EADS Astrium

Test Report

Herschel

Title: Test Report For Integrated FM SPIRE Warm Units UFT

CI-No: 125200

Prepared by:	S. Hamer/TERMA AS	Date:	4th May 2007
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Issue	Date	Sheet	Description of Change	Release
1	04.05.07	All	Formal Issue	

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0 Test Summary

0.1 Unit tested

FM SPIRE Warm Units

PFM DPU, PN: 20-SPIRE-00.00, S/N: 01

DRCU: PFM DCU, PFM FCU

0.2 Applied Procedures:

FM SPIRE Warm Units UFT	HP-2-ASED-TP-0148, Issue 1 Redlined
ACS: SPIRE PRIME FM UFT with DRCU Simulator	HP-2-ASED-SD-0164 Issue 1

0.3 Procedure Execution Summary:

FM SPIRE WU TRR:	05.04.2007 HP-ASP-MN-9005
FM SPIRE WU UFT:	11-12.04.2007 see Appendix 1 for “as-run”
FM SPIRE WU PTR:	13.04.2007 HP-ASP-MN-9006
Location:	Astrium-EADS, Friedrichshafen
Test Session Name 1:	2007_04_11_04_44_hercdmu_hpws23_REALTIME
Environment:	H_ASTRIUM_ENV

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

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

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

Section/ Step No.	Description	Item Affected	NCR Raised	Affects Test Objective
Pre-Test	DPU Prime EEPROM failure (primary partition, secondary partition OK)	FM DPU	3204	No
Pre-Test	MilBus Interface not working on DPU Redundant during Integration (Procedure error – redline correction to UFT procedure)	Procedure	3205	No
Pre-Test	HP CCS session start problems	HPCCS	3275	No
§6.2.2 – 6.2.23	TM packets received in bursts on HPCCS.	HPCCS	3276	No
§6.2.3 & §6.2.14	Switch on Sequence for DRCU (FCU) Prime & Redundant incorrect	Procedure	3211	No
§6.2.6 Step 6.2 & §6.2.17 Step 17.2	Voltages out of limits for MCU Prime parameter MCUP15C & MCU Prime & Redundant parameter MCUM15V	Spec. (EIDP)	3277	No
§6.2.9 Step 9.3 & §6.2.20. Step 20.3	DCU Prime & Redundant High Speed check only works for Full Photometer packets	Test Script	3210	Yes

Table 1: FM SPIRE Warm Units UFT Summary

0.4 Summary Conclusion

The FM SPIRE Unit Functional Test (UFT) has been performed using version 2.2.G of the DPU OBSW with both FM DRCU and DRCU simulator.

There are a couple of open issues arising from the integration and UFT activities, which are listed in the following section.

A number of Non-Conformance Reports (as listed above) were raised, prior to, or during the test and only one affected the test objectives (NCR-3210). However, subsequently a new test script has been provided by SPIRE and the re-test demonstrated that all Spectrometer and Photometer packets were produced correctly.

0.5 Open Issues:

- SPIRE PRIME DPU EEPROM Partition 1 Failure (NCR-3204);
- SPIRE DCU High Speed Checks on both Main & Redundant units (NCR-3210), however it is believed that this is related to a SPIRE test script problem rather than an onboard;

1 Scope

This document reports on the UFT performed on the FM SPIRE Instrument warm units to check correct operation, after they have been electrically integrated with the FM SVM, using the Herschel CCS.

It is also addresses the repeat UFT on SPIRE PRIME DPU using the DRCU Simulator.

1.1 Objective

The objectives of the UFT and software upload were:

1. To check as much as possible the correct functional operation of the integrated FM SPIRE warm units;
2. To re-check the correct functional operation of the FM SPIRE DPU PRIME with the DRCU Simulator for use in the development of the IST Reference Mission Scenario where the FM FPU will not be available;
3. To act as baseline procedure on which the SPIRE specific aspects of the satellite level SFT and IST procedures can be developed;

The UFT verified the following for SPIRE warm units:

- Power on/off of FM SPIRE Prime & Redundant (CDMS/PCDU Interface) warm units (DPU + DRCU);
- Health Status HKTM Acquisition from SPIRE Prime (CDMS Interface);
- DRCU SCU/MCU/DCU High/Low Speed Link Checks;

1.2 Test Flow

The UFT test flow was structured to reflect nominal operations of SPIRE as much as possible to enable re-use for PFM and higher-level Satellite tests (SFT and IST).

The flow is as follows:

1. Power on and configure EGSE for test
2. Power on and configure SVM for test
3. Power on NOMINAL SPIRE warm units and enable Mil1553B-bus interface
4. Simulated SCU Prime Low Speed Link Check
5. Simulated SCU Prime High Speed Link Check
6. Simulated MCU Prime Low Speed Link Check
7. Simulated MCU Prime High Speed Link Check

8. Simulated DCU Prime Low Speed Link Check
9. Simulated DCU Prime High Speed Link Check
10. Disable Mil1553B-bus interface and Power off NOMINAL SPIRE warm units
11. Repeat Steps 3-10 for SPIRE Redundant Units
12. Repeat Prime UFT (steps 3-10) using FM DPU & DRCU Simulator
13. Power off SVM
14. Switch off all EGSE

2 Documents/Drawings

2.1 Applicable Documents

AD 1	Unit Functional Test of Integrated FM SPIRE Warm Units	HP-2-ASED-TP-0148

2.2 Reference Documents

None

2.3 Other Documents

None

2.4 Acronyms & Abbreviations

See “as-run” procedure.

3 Main Observations and Problems Identified

3.1 DPU Prime EEPROM Failure (NCRs: 3204)

Observed: Pre-Test: Instrument Warm Unit Electrical Integration

EEPROM Failure in Primary Partition of DPU Prime detected during Warm Unit Integration. NRB agreed to use secondary partition for formal UFT. New test script provided by SPIRE to force boot from the secondary partition. Procedure redlined to reference this new test script.

3.2 No Communication on DPU Redundant MilBus Interface (NCR-3205)

Observed: Pre-Test: Instrument Warm Unit Electrical Integration

No communication was observed on DPU Redundant Interface during electrical integration. Identified as a CDMU commanding error (wrong bit set in ConfigureSDBFDIR – DC005161 - command). Procedures redlined accordingly – no impact on UFT execution.

3.3 HPCCS Session Start Anomalies (NCR-3275)

Observed: Pre-Test: HPCCS Session Start

Start of test was delayed due to a number of HPCCS session start up problems. Initial attempt to start a Real—Time session failed with errors. Following attempt no communication could be established with the Power SCOE. Third attempt HPCCS reported errors in generating TM cache.

3.4 HPCCS Appears to Receive TM Packets in Bursts (NCR-3276)

Observed: Full Test Duration

TM Packets from satellite appear to be arriving in bursts even though they are generated at regular intervals. Default switch on configuration of SVM enables all 3 TM Packets (DLCM, Monitoring Mode 1 & Monitoring Mode 2) for downlink from CCU A & B. However, only one of the above should be downlinked at any one time. Moreover, none should be downlinked when CCU switched off (as was the case for the UFT). These packets were disabled as per Procedure Variation Sheet 1, which appeared to have some effect but regular bursts were still observed afterwards. Alenia on-site support suggests it is possibly related to the TM DFE but needs further investigation.

3.5 Switch On Sequence for DRCU (FCU) (NCR-3211)

Observed: Sections 6.2.3 & 6.2.14

Switch on sequence for DRCU(FCU) incorrect for both main and redundant units. HK TM packets need to be stopped before closing the FCU LCL and then restarted afterwards. The test did not fail with the incorrect sequence used on DRCU Prime. However, the correct sequence was attempted on DRCU Redundant but failed. This was identified as a timing problem between disabling HKTM packets generation and restarting, resulting in the CDMS declaring SickTM on the MilBus interface, as it considered the DPU to have failed as no TM packets had arrived within its timeout period.

After the formal UFT test run the required switch on sequence was repeated in a more timely fashion and this was successful.

