SPIRE Short Functional Test (SFT) Report for STM2 Test
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Scope
Report on the initial short cold functional test carried out on the CQM instrument installed in the Herschel STM-2 cryostat at Estec on 11 October 2006.

Introduction
This document describes the Short Functional Test (SFT) procedures to executed on the SPIRE CQM at ESTEC during the STM2 test. The procedures are as set out in **RD03** and are a subset of those appearing in **RD01** and were successfully validated during the EQM test campaign as described in **RD02**

Change Record
Issue 1.0, 11/10/2006 – First version.

Applicable Documents

Reference Documents

Ref#	Document Title	Issue nb.	Date
RD01	SPIRE Warm Functional Test Procedures for the SCOS	1.4	15/07/2005
RD02	SPIRE 3rd Warm Functional Test Report HP-2-ASED-TR-0077_1_0	1.0	19/07/2005
RD03	SPIRE Short Functional Test (SFT) Procedure for STM2 Test SPIRE-RAL-PRC-002729	1.0	6/10/2006

Test Configuration
The STM2 SPIRE Warm Units consist of the SPIRE AVM1 DPU and the DRCU QM2 electronics The WU was commanded using an ILT like configuration where the ground station SCOS2000 sends TCs via TestControl to the CDMS simulator and this forwards the commands to the SPIRE WU.

The following sections give a description of the HW/SW configuration for this test.

Hardware configuration

- DPU MAIN Power (HSDPU J01) is connected to power supply.
- DRCU MAIN Power (HSFCU J05) is connected to power supply.
- SPIRE AVM1 DPU is interconnected with SPIRE QM2 DRCU.
- SPIRE CQM FPU is connected to the DRCU QM2 electronics.
- SPIRE DPU AVM1 is to CDMS simulator on HSDPU J03. (1553 Mil Bus)
- CDSM Simulator is connected via LAN to I-EGSE
- I-EGSE workstations are interconnected via LAN.

Software configuration

- OBSW 2.0.C Resident on SPIRE AVM1 DPU EEPROM.
- BSW 2.0 Resident on SPIRE AVM1 PROM.
- CDMS Simulator v2.5 installed on CDMS Simulator NT 4.0 workstation.
- SPIRE Build #195 (HCSS build #691) installed on HOSQLA4-2
- SCOS2.3eP5 installed on HOSS2K4-2
- Versant 6.0.5 installed on HOSQLA4-2
- Java runtime 1.4.2 installed on HOSQLA4-2

Cryostat configuration

- Cryostat partly filled temperatures below 5 K everywhere (see section on test SPIRE-STM2-SCU-03)

On HOSQLA4-2 the following applications were running/ installed:

- Router and Gateway are running.
- SPIRE build of the HCSS and QLA installed.
- Test Database has been created on data server.
- Test Control Server is running.
- Telemetry ingestion is running.
- Packet Display running.
- QLA running and connected to the router.

On HOSS2K4-2 the following applications were running/ installed:

- SCOS is running on I-EGSE.
- Manual Stack Task started on SCOS
- TOPE is running

On CDSM Simulator workstation the following applications were running/ installed:

- CDMS Simulator executable is installed.
- CDMS Simulator is running. SPIRE Nominal Bus List selected.

Instrument EGSE (I-EGSE) set up:

- EGSE configured as per RD3

Detailed Test Procedure Reports

Procedure: SPIRE-STM2-DPU-ON
Execution date: 11th October 2006
Purpose: To switch on the SPIRE DPU and start generating housekeeping
Duration: ~ 1 minute
Pass/Fail Criterion: SPIRE OBS starts and Nominal and Critical HK reports are generated at nominal rates (1Hz and 0.5Hz respectively).

