power the switch on sequence can be executed without any constraints.**

Initial Configuration:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute Procedure SPIRE-IST-DPU-ON	MODE	-/-/DPU_ON		
2	Execute Procedure SPIRE-IST-DRCU-ON	MODE	DPU_ON/-/DRCU_ON		
3	Execute TCL script SPIRE-IST-SCU-ON.tcl	SCUTEMPSTAT SUBKSTAT	0/-/0xFFFF 0/-/1		
4	Execute TCL script SPIRE-IST-MCU-ON	MCUBITSTAT	0/-/1		
5	Check that SPIRE is in REDY mode	MODE	DRCU_ON/-/REDY		

Test Result (Pass/Fail):

Final Configuration:
- SPIRE is in REDY mode
- SPIRE DPU is on and generating nominal HK at 4 second intervals

4. APPENDIX 2: NOMINAL SPIRE SWITCH-OFF SEQUENCE

Version: 1.0
Date: 12th June 2006
Purpose: Switch Off SPIRE instrument from REDY mode.

Preconditions:
- **SPIRE is electrically integrated with the Herschel satellite.**
- **SPIRE is in REDY mode**
- **This switch off sequence can be executed in an emergency or if there is a malfunction in the cryostat operations.**

Initial Configuration:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-MCU-OFF	MCUBITSTAT	1/1/0		
2	Execute TCL script SPIRE-IST-SCU-OFF	SCUTEMPSTAT SUBKSTAT MODE	0xFFFF/-/0 1/-/0 REDY/-/DRCU_ON		
3	Execute Procedure SPIRE-IST-DRCU-OFF	MODE	DRCU_ON/-/DPU_ON		
4	Check that HK generation has stopped. TM2N should not be incrementing anymore	—	—	—	
5	Execute Procedure SPIRE-IST-DPU-OFF	—	—	—	

Test Result (Pass/Fail):

Final Configuration:
- SPIRE is switched off
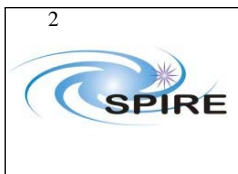
5. APPENDIX 3: SAFE SWITCH OFF IN CASE OF ANOMALY

The following procedure describes the necessary steps to safely switch off SPIRE if an anomaly should occur.

Procedure: SPIRE-SAFE-SWITCH-OFF
Version: 1.0
Date: 21st August 2006
Purpose: Switch off SPIRE

Preconditions: DPU AND OBS PARAMETERS SCOS display on MON1 task must be selected

Initial Configuration: SPIRE can be in any instrument configuration.

Procedure Steps:

Step	Description	Parameter - Unit	Current value	Success/ Failure
1	Check the current instrument configuration	MODE		
2	Case MODE 1: REDY → Go to step 3 2: DRCU_ON → Go to step 4			
3	Execute the following procedures in this document: ▪ 2.3.20 ▪ 2.3.21 ▪ 2.3.22 Go to step 5			
4	Execute the following procedures in this document: ▪ 2.3.22 Go to step 5			
5	Execute the following procedures in this document: ▪ 2.3.23			

Final Configuration: SPIRE is OFF