It needs to be clarified what timeout period the CDMS uses to detect a problem on the MilBus TM interface.

3.6 MCU Voltages Out-Of-Limits (NCR-3277)

Observed: Sections 6.2.6 Step 6.2 (MCU Prime) & 6.2.17 Step 17.2 (MCU Redundant

A number of MCU voltages were slightly outside their nominal limits.

MCU Prime:

MCUP15V 15.54V (High Limit = 15.50V)

MCUM15V -15.63V (Low Limit = -15.50V)

MCU Redundant:

MCUM15V -15.61V (Low Limit = -15.50V)

3.7 DCU High Speed Checks only Working for Full Photometer Mode (NCR-3210)

Observed: Sections 6.2.9 Step 9.3 (DCU Prime) & 6.2.20 Step 20.3 (DCU Redundant)

Execution of test script SPIRE-WU-INT-MCU-02-P(R).tcl results in Science Packets only being generated for Full Photometer (TM Pkt 21,1 APID 1284(P) or 1285 (R).

Believed to be a test script timing problem. New test script provided, to be tested under cover of ACS HP-2-ASED-SD-0166 as part of the NCR investigation.

3.8 Procedure Changes

Several updates and clarifications in the UFT procedure were required. The procedure was redlined accordingly for inclusion, where relevant, in the FM UFT procedure. Main updates covered:

- DPU Redundant MilBus Configuration parameter to be set to 1 indicating Redundant Unit
- Reference to new test script (SPIRE-WU-INT-DPU-START-P-SP.tcl) to boot from DPU Prime secondary EEPROM Partition.
- DRCU Switch On Sequence corrected and warning added.

3.9 Re-Run Of SPIRE Prime UFT with DRCU Simulator

The Reference Mission Scenario cannot be run on the FM SPIRE Warm Units alone. Therefore a repeat test was performed with the DRCU Simulator in place of the FM DRCU under cover of ACS: HP-2-ASED-SD- 0164. All test steps were executed successfully with the known exceptions in the number of science packets generated by the DRCU Simulator (ref. NCR-3274) identified during the AVM SPIRE WU UFT.

4 Conclusion

The FM SPIRE Warm Units UFT was successfully performed apart from two open issues; DCU High Speed Checks failure to produce expected frames (ref. NC-3210). Secondly, the SPIRE PRIME UFT had to be performed booting from the secondary partition of DPU EEPROM (ref. NC-3204).

Post test investigations into the DCU High Speed Checks failure (NC-3210) have shown that the problem was related to a test script. A new test script has been provided by SPIRE and a re-test demonstrated that all Spectrometer and Photometer packets were produced correctly.

The repeat of the FM PRIME UFT using the DRCU Simulator was successful.

All other problems observed during the UFT, and NCRs raised, were primarily related to the EGSE configuration, procedural or documentation issues.

All procedures have been redlined for update in readiness for any repeat of the FM SPIRE UFT.

5 Appendix 1: FM SPIRE UFT As-Run Procedure

AS RUN.
REDLINED
MASTER

Title: **Unit Functional Test of Integrated FM SPIRE Warm Units**

CI-No: 125200

Prepared by:	S. Hamer/TERMA AS	Date:	31st March 2007
Checked by:	S. Idler		2.4.2007
Product Assurance:	for R. Stritter		4.4.2007
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1.0	31.03.07	All	First Formal Issue	

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1 Scope

This document describes the set of functional tests to be performed on the FM SPIRE Instrument to check correct operation using the Herschel CCS after it has been electrically integrated with the FM SVM.

Specifically the functional test will verify the following for both prime and redundant SPIRE warm units:

- **Power on/off of FM SPIRE (CDMS/PCDU Interface) warm unit and DRCU (FCU)**
- **Health Status HKTM Acquisition from SPIRE (CDMS Interface)**
- **Check of SCU Prime Low & High Speed Links**
- **Check of MCU Prime Low & High Speed Links**
- **Check of DCU Prime Low & High Speed Links**

Constraint

This test shall only be executed upon successful completion of the FM SPIRE integration activities as defined in ref. AD1.

1.1 Objective

The objective of the test is twofold:

1. To check as much as possible the correct functional operation of the integrated FM SPIRE warm units.
2. To act as baseline procedure on which the SPIRE specific aspects of the satellite level SFT and IST procedures can be developed.

1.2 Test Flow

This test flow is structured to reflect nominal operations of the FM SPIRE as much as possible to enable re-use for higher-level Satellite tests (SFT and IST).

The flow is as follows:

1. Power on and configure EGSE for test
2. Power on and configure SVM for test
3. Power on NOMINAL SPIRE Prime DPU and enable Mil1553B-bus interface
4. Power on DRCU(FCU) Prime

5. Check of SCU Prime Low & High Speed Links
6. Check of MCU Prime Low & High Speed Links
7. Check of DCU Prime Low & High Speed Links
8. Power off MCU Prime
9. Power off DRCU(FCU) Prime
10. Disable Mil1553B-bus interface and Power off SPIRE Prime DPU
11. Repeat Steps 3 – 10 for Spire Redundant including bus
12. Power off SVM
13. Switch off all EGSE

2 Documents/Drawings

2.1 Applicable Documents

AD 1	FM SPIRE Integration to Herschel SVM Procedure	HP-2-ASED-TP-125
AD 2	Herschel PCDU & CDMS Nominal Switch On/Off Procedure	HP-2-ASED-PR-070 in preparation
AD 3	Herschel SAT Emergency Switch Off Procedure	HP-2-ASED-PR-071
AD 4	PA Plan	HP-2-ASED-PL-0007
AD 5	I-EGSE Switch ON/OFF Procedure	TBI
AD 6	Test Specification for Herschel Instrument AVM & FM Tests Performed at Satellite Level	H-P-2-ASP-TS-1083
AD 7	H-P GDIR	H-P-1-ASPI-SP-0027
AD 8	SPIRE I-EGSE Set-Up, Issue 1.2	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	N/A	N/A
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 Warm Units Integration Test Procedures Iss. 1.3	SPIRE-RAL-PRC-2680
RD 7	SPIRE Functional Test Specification Iss. 1.4	SPIRE-RAL-DOC-001652
RD 8	SPIRE ILT Warm Unit Functional Test Procedure Iss. 1.2	SPIRE-RAL-PRC-002322
RD 9	SPIRE Instrument User Manual Iss. 1.0	SPIRE-RAL-PRJ-002395

RD 10	H/P OBT-UTC Time Synchronisation Technical Note Iss. 1.3	PT-CMOC-OPS-TN-6604-OPS- OGH
RD 11	Operating Manual DRCU Simulator, Iss 1	SPIRE-STK-PRC-001744

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

The figure below shows the overall EGSE/Satellite configuration for the test.