Preconditions:

- 28V Power Supply to the DPU is available
- SPIRE MIB is imported in the SCOS database.
- SCOS, TOPE and the CDMS Simulator are up and running
- DPU AND OBS PARAMETERS display is selected on SCOS

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 DPU AVM1	—	—	O.k.	**ok**
2	After the DPU is switched on, (5,1) event reports are produced every 10 seconds by the boot software. ➢ On PacketDisplay check the reception of these packets. ➢ On SCOS select BootROMMemoryCheck display and check that there are no errors reported on these event packets.	NERRORS	0/0	0/0	**ok**
3	Execute TCL script SPIRE-STM2-DPU-ON.tcl	—	—	done	**ok**
4	Press the RED reset button located on the DPU AVM1. See Figure 1 below			Repeated as pressed first before step 3	**ok**
5	Check that THSK parameter on the DPU AND OBS PARAMETERS display on SCOS is refreshing every second	THSK	-/refreshing every second	o.k.	**ok**
6	Check that TM2N parameter on the DPU AND OBS PARAMETERS display on SCOS is incrementing every second	TM2N	-/Incrementing by one every second	o.k.	**ok**
Test Result (Pass/Fail): Pass					

Final Configuration: SPIRE DPU is on but the DRCU is still off

Procedure: SPIRE-STM2-DRCU-ON
Execution date: 11th October 2006
Purpose: To switch on the SPIRE DRCU and start generating housekeeping
Duration: ~ 5 minutes
Pass/Fail Criterion: SPIRE DRCU QM2 voltages are nominal.

Preconditions:

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched off
- DPU and OBS PARAMETERS display is selected on SCOS

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
1	Execute TCL script SPIRE-STM2-DRCU-ON-STEP1.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	THSK	Refreshing/Not refreshing	Stopped	**ok**
3	Check that TM2N parameter is not incrementing anymore	TM2N	Incrementing/Not incrementing	Stopped	**ok**
4	Power ON SPIRE DRCU electronics.	—	—		**ok**
5	Execute SPIRE-STM2-DRCU-ON-STEP2.tcl	—	—	Started 09:55 UT	**ok**
6	Check that DRCU (FCU/DCU) voltages are nominal Correspondent parameters are located on SCU PARAMETERS and BIAS PARAMETERS displays.	SCUP5V SCUP9V SCUM9V BIASP5V BIASP9V BIASN9V	-/~5V -/~9V -/~-9V -/~5V -/~9V -/~-9V	5.23 V 9.067 V -9.077 V 5.12 V 8.95 V -9.08 V	**ok**
7	Check that THSK parameter is again refreshing every second	THSK	Not refreshing/ Refreshing	Started	**ok**
8	Check that TM2N parameter is again incrementing every second	TM2N	Not incrementing/incrementing by one @ 1Hz	Started	**ok**
Test Result (Pass/Fail): Pass					

Final Configuration:

- SPIRE DPU and DRCU are both on
- HK generation is on

Procedure: SPIRE-STM2-FUNC-SCU-01
Execution date: 11th October 2006
Purpose: SCU science packet generation check
Duration: ~ 1 minute
Pass/Fail Criterion: 31 SCU Nominal Science Frames are received at SCOS.

Preconditions:

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS

Procedure Steps:

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-SCU-01.tcl	SCUFRAMECNT TM5N	0/31 3FFF/1	0/31 3FFF/1	**ok**
Test Result (Pass/Fail): Pass					

Final Configuration: Unchanged

Procedure: SPIRE-STM2-FUNC-DCU-01
Execution date: 11th October 2006
Purpose: DCU science packet generation check for all Photometer and Spectrometer packet types (PF, PSW, PMW, PLW, SF, SSW and SLW)
Duration: ~ 3 minutes
Pass/Fail Criterion: 700 DCU Nominal Science Frames are received in SCOS

Preconditions:

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- DCU PARAMETERS display is selected on SCOS

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-DCU-01.tcl	DCUFRAMECNT	0/700	0/700	**ok**

Test Result (Pass/Fail): Pass
Final Configuration: Unchanged

Procedure: SPIRE-STM2-FUNC-DCU-04-PS-ON
Execution date: 11th October 2006
Purpose: Photometer LIAs switch on
Duration: ~ 1 minute
Pass/Fail Criterion: Photometer LIA boards show a rise in their temperature while switch ON

Preconditions: The Photometer and Spectrometer LIAs are switched off

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-DCU-04-PS-ON.tcl	SCUDCDCSTAT	0/1	**0/1**	**ok**
Test Result (Pass/Fail): Pass temps rising both SLIA/PLIA					

Final Configuration: The Photometer and Spectrometer LIAs are on.

Procedure: SPIRE-STM2-FUNC-SCU-04
Execution date: 11th October 2006
Purpose: Photometer Calibrator check
Duration: ~ 2 minutes
Pass/Fail Criterion: Measured PCAL voltage/current agrees with expected values (+/- 10%).

Preconditions: SPIRE CQM is electrically integrated with the cryostat.

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS

Step	Description	Parameter Name - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-SCU-04.tcl The expected values during the test should be monitored when parameter BBFULLTYPE in the SCU PARAMETERS display is set to PCAL_Check This usually happens about 30 seconds from the start of test execution.	PCALCURR - mA PCALV - V	0.0/0.1/0.0 0.0/0.026/0.0	**0/0.1/0 0 /0.0254 /0**	**ok**
Test Result (Pass/Fail):Pass					

Final Configuration: Unchanged

Procedure: SPIRE-STM2-FUNC-SCU-05
Execution date: 11th October 2006
Purpose: Spectrometer Calibrators check
Duration: ~ 3 minutes
Pass/Fail Criterion: Measured SCAL2/SCAL4 voltage/current agrees with expected values (+/- 10%).

Preconditions: SPIRE CQM is electrically integrated with the cryostat

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-SCU-05.tcl	—	—	10:17	
2	**Wait for the parameter BBFULLTYPE to get set to SCAL4_Check**	—	—	—	
3	A few seconds later record the value of parameters SCAL4CURR and SCAL4V *These parameters are set back to 0 after ~60 seconds*	SCAL4CURR – mA SCAL4V – V	0.0/0.10/0.0 0.0/0.05/0.0	0.098 0.0493	**ok**
4	**Wait for the parameter BBFULLTYPE to get set to SCAL2_Check**	—	—	—	
5	A few seconds later record the values of parameters SCAL2CURR and SCAL2V *These parameters are set back to 0 after ~60 seconds*	SCAL2CURR – mA SCAL2V – V	0.0/0.10/0.0 0.0/0.05/0.0	0.0986 0.0497	**ok**
Test Result (Pass/Fail): pass					

Final Configuration: Unchanged

Procedure: SPIRE-STM2-FUNC-SCU-07
Execution date: 11th October 2006
Purpose: SCU cooler heaters check
Duration: ~ 3 minutes
Pass/Fail Criterion: Measured Cooler Heat Switch voltages agree with expected values (+/- 10%).

Preconditions: SPIRE CQM is electrically integrated with the cryostat

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-SCU-07.tcl	—	—	10:20 rep 10:28	—
2	**Wait for the parameter BBFULLTYPE to get set to Cooler_Htr_Chk**				
3	A few seconds later record the value of parameter EVHSV – the Evaporator Heat Switch Voltage. *This voltage stays on for ~45 seconds.*	EVHSV - mV	0/~323/0	0/324.4/0	**ok**
4	A few seconds after the EVHSV parameter has been set back to 0, record the value of parameter SPHSV – the Sorption Pump Heat Switch Voltage. *This voltage stays on for ~45 seconds.*	SPHSV - mV	0/~323/0	0/324.94/ 0	**ok**
5	A few seconds after the SPHSV parameter has been set back to 0, record the value of parameter SPHTRV – the Sorption Pump Heater Voltage. *This voltage stays on for ~45 seconds.*	SPHTRV - V	0/~8.8/0	0/8.84/0	**ok**
Test Result (Pass/Fail): Pass – repeated cos I missed the parameters first time					

Final Configuration: Unchanged

Procedure: SPIRE-STM2-FUNC-SCU-03
Execution date: 11th October 2006
Purpose: SCU DC thermometry check
Duration: ~ 2 minutes
Pass/Fail Criterion: ALL temperature sensors show expected reading according to FPU temperature

Preconditions: SPIRE CQM is electrically integrated with the cryostat

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS

Step	Description	Parameter - Unit	Expected values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-SCU-03.tcl	—	—	10:29	—
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	
4	Record the CONVERTED values of SCU temperatures at the end of this test.	PUMPHTRTEMP PUMPHSTEMP EVAPHSTEMP SHUNTTEMP SOBTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	— — — — — — — — — — — — — — — —	11.46 4.99 5.58 2.12 5.31 2.10 2.14 5.32 5.75 5.30 5.42 5.89 5.22 5.04 5.54 4.88	**ok – STM-2 is part filled**

Test Result (Pass/Fail): **Pass**

Fina5.30l Configuration: SCU DC thermometry on.