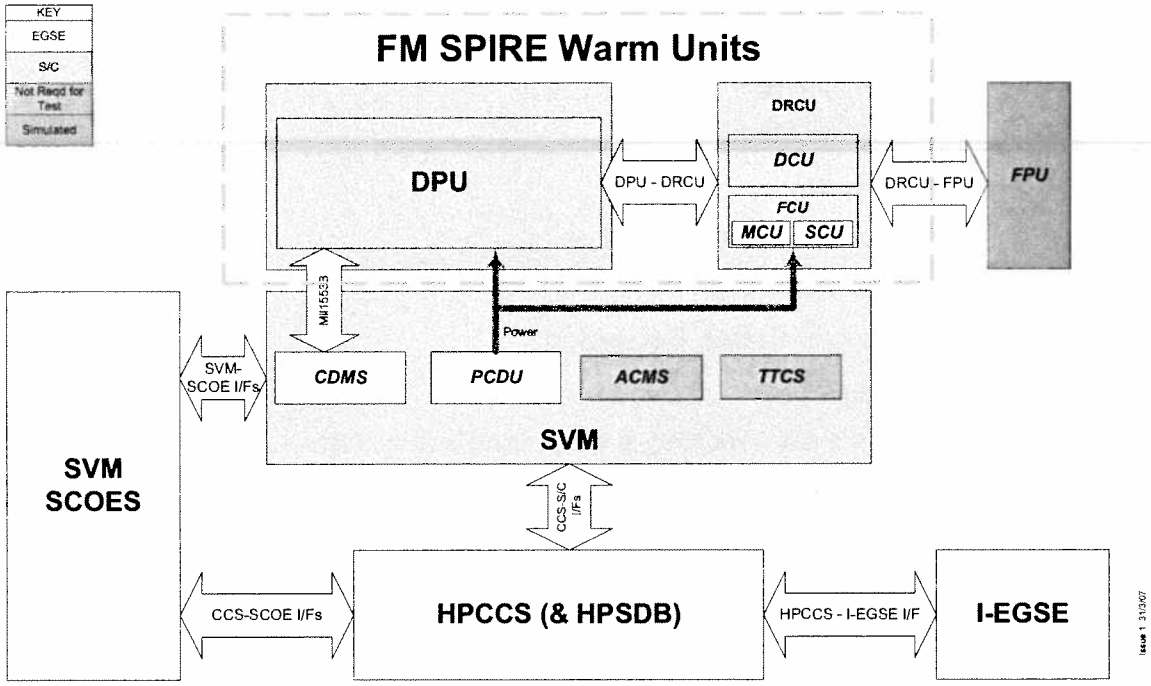

Figure 3-1: FM SPIRE UFT Configuration

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.

3.2 EGSE Configuration

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

I-EGSE shall be configured and connected to the HPCCS in accordance with AD 5 & AD 9.

3.3 Set-up

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

The following test scripts are required for execution on the HPCCS:

No.	Tcl Script Name	Comment	Confirmed
1	SPIRE-WU-INT-DPU-ON-P	DPU Prime power on sequence	
2	SPIRE-WU-INT-DRCU-START-P-STEP1	DRCU PRIME Power up step 1	
3	SPIRE-WU-INT-DRCU-START-P-STEP2	DRCU PRIME Power up step 1	
4	SPIRE-WU-INT-SCU-01-P	SCU Low Speed Link check	
5	SPIRE-WU-INT-SCU-02-P	SCU High Speed Link check	
6	SPIRE-WU-INT-MCU-01-P	MCU Low Speed Link check	
7	SPIRE-WU-INT-MCU-02-P	MCU High Speed Link check	
8	SPIRE-WU-INT-DCU-01-P	DCU Low Speed Link check	
9	SPIRE-WU-INT-DCU-02-P	DCU High Speed Link check	
10	SPIRE-WU-INT-MCU-OFF-P	MCU power off	
11	SPIRE-WU-INT-DRCU-OFF-P	DRCU PRIME power off	
12	SPIRE-WU-INT-DPU-ON-R	DPU Prime power on sequence	
13	SPIRE-WU-INT-DRCU-START-R-STEP1	DRCU PRIME Power up step 1	
14	SPIRE-WU-INT-DRCU-START-R-STEP2	DRCU PRIME Power up step 1	
15	SPIRE-WU-INT-SCU-01-R	SCU Low Speed Link check	
16	SPIRE-WU-INT-SCU-02-R	SCU High Speed Link check	
17	SPIRE-WU-INT-MCU-01-R	MCU Low Speed Link check	
18	SPIRE-WU-INT-MCU-02-R	MCU High Speed Link check	
19	SPIRE-WU-INT-DCU-01-R	DCU Low Speed Link check	
20	SPIRE-WU-INT-DCU-02-R	DCU High Speed Link check	
21	SPIRE-WU-INT-MCU-OFF-R	MCU power off	
22	SPIRE-WU-INT-DRCU-OFF-R	DRCU PRIME power off	
23	SubscribeParams	Subscribe Parameters sequence	

24 SPIRE-WU-INT-DPU-ON-P-SP DPU Prime Power on sequence boot from secondary segment

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

HPCCS Software	Version	Comment	Confirmed Installed
SPIRE MIB version	2.2.G2	Valid for both versions of DPU software.	

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

I-EGSE Software	Version	Comment
SPIRE MIB version	2.2.G2	Valid for both versions of DPU software.
SCOS version	2.3e patch 5	

4 Conditions

4.1 Personnel

Responsibility	Name / Organisation
Test Director	A. KOPPE/ASED
Test Conductor	A. Koppe /ASED
EGSE Operator	S. HAMER/TERMA
Electrical Engineer	N/A
Specialist Engineer	N/A
Element Cognizant	S. IDLER/ASED
PA Responsible	B. BARLAGE /ASED
Instrument Representative	S. SIDHER/RAL
Customer Representative	N/P.
ESA Representative	C. SCHARMBERG

4.2 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	96	✓	
Temperature	22°C ± 3°C	21.3°C	✓	
Rel. Humidity	40 % - 60 %	48%	✓	
Pressure	Ambient	973.7hPa	✓	

4.3 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 performed are detailed in the following sections.

4.3.1 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.

4.3.2 ESD constraints

Normal ESD constraints are to be observed when handling SPIRE units.

4.3.3 Special QA Requirements

None.

4.4 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.

4.4.1 MGSE

None.

4.4.2 CVSE

None.

4.4.3 EGSE

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

4.4.4 OGSE

None.

4.4.5 Special Equipment

None.

5 Verification Requirements and Test Criteria

This is purely a functional health check of the FM SPIRE warm units and interfaces. 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.

6 Test Procedure

6.1 Initial EGSE and Satellite Configuration for the Test

Spire FM Warm Units Integration to Herschel SVM Test Procedure ref. AD 1 SHALL be successfully completed before execution of this procedure.

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

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

6.2 Step by Step Procedure

6.2.1 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		SMG	
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						
1.3	Record Test Session Name:	2007_04_12_04_44_herccdmu_hpus23_REALTIME					
1.4	Confirm that EGSE and Satellite are in the correct configuration as per AD 2	OK		OK			
1.5	If not already selected, from HPCCS command CDMU to use SPIRE Bus Profile (Profile 3): **DC819160** SelectActiveSCBP **DH049160** **=3**	OK		OK	AND: ZAD07999 SPIRE Bus Profile	SMG	
1.6	Verify correct bus profile selected: **DEF5F160**	3		3		SMG	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
1.7	Switch on & configure SPIRE I-EGSE i.a.w. **AD5 & AD 9**						
1.8	Confirm SPIRE I-EGSE is in the correct configuration as per AD5 & AD 9	OK		OK			
1.9	From HPCCS Test Conductor console issue command to connect to SPIRE I-EGSE **connect HIEGSE**						
1.10	Confirm from HPCCS and SPIRE I-EGSE that the connection has been established	OK		OK			
	START OF SPIRE UFT						
1.11	Load Synoptics INSTURMENTS on HPCCS to display SPIRE status overview						

6.2.2 Switch On SPIRE PRIME DPU

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH ON DPU PRIME						
	DPU-A Power On Initial Conditions: DPU-A OFF						
2.1	Verify the following PCDU telemetry to verify DPU-A Off: LCL11 Status **SpireHsdN_L**11 **WM32C565** LCL11 current **SpireHsN_L**11 **WM308565**	OFF =0.0A	+/-0.046A	OFF 0.0	AND: ZAD03999 MIM: LCL_HERSCHEL		

Step-No.	Test-Step-Description			Nominal Value	Tolerance	Actual Value	Remarks	P	N
2.2	Disable CDMU FDIR while DPU switched ON and forced boot (RTA SPIRE used but not relevant) by issuing the following CMDS telecommand and verify on-board execution (x = don't care, either 0 or 1) :							SM	
	ConfigureSDBFDIR			**DC005161**	OK	OK			
	RTA	**DH011161**	**=21**				**SPIRE-A**		
	F0	**DH018161**	**=x**				RTA ON		
	F1	**DH019161**	**=x**				RTA Alive		
	F2	**DH020161**	**=x**				RTA Well_TC		
	F3	**DH021161**	**=x**				RTA Well_TM		
	F4	**DH022161**	**=x**				RTA Valid		
	F5	**DH023161**	**=x**				RTA Vital/Non-vital		
	F6	**DH024161**	**=x**				RT Nominal Unit		
	F7	**DH025161**	**=x**				RT TM Retry On/Off		
	F8	**DH026161**	**=x**				Bus A Active		
	F9	**DH027161**	**=x**				Bus A Healthy/Unhealthy		
	F10	**DH028161**	**=x**				Bus B Healthy/Unhealthy		
	F11	**DH029161**	**=0**				SDBFDIR Disable		
	M0	**DH030161**	**=0**				Mask F0		
	M1	**DH031161**	**=0**				Mask F1		
	M2	**DH032161**	**=0**				Mask F2		
	M3	**DH033161**	**=0**				Mask F3		
	M4	**DH034161**	**=0**				Mask F4		
	M5	**DH035161**	**=0**				Mask F5		
	M6	**DH036161**	**=0**				Mask F6		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	M7 DH037161 =0				Mask F7		
	M8 DH038161 =0				Mask F8		
	M9 DH039161 =0				Mask F9		
	M10 DH040161 =0				Mask F10		
	M11 DH041161 =1				Mask F11		
	CNT DH042161 =1				**Vital RT Loop (1)**		
	M_C DH043161 =0				**Mask for CNT**		
2.3	Verify FDIR disabled **DEFJ4160**	**DISABLED**		DISABLED	AND: ZAD07999	SWK	
2.4	Switch on RTA and enable Bus A on SPIRE DPU-A (RTA=21) by issuing the following CMDS telecommand and verify on-board execution (x = don't care, either 0 or 1) : **ConfigureSDBFDIR**	**DC005161**	OK	OK		SWK	
	RTA DH011161 =21				**SPIRE-A**		
	F0 DH018161 =1				**RTA ON**		
	F1 DH019161 =1				**RTA Alive**		
	F2 DH020161 =1				**RTA Well_TC**		
	F3 DH021161 =1				**RTA Well_TM**		
	F4 DH022161 =1				**RTA Valid**		
	F5 DH023161 =x				RTA Vital/Non-vital		
	F6 DH024161 =0				**RT Nominal Unit**		
	F7 DH025161 =x				RT TM Retry On/Off		
	F8 DH026161 =0				**Bus A Active**		
	F9 DH027161 =x				Bus A Healthy/Unhealthy		
	F10 DH028161 =x				Bus B Healthy/Unhealthy		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	F11 DH029161 =x				SDBFDIR Enable/Disable		
	M0 DH030161 =1				Mask F0		
	M1 DH031161 =1				Mask F1		
	M2 DH032161 =1				Mask F2		
	M3 DH033161 =1				Mask F3		
	M4 DH034161 =1				Mask F4		
	M5 DH035161 =0				Mask F5		
	M6 DH036161 =1				Mask F6		
	M7 DH037161 =0				Mask F7		
	M8 DH038161 =1				Mask F8		
	M9 DH039161 =0				Mask F9		
	M10 DH040161 =0				Mask F10		
	M11 DH041161 =0				Mask F11		
	CNT DH042161 =1				**Vital RT Loop (1)**		
	M_C DH043161 =0				**Mask for CNT**		
2.5	After 10secs verify SPIRE-A RTA ON: **SPIREA_OnOff DED1G161** **SPIREA_DeadAliv DED1H161** **SPIREA_WellStiTM DED1J161** **SPIREA_ValidInval DED1K161** **SPIREA_WellStiTC DED1Z161**	 ON Alive Well Valid Well		ON Alive Well Valid Well	AND: ZAD12999	SM	
2.6	Power on DPU-A by issuing the following **SwOn_SpireHSPDU_N_L11** telecommand (CDMS-TC(8,4,112,5)) and verify on-board execution: **DC11D170**	 OK		 OK		SM	
2.7	Verify the following PCDU telemetry to verify DPU-A ON:						

Step-No.	Test-Step-Description			Nominal Value	Tolerance	Actual Value	Remarks	P	N
	LCL11 (DPU-A) Status **STS_LCL**11 **WM32C565** LCL11 (DPU-A) current **ITLM_LCL**11 **WM308565**			ON 0.46 A	 +/- 0.046 A	ON 0.44A			
2.8	HPCCS Operator to inform SPIRE Responsible that SPIRE DPU Nominal powered			OK		OK.			
2.9	On HPCCS start test script **SubscribeParams.tcl** to handle command parameter packets sent from the I-EGSE			OK		OK			
2.10	On HPCCS start **SPIRE-WU-INT-DPU-START-P-SP.tcl** test script to configure DPU			OK		OK	Boot from secondary partition		
2.11	Enable CDMU FDIR (RTA SPIRE used but not relevant) by issuing the following CMDS telecommand and verify on-board execution (x = don't care, either 0 or 1) : **ConfigureSDBFDIR**			**DC005161**	OK	OK			
	RTA	**DH011161**	**=21**				**SPIRE-A**		
	F0	**DH018161**	=x				RTA ON		
	F1	**DH019161**	=x				RTA Alive		
	F2	**DH020161**	=x				RTA Well_TC		
	F3	**DH021161**	=x				RTA Well_TM		
	F4	**DH022161**	=x				RTA Valid		
	F5	**DH023161**	=x				RTA Vital/Non-vital		
	F6	**DH024161**	=x				RT Nominal Unit		
	F7	**DH025161**	=x				RT TM Retry On/Off		
	F8	**DH026161**	=x				Bus A Active		
	F9	**DH027161**	=x				Bus A Healthy/Unhealthy		

Step-No.	Test-Step-Description			Nominal Value	Tolerance	Actual Value	Remarks	P	N
	F10	DH028161	=x				Bus B Healthy/Unhealthy		
	F11	DH029161	=1				**SDBFDIR Enable**		
	M0	DH030161	=0				Mask F0		
	M1	DH031161	=0				Mask F1		
	M2	DH032161	=0				Mask F2		
	M3	DH033161	=0				Mask F3		
	M4	DH034161	=0				Mask F4		
	M5	DH035161	=0				Mask F5		
	M6	DH036161	=0				Mask F6		
	M7	DH037161	=0				Mask F7		
	M8	DH038161	=0				Mask F8		
	M9	DH039161	=0				Mask F9		
	M10	DH040161	=0				Mask F10		
	M11	DH041161	=1				**Mask F11**		
	CNT	DH042161	=1				**Vital RT Loop (1)**		
	M_C	DH043161	=0				Mask for CNT		
2.12	Verify FDIR (re-)enabled		**DEFJ4160**	**ENABLED**		ENABLED	AND: ZAD07999	SWA	
2.13	Check that Nominal and Critical HK packets are arriving at the CCS: **SPIRE Nominal HK:** • (type ,subtype) : (3,25) • APID : 0x502 (1282) **SPIRE Critical HK:** • (type ,subtype) : (3,25) • APID: 0x500 (1280)			OK			OK	SWA	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
2.14	On I-EGSE check that THSK parameter is refreshing every second	OK		OK.			
2.15	On I-EGSE check that TM2N parameter is incrementing by 1 every second	OK		OK.			
2.16	On I-EGSE check that TM1N parameter is incrementing by 1 every 2 second	OK		OK			
2.17	On CCS check the consistency of the SPIRE on board time to the HCDMU time and the CCS.	OK		OK			
2.18	On IEGSE check the consistency between SCOS time and THSK and QLA time.	OK		OK			
	SPIRE PRIME DPU POWER ON COMPLETE						