Procedure: SPIRE-STM2-FUNC-SCU-06
Execution date: 11th October 2006
Purpose: SCU AC thermometry check
Duration: ~ 1 minute
Pass/Fail Criterion: SUBKSTAT parameters changes from 0 to 1

Preconditions: SPIRE CQM is electrically integrated with the cryostat

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS
- DPU AND OBS PARAMETERS display is selected on SCOS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-SCU-06.tcl	—	—	10:34	—
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	
4	**Only execute this step if the instrument is WARM** Record the RAW value of SUBKTEMP only if the	SUBKTEMP	~31915//~31904		
5	**Only execute this step if the instrument is COLD (He I or He II conditions)** **Note down the cryostat temperature (He I or He II)** Record the CONVERTED values of SUBKTEMP at the end of this test.	SUBKTEMP - K	—	3.08375	**ok**
Test Result (Pass/Fail): Pass					

Final Configuration: SCU AC thermometry on.

Procedure: SPIRE-STM2-FUNC-THO
Execution date: Not done so far
Purpose: Switch off SCU DC and AC thermometry – if necessary
Duration: ~ 1 minute
Pass/Fail Criterion: Test passed if SCUTEMPSTAT parameter changes from 0xFFFF to 0 and SUBKSTAT parameter changes from 1 to 0.

Preconditions: SPIRE CQM is electrically integrated with the cryostat

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS
- DPU AND OBS PARAMETERS display is selected on SCOS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-THO.tcl	—	—	—	—
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	FFFF/-/0	FFFF/0	**ok**
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0	1/0	**ok**

Test Result (Pass/Fail): Pass – see log executed at 15.31

Final Configuration:

- SCU DC and AC thermometry off.
- SPIRE in DRCU_ON mode.

Procedure: SPIRE-STM2-FUNC-DCU-04-PS-OFF
Execution date: 11th October 2006
Purpose: Photometer LIAs switch off
Duration: ~ 1 minute
Pass/Fail Criterion: Test passed if SCUDCDCSTAT parameter changes from 1 to 0.

Preconditions: The Photometer and Spectrometer LIAs are switched on, i.e. Procedure SPIRE-STM2-FUNC-DCU-04-PS-ON has been executed.

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- SCU PARAMETERS display is selected on SCOS

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-STM2-FUNC-DCU-04-PS-OFF.tcl	SCUDCDCSTAT	1/0	1/0	**ok**
Test Result (Pass/Fail): Pass – executed at 10:38					

Final Configuration: The Photometer and Spectrometer LIAs are off.

Procedure: SPIRE-STM2-DRCU-OFF
Execution date: Not carried out yet
Purpose: Switch off the DRCU

Preconditions: Procedure SPIRE-STM2-FUNC-THO has been successfully executed if SPIRE CQM is electrically integrated with the cryostat.

Initial Configuration:

- SPIRE DPU is on and generating HK
- DRCU is switched ON
- DPU AND OBS PARAMETERS display is selected on SCOS

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-STM2-DRCU-ON-STEP1.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	—	—	—	
3	Check that TM2N parameter is not incrementing anymore	—	—	—	
4	Power off the SPIRE DRCU	—	—	—	
Test Result (Pass/Fail): Pass – see log executed at 15:36					

Final Configuration:

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

Procedure: SPIRE-STM2-DPU-OFF
Execution date: 11th October 2006
Purpose: Switch off the DPU
Duration: ~ 1 minute

Preconditions: SPIRE-STM2-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 the SPIRE DPU	—	—	—	

Test Result (Pass/Fail): Pass – see log executed at 15:38
Final Configuration: SPIRE DPU is switched off