6.2.3 Switch On DRCU Prime

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH ON DRCU PRIME						
	DRCU-A Power On						
	Initial Conditions: DRCU-A OFF						
3.1	Verify the following PCDU telemetry to verify FCU-A Off: LCL51 Status **SpireHsfN_L**51 **WM42C565** LCL51 current **SpireHsfN_L**51 **WM408565**	 OFF =0.0A	 +/-0.28A	 OFF 0.0.	AND: ZAD03999 MIM: LCL_HERSCHEL		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
3.2	Power on FCU-A by issuing the following **SwOn_SpireHSPDU_N_L51** telecommand (CDMS-TC(8,4,112,5)) and verify on-board execution: **DC51D170**	OK		OK			
3.3	Verify the following PCDU telemetry to verify FCU-A ON: LCL51 (FCU-A) Status **STS_LCL**51 **WM42C565** LCL51 (FCU-A) current **ITLM_LCL**51 **WM408565**	ON ~~2.8A~~0.44	+/- 0.~~28~~06 A	0.424	Rises to around 2.8A when MCU powered		
3.4	HPCCS Operator to inform SPIRE Responsible that SPIRE DRCU Nominal powered	OK		OK			
3.5	On HPCCS start **SPIRE-WU-INT-DRCU-START-P-STEP1.tcl** test script to configure DRCU	OK		OK			
3.6	On I-EGSE check that **THSK** parameter is not refreshing anymore	OK		OK			
3.7	On I-EGSE check that **TM2N** parameter is not incrementing anymore	OK		OK			
3.8	On HPCCS Execute **TCL** script **SPIRE-WU-INT-DRCU-START-P-STEP2.tcl**			OK			
3.9	On I-EGSE check that **THSK** parameter is refreshing every second	OK		OK			
3.10	On I-EGSE check that **TM2N** parameter is incrementing by 1 every second	OK					
3.11	Check that the SCU/DCU voltages show nominal values: **SCUP5V** **SCUP9V**	~ 5.2 ± 0.5V ~ 9.0 ± 0.2V		5.24 V 9.09 V			

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SCUM9V	~ -9.0 ± 0.2V		-9.08 V			
	BIASP5V	~ 5.1 ± 0.5V		5.18 V			
	BIASP9V	~ 9.0 ± 0.2V		8.99 V			
	BIASM9V	~ -9.0 ± 0.2V		-9.05 V.			
	SPIRE PRIME DRCU POWER ON COMPLETE						

6.2.4 Check correct functioning of the SCU PRIME Low Speed Link

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
4.1	On HPCCS Execute TCL script **SPIRE-WU-INT-SCU-01-P.tcl**		OK	OK		
4.2	On I-EGSE verify:	SCUTEMPSTAT SUBKSTAT	0/0xFFFF 0/1	0 0xFFFF 0 / 1		

6.2.5 *Check correct functioning of the SCU PRIME High Speed Link*

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
5.1	On HPCCS Execute TCL script **SPIRE-WU-INT-SCU-02-P.tcl**		OK	OK		
5.2	On I-EGSE verify:	SCUFRAMECNT TM5N	0/31 0x3FFF/1	0/31 0x3FFF/1		Pass
5.3	Verify that two telemetry packets with : • (type,subtype): (21,1). • APID : 0x508 (1288) have been received at CCS		OK	OK		Pass

6.2.6 *Check correct functioning of the MCU PRIME Low Speed Link*

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
6.1	On HPCCS Execute TCL script **SPIRE-WU-INT-MCU-01-P.tcl**		OK	OK		
6.2	On I-EGSE check that the MCU is booted up successfully	**MCUBITSTAT** **MCUP5V** **MCUP14V** **MCUM14V**	0/-/1 ~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V	0 / 1 5.01 14.15 −14.46		OK

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
		MCUP15V **MCUM15V**	~ 15.0 ± 0.5V ~ -15.0 ± 0.5V	15.54 V -15.63 V	FCU current ≈ 0.92A.	NOK.

6.2.7 *Check correct functioning of the MCU PRIME High Speed Link*

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
7.1	On HPCCS Execute TCL script **SPIRE-WU-INT-MCU-02-P.tcl**		OK			
7.2	On I-EGSE Record the values of MCUFRAMECNT at the start and end of the test	MCUFRAMECNT	FM: 0/297	0/297		Pass
7.3	Verify that the following type of MCU telemetry packets have been received at the CCS : ENG: - (type,subtype): (21,3). - APID 0x508 (1288) BSM - (type,subtype): (21,1). - APID 0x508 (1288) SMEC -(type,subtype): (21,1).		OK	OK		Pass

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
	- APID 0x508 (1288)					

6.2.8 *Check correct functioning of the DCU PRIME Low Speed Link*

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
8.1	On HPCCS Execute TCL script **SPIRE-WU-INT-DCU-01-P.tcl**		OK	OK		
8.2	On I-EGSE check that:	PSWBIAS PMWBIAS PLWBIAS	0/0xff/0 0/0xff/0 0/0xff/0	0/0xff/0 0/0xff/0 0/0xff/0		Pass

6.2.9 *Check correct functioning of the DCU PRIME High Speed Link*

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
9.1	On HPCCS Execute TCL script **SPIRE-WU-INT-DCU-02-P.tcl**		OK	OK		
9.2	On I-EGSE check that:	DCUFRAMECNT	FM: 0/700	0/100		
9.3	Verify that the following type of DCU science telemetry packets have been received at the CCS : Full Photometer: - (type,subtype): (21,1). - APID 0x504 (1284) PSW - (type,subtype): (21,2). - APID 0x504 (1284) PMW -(type,subtype): (21,2). - APID 0x504 (1284) PLW -(type,subtype): (21,2). - APID 0x504 (1284) Full Spectrometer: - (type,subtype): (21,1). - APID 0x506 (1286) SSW - (type,subtype): (21,2). - APID 0x506 (1286) SLW -(type,subtype): (21,2). - APID 0x506 (1286)		OK OK (100) NOK (0) NOK (0) NOK (0) NOK (0) NOK (0) NOK (0) NOK (0)			NCR-ASED-3210

6.2.10 Switch Off MCU Prime

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
10.1	On HPCCS Execute TCL script **SPIRE-WU-INT-MCU-OFF-P.tcl**		OK	OK.		Pass
10.2	On I-EGSE check that the MCU is switched off:	MCUBITSTAT	1/-/0	1/-/0		Pass

6.2.11 Switch Off DRCU PRIME

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH OFF DRCU PRIME						
	DRCU-A Power Off						
	Initial Conditions: DRCU-A ON						
11.1	Verify the following PCDU telemetry to verify FCU-A On: LCL51 Status **SpireHsfN_L**51 **WM42C565** LCL51 current **SpireHsfN_L**51 **WM408565**	 ON =~~2.80~~.44A	 +/-0.~~28A06A~~	 ON 0.50A	AND: ZAD03999 MIM: LCL_HERSCHEL	 SMG	 |
11.2	On HPCCS start **SPIRE-WU-INT-DRCU-OFF-P.tcl** test script to configure DRCU for switch off	OK		OK		SMG	
11.3	On I-EGSE check that THSK parameter is not refreshing anymore	OK		OK		SMG	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
11.4	On I-EGSE check that TM2N parameter is not incrementing anymore	OK		OK			
11.5	Power off FCU-A by issuing the following **SwOff_SpireHSPDU_N_L51** telecommand (CDMS-TC(8,4,112,5)) and verify on-board execution: **DC51B170**	OK		OK			
11.6	Verify the following PCDU telemetry to verify FCU-A OFF: LCL51 (FCU-A) Status **STS_LCL**51 **WM42C565** LCL51 (FCU-A) current **ITLM_LCL**51 **WM408565**	OFF 0.0 A	+/- 0.~~28~~06 A	OFF 0.0 A			
11.7	HPCCS Operator to inform SPIRE Responsible that SPIRE DRCU/FCU Prime powered off	OK		OK			
	SPIRE PRIME DRCU POWER OFF COMPLETE						

6.2.12 Switch Off SPIRE DPU Prime Unit

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH OFF DPU PRIME						
	DPU-A Power Off Initial Conditions: DPU-A ON						
12.1	Verify the following PCDU telemetry to verify DPU-A On: LCL11 Status **SpireHsdN_L**11				AND: ZAD03999 MIM: LCL_HERSCHEL		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	LCL11 current **SpireHsN_L**11 **WM32C565**	ON		ON			
	WM308565	0.46 A	+/- 0.046 A	0.444			
12.2	Disable and Switch off RTA SPIRE DPU-A (RTA=21) by issuing the following CMDS telecommand and verify on-board execution (x = don't care) : **ConfigureSDBFDIR**	**DC005161**	OK	OK			
	RTA DH011161 =21				**SPIRE-A**		
	F0 DH018161 =0				**RTA OFF**		
	F1 DH019161 =x				RTA Alive		
	F2 DH020161 =x				RTA Well_TC		
	F3 DH021161 =x				RTA Well_TM		
	F4 DH022161 =0				**RTA Invalid**		
	F5 DH023161 =x				RTA Vital/Non-vital		
	F6 DH024161 =x				RT Nominal Unit		
	F7 DH025161 =x				RT TM Retry On/Off		
	F8 DH026161 =x				Bus A Active		
	F9 DH027161 =x				Bus A Healthy/Unhealthy		
	F10 DH028161 =x				Bus B Healthy/Unhealthy		
	F11 DH029161 =x				SDBFDIR Enable/Disable		
	M0 DH030161 =1				**Mask F0**		
	M1 DH031161 =0				Mask F1		
	M2 DH032161 =0				Mask F2		
	M3 DH033161 =0				Mask F3		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	M4 DH034161 =1				**Mask F4**		
	M5 DH035161 =0				Mask F5		
	M6 DH036161 =0				Mask F6		
	M7 DH037161 =0				Mask F7		
	M8 DH038161 =0				Mask F8		
	M9 DH039161 =0				Mask F9		
	M10 DH040161 =0				Mask F10		
	M11 DH041161 =0				Mask F11		
	CNT DH042161 =1				**Vital RT Loop (1)**		
	M_C DH043161 =0				**Mask for CNT**		
12.3	After 10secs verify SPIRE-A RTA OFF: **SPIREA_OnOff DED1G161** **SPIREA_ValidInval DED1K161**	 OFF Invalid		OFF Invalid	AND: ZAD12999		
12.4	Power off DPU-A by issuing the following **SwOff_SpireHSPDU_N_L11** telecommand (CDMS-TC(8,4,112,5)) and verify on-board execution: **DC11B170**	 OK		OK			
12.5	Verify the following PCDU telemetry to verify DPU-A OFF: LCL11 (DPU-A) Status **STS_LCL**11 **WM32C565** LCL11 (DPU-A) current **ITLM_LCL**11 **WM308565**	 OFF 0.0 A	 +/- 0.046A	 OFF 0.0 A	AND: ZAD03999 MIM: LCL_HERSCHEL		
12.6	HPCCS Operator to inform SPIRE Responsible that SPIRE DPU Prime powered off	OK					
12.7	On HPCSS terminate SubscribeParams test script.	OK		OK			
	SPIRE DPU PRIME POWER OFF COMPLETE						

6.2.13 Switch On Redundant SPIRE Units

Step-No.	Test-Step-Description			Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH ON DPU REDUNDANT								
	DPU-B Power On								
	Initial Conditions: DPU-A OFF								
13.1	Verify the following PCDU telemetry to verify DPU-B Off: LCL12 Status **SpireHsdN_L**12		**WM82C565**	OFF		OFF	AND: ZAD03999 MIM: LCL_HERSCHEL	SWH	
	LCL12 current **SpireHsN_L**12		**WM808565**	=0.0A	+/-0.046A	0.0A			
13.2	Disable CDMU FDIR while DPU switched ON and forced boot (RTA SPIRE used but not relevant) by issuing the following CMDS telecommand and verify on-board execution (x = don't care, either 0 or 1) :		**ConfigureSDBFDIR**	**DC005161**	OK	OK		SWH	
		RTA	**DH011161**	**=22**				**SPIRE-B**		
		F0	**DH018161**	**=x**				RTA ON		
		F1	**DH019161**	**=x**				RTA Alive		
		F2	**DH020161**	**=x**				RTA Well_TC		
		F3	**DH021161**	**=x**				RTA Well_TM		
		F4	**DH022161**	**=x**				RTA Valid		
		F5	**DH023161**	**=x**				RTA Vital/Non-vital		
		F6	**DH024161**	**=x**				RT Nominal Unit		
		F7	**DH025161**	**=x**				RT TM Retry On/Off		

Step-No.	Test-Step-Description			Nominal Value	Tolerance	Actual Value	Remarks	P	N
	F8	**DH026161**	**=x**				Bus A Active		
	F9	**DH027161**	**=x**				Bus A Healthy/Unhealthy		
	F10	**DH028161**	**=x**				Bus B Healthy/Unhealthy		
	F11	**DH029161**	**=0**				SDBFDIR Disable		
	M0	**DH030161**	**=0**				Mask F0		
	M1	**DH031161**	**=0**				Mask F1		
	M2	**DH032161**	**=0**				Mask F2		
	M3	**DH033161**	**=0**				Mask F3		
	M4	**DH034161**	**=0**				Mask F4		
	M5	**DH035161**	**=0**				Mask F5		
	M6	**DH036161**	**=0**				Mask F6		
	M7	**DH037161**	**=0**				Mask F7		
	M8	**DH038161**	**=0**				Mask F8		
	M9	**DH039161**	**=0**				Mask F9		
	M10	**DH040161**	**=0**				Mask F10		
	M11	**DH041161**	**=1**				Mask F11		
	CNT	**DH042161**	**=1**				**Vital RT Loop (1)**		
	M_C	**DH043161**	**=0**				**Mask for CNT**		
13.3	Verify FDIR disabled **DEFJ4160**			**DISABLED**		DISABLED	AND: ZAD07999		
13.4	Switch on RTA and enable Bus A on SPIRE DPU-A (RTA=22) by issuing the following CMDS telecommand and verify on-board execution (x = don't care, either 0 or 1) : **ConfigureSDBFDIR**			**DC005161**	OK	OK			
	RTA	**DH011161**	**=22**				**SPIRE-B**		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	F0 DH018161 =1				**RTA ON**		
	F1 DH019161 =1				**RTA Alive**		
	F2 DH020161 =1				**RTA Well_TC**		
	F3 DH021161 =1				**RTA Well_TM**		
	F4 DH022161 =1				**RTA Valid**		
	F5 DH023161 =x				RTA Vital/Non-vital		
	F6 DH024161 =01				**RT ~~Nominal~~ Redundant Unit**		
	F7 DH025161 =x				RT TM Retry On/Off		
	F8 DH026161 =0				**Bus A Active**		
	F9 DH027161 =x				Bus A Healthy/Unhealthy		
	F10 DH028161 =x				Bus B Healthy/Unhealthy		
	F11 DH029161 =x				SDBFDIR Enable/Disable		
	M0 DH030161 =1				Mask F0		
	M1 DH031161 =1				Mask F1		
	M2 DH032161 =1				Mask F2		
	M3 DH033161 =1				Mask F3		
	M4 DH034161 =1				Mask F4		
	M5 DH035161 =0				Mask F5		
	M6 DH036161 =1				Mask F6		
	M7 DH037161 =0				Mask F7		
	M8 DH038161 =1				Mask F8		
	M9 DH039161 =0				Mask F9		
	M10 DH040161 =0				Mask F10		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	M11 DH041161 =0				Mask F11		
	CNT DH042161 =1				**Vital RT Loop (1)**		
	M_C DH043161 =0				**Mask for CNT**		
13.5	After 10secs verify SPIRE-B RTA ON:				AND: ZAD12999		
	SPIREB_OnOff DED21161	ON		ON			
	SPIREB_DeadAliv DED22161	Alive		Alive			
	SPIREB_WellStiTC DED23161	Well		Well			
	SPIREB_WellStiTM DED24161	Well		Well			
	SPIREB_ValidInval DED25161	Valid		Valid			
13.6	Power on DPU-B by issuing the following **SwOn_SpireHSPDU_N_L12** telecommand (CDMS-TC(8,4,112,5)) and verify on-board execution: **DC12D170**	OK		OK			
13.7	Verify the following PCDU telemetry to verify DPU-B Off: LCL12 Status **SpireHsdN_L**12 **WM82C565**	ON		ON			
	LCL12 current **SpireHsN_L**12 **WM808565**	0.46 A	+/- 0.046 A	0.45			
13.9	On HPCCS start test script SubscribeParams.tcl to handle command parameter packets sent from the I-EGSE	OK		OK			
13.10	On HPCCS start **SPIRE-WU-INT-DPU-START-R.tcl** test script to configure DPU	OK		OK			
13.11	Enable CDMU FDIR (RTA SPIRE used but not relevant) by issuing the following CMDS telecommand and verify on-board execution (x = don't care, either 0 or 1) : **ConfigureSDBFDIR**	**DC005161**	OK	OK			
	RTA DH011161 =22				**SPIRE-B**		

Step-No.	Test-Step-Description			Nominal Value	Tolerance	Actual Value	Remarks	P	N
	F0	**DH018161**	=x				RTA ON		
	F1	**DH019161**	=x				RTA Alive		
	F2	**DH020161**	=x				RTA Well_TC		
	F3	**DH021161**	=x				RTA Well_TM		
	F4	**DH022161**	=x				RTA Valid		
	F5	**DH023161**	=x				RTA Vital/Non-vital		
	F6	**DH024161**	=x				RT Nominal Unit		
	F7	**DH025161**	=x				RT TM Retry On/Off		
	F8	**DH026161**	=x				Bus A Active		
	F9	**DH027161**	=x				Bus A Healthy/Unhealthy		
	F10	**DH028161**	=x				Bus B Healthy/Unhealthy		
	F11	**DH029161**	**=1**				**SDBFDIR Enable**		
	M0	**DH030161**	=0				Mask F0		
	M1	**DH031161**	=0				Mask F1		
	M2	**DH032161**	=0				Mask F2		
	M3	**DH033161**	=0				Mask F3		
	M4	**DH034161**	=0				Mask F4		
	M5	**DH035161**	=0				Mask F5		
	M6	**DH036161**	=0				Mask F6		
	M7	**DH037161**	=0				Mask F7		
	M8	**DH038161**	=0				Mask F8		
	M9	**DH039161**	=0				Mask F9		
	M10	**DH040161**	=0				Mask F10		
	M11	**DH041161**	**=1**				**Mask F11**		
	CNT	**DH042161**	**=1**				**Vital RT Loop (1)**		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	M_C DH043161 =0				Mask for CNT		
13.12	Verify FDIR (re-)enabled DEFJ4160	ENABLED		ENABLED	AND: ZAD07999		
13.13	HPCCS Operator to inform SPIRE Responsible that SPIRE DPU Redundant powered	OK		OK			
13.14	Check that Nominal and Critical HK packets are arriving at the CCS: **SPIRE Nominal HK:** • (type ,subtype) : (3,25) • APID : 0x503 (1283) **SPIRE Critical HK:** • (type ,subtype) : (3,25) • APID: 0x501 (1281)	OK		OK			
13.15	On I-EGSE check that THSK parameter is refreshing every second	OK		OK			
13.16	On I-EGSE check that TM2N parameter is incrementing by 1 every second	OK		OK			
13.17	On I-EGSE check that TM1N parameter is incrementing by 1 every 2 second	OK		OK			
13.18	On CCS check the consistency of the SPIRE on board time to the HCDMU time and the CCS.	OK		OK			
13.19	On IEGSE check the consistency between SCOS time and THSK and QLA time.	OK		OK			
	SPIRE REDUNDANT DPU POWER ON COMPLETE						

6.2.14 Switch On DRCU REDUNDANT

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH ON DRCU REDUNDANT						
	DRCU-B Power On Initial Conditions: DRCU-B OFF						
14.1	Verify the following PCDU telemetry to verify FCU-B Off: LCL52 Status **SpireHsfN_L**52 **WM72C565** LCL52 current **SpireHsfN_L**52 **WM708565**	OFF =0.0A	+/-0.28A06A	OFF 0.0A	AND: ZAD03999 MIM: LCL_HERSCHEL		
14.2	Power on FCU-B by issuing the following **SwOn_SpireHSPDU_N_L52** telecommand (CDMS-TC(8,4,112,5)) and verify on-board execution: **DC52D170**	OK		OK			
14.3	Verify the following PCDU telemetry to verify FCU-B ON: LCL52 (FCU-B) Status **STS_LCL**52 **WM72C565** LCL52 (FCU-B) current **ITLM_LCL**52 **WM708565**	ON 2.80.44A	+/- 0.28-06 A	ON 0.47A	Rises to around 2.8A when MCU powered		
14.4	HPCCS Operator to inform SPIRE Responsible that SPIRE DRCU Redundant powered	OK		OK			
14.5	On HPCCS start **SPIRE-WU-INT-DRCU-START-R-STEP1.tcl** test script to configure DRCU	OK		OK			
14.6	On I-EGSE check that THSK parameter is not refreshing anymore	OK		OK			

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
14.7	On I-EGSE check that TM2N parameter is not incrementing anymore	OK		OK			
14.8	On HPCCS Execute TCL script **SPIRE-WU-INT-DRCU-START-R-STEP2.tcl**			OK			
14.9	On I-EGSE check that THSK parameter is refreshing every second	OK					
14.10	On I-EGSE check that TM2N parameter is incrementing by 1 every second	OK					
14.11	Check that the SCU/DCU voltages show nominal values: **SCUP5V** **SCUP9V** **SCUM9V** **BIASP5V** **BIASP9V** **BIASM9V**	 ~ 5.2 ± 0.5V ~ 9.0 ± 0.2V ~ -9.0 ± 0.2V ~ 5.1 ± 0.5V ~ 9.0 ± 0.2V ~ -9.0 ± 0.2V		5.23 9.09 -9.10 5.17 9.01 -9.07			
	SPIRE REDUNDANT DRCU POWER ON COMPLETE						

6.2.15 Check correct functioning of the SCU REDUNDANT Low Speed Link

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
15.1	On HPCCS Execute **TCL script SPIRE-WU-INT-SCU-01-R.tcl**		OK	OK		
15.2	On I-EGSE verify:	SCUTEMPSTAT SUBKSTAT	0/0xFFFF 0/1	0 / FFFF 0 / 1		

DS: 65535 ID: ZAD129 Title: CDMS HK-0x1000 EssLow 2 of 12 Sample Time: 2007.101.19.40.30.142 Workstation: hpws24

NAME	DESCRIPTION	VALUE	UNIT
DEF75160	ACCBValid_Inval	Invalid	
DEDZF161	SdbRtaCfgHIFI_A	14	
DEDZG161	HIFIA_OnOff	OFF	
DEDZH161	HIFIA_DeadAlive	Alive	
DEDZZ161	HIFIA_WellSicTC	Well	
DEDZJ161	HIFIA_WellSicTM	Well	
DEDZK161	HIFIA_ValidInv	Invalid	
DED10161	SdbRtaCfgHIFI_B	14	
DED11161	HIFIB_OnOff	OFF	
DED12161	HIFIB_DeadAlive	Alive	
DED13161	HIFIB_WellSicTC	Well	
DED14161	HIFIB_WellSicTM	Well	
DED15161	HIFIB_ValidInv	Invalid	
DED1F161	SdbRtaCfgSpireA	14	
DED1G161	SPIREA_OnOff	OFF	
DED1H161	SPIREA_DeadAliv	Alive	
DED1Z161	SPIREA_WellSiTC	Well	
DED1J161	SPIREA_WellSiTM	Well	
DED1K161	SPIREA_ValidInv	Invalid	
DED20161	SdbRtaCfgSpireB	29	
DED21161	SPIREB_OnOff	ON	
DED22161	SPIREB_DeadAliv	Alive	
DED23161	SPIREB_WellSiTC	Well	
DED24161	SPIREB_WellSiTM	Sick	
DED25161	SPIREB_ValidInv	Valid	
DED2F161	SdbRtaCfgPACS_A	14	
DED2G161	PACSA_OnOff	OFF	
DED2H161	PACSA_DeadAliv	Alive	
DED2Z161	PACSA_WellSiTC	Well	
DED2J161	PACSA_WellSiTM	Well	
DED2K161	PACSA_ValidInv	Invalid	
DED30161	SdbRtaCfgPACS_B	14	
DED31161	PACSB_OnOff	OFF	
DED32161	PACSB_DeadAliv	Alive	
DED33161	PACSB_WellSiTC	Well	
DED34161	PACSB_WellSiTM	Well	
DED35161	PACSB_ValidInv	Invalid	
DEFAF160	BSW_SDBRTAPCDUA	31	
DEFAG160	PCDUA_On_Off	ON	
DEFAH160	PCDUADead_Alive	Alive	
DEFAZ160	PCDUAWellSickTC	Well	
DEFAJ160	PCDUAWellSickTM	Well	
DEFAK160	PCDUA_Val_Inval	Valid	
DEFB0160	BSW_SDBRTAPCDUB	31	
DEFB1160	PCDUB_On_Off	ON	
DEFB2160	PCDUBDead_Alive	Alive	
DEFB3160	PCDUBWellSickTC	Well	
DEFB4160	PCDUBWellSickTM	Well	
DEFB5160	PCDUB_Val_Inval	Valid	
DED3F161	SdbRtaCfgCCU_A	14	
DED3G161	CCUA_OnOff	OFF	
DED3H161	CCUA_DeadAlive	Alive	
DED3Z161	CCUA_WellSickTC	Well	
DED3J161	CCUA_WellSickTM	Well	
DED3K161	CCUA_ValidInval	Invalid	
DED40161	SdbRtaCfgCCU_B	14	
DED41161	CCUB_OnOff	OFF	
DED42161	CCUB_DeadAlive	Alive	
DED43161	CCUB_WellSickTC	Well	
DED44161	CCUB_WellSickTM	Well	
DED45161	CCUB_ValidInval	Invalid	
DEFCF160	BSW_SDBRTAXPND1	14	
DEFCG160	XPND1On_Off	OFF	

Steps 14.2 (first attempt) - 14.8. Sick TM

Command history display printout from time: 2007.101.19.33.26.822 to time: 2007.101.19.41.05.236
Current printout time: 2007.102.19.42.44.465 Display view mode: BRIEF Sort order: RELEASE Filter status: INACTIVE
Number of commands printed: 50

Name	Description	Sequence Release Time	Execution Time	S	D	C	G	B	IL	ST	Source	Update Time	R	GTO	A	S	012345	C
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.05	2007.101.19.41.05.296	E	E	E				EX	hp2-s	2007.101.19.42.35.237	S	SS	X	X		X
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.04	2007.101.19.41.04.343	E	E	E				EX	hp2-s	2007.101.19.42.34.304	S	SS	X	X		X
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.04	2007.101.19.41.04.203	E	E	E				EX	hp2-s	2007.101.19.42.34.198	S	SS	X	X		X
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.03	2007.101.19.41.03.327	E	E	E				EX	hp2-s	2007.101.19.42.33.265	S	SS	X	X		X
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.03	2007.101.19.41.03.186	E	E	E				EX	hp2-s	2007.101.19.42.33.160	S	SS	X	X		X
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.02	2007.101.19.41.02.358	E	E	E				EX	hp2-s	2007.101.19.42.32.330	S	SS	X	X		X
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.02	2007.101.19.41.02.280	E	E	E				EX	hp2-s	2007.101.19.42.32.224	S	SS	X	X		X
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.01	2007.101.19.41.01.327	E	E	E				EX	hp2-s	2007.101.19.42.31.291	S	SS	X	X		X
SCD06505	SEND_DRCU_COMMAND	2007.101.19.41.01	2007.101.19.41.01.249	E	E	E				EX	hp2-s	2007.101.19.42.31.186	S	SS	X	X		X
SC002500	SET_OBS_MODE	2007.101.19.41.00	2007.101.19.41.00.296	E	E	E				EX	hp2-s	2007.101.19.42.30.252	S	SS	X	X		X
SC001500	SET_BBID	2007.101.19.40.58	2007.101.19.40.58.217	E	E	E				EX	hp2-s	2007.101.19.42.28.181	S	SS	X	X		X
SCR00500	DEFINE_NEW_HK_REPORT	2007.101.19.40.56	2007.101.19.40.56.475	E	E	E				EX	hp2-s	2007.101.19.42.26.316	S	SS	X	X		X
SCR00500	DEFINE_NEW_HK_REPORT	2007.101.19.40.56	2007.101.19.40.56.374	E	E	E				EX	hp2-s	2007.101.19.42.26.312	S	SS	X	X		X
YC005964	Observation_will_start	2007.101.19.40.56	2007.101.19.40.56.212	E	E	E				EX	hp2-s	2007.101.19.40.56.212	S	SS				
YC003964	Req_Obs_TC_Params_Chunks	2007.101.19.40.47	2007.101.19.40.47.413	E	E	E				EX	hp2-s	2007.101.19.40.47.413	S	SS				
YC001964	Report_Test_Start	2007.101.19.40.47	2007.101.19.40.47.309	E	E	E				EX	hp2-s	2007.101.19.40.47.310	S	SS				
DC52D170	SwOn_SpireHSFCU_R_L52	2007.101.19.39.39	2007.101.19.39.39.231	E	E	E				MS	hpws23	2007.101.19.39.41.508	S	SS	S			S
YC002964	Report_Test_End	2007.101.19.38.29	2007.101.19.38.29.672	E	E	E				EX	hp2-s	2007.101.19.38.29.708	S	SS				
SCR01500	CLEAR_HK_REPORT	2007.101.19.38.29	2007.101.19.38.29.798	E	E	E				EX	hp2-s	2007.101.19.38.37.924	S	SS	S	S		S
SCR01500	CLEAR_HK_REPORT	2007.101.19.38.29	2007.101.19.38.29.697	E	E	E				EX	hp2-s	2007.101.19.38.37.906	S	SS	S	S		S
YC005964	Observation_will_start	2007.101.19.38.29	2007.101.19.38.29.564	E	E	E				EX	hp2-s	2007.101.19.38.29.564	S	SS				
YC003964	Req_Obs_TC_Params_Chunks	2007.101.19.38.27	2007.101.19.38.27.494	E	E	E				EX	hp2-s	2007.101.19.38.27.494	S	SS				
YC001964	Report_Test_Start	2007.101.19.38.27	2007.101.19.38.27.391	E	E	E				EX	hp2-s	2007.101.19.38.27.391	S	SS				
YC002964	Report_Test_End	2007.101.19.33.59	2007.101.19.33.59.787	E	E	E				EX	hp2-s	2007.101.19.33.59.819	S	SS				
SCB02500	UPDATE_TABLE	2007.101.19.33.59	2007.101.19.33.59.738	E	E	E				EX	hp2-s	2007.101.19.34.05.547	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.58	2007.101.19.33.58.785	E	E	E				EX	hp2-s	2007.101.19.34.05.520	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.57	2007.101.19.33.57.769	E	E	E				EX	hp2-s	2007.101.19.34.05.510	S	SS	S	S		S
SCB00500	SET_TABLE	2007.101.19.33.56	2007.101.19.33.56.691	E	E	E				EX	hp2-s	2007.101.19.34.00.556	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.54	2007.101.19.33.54.738	E	E	E				EX	hp2-s	2007.101.19.34.00.539	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.53	2007.101.19.33.53.722	E	E	E				EX	hp2-s	2007.101.19.34.00.529	S	SS	S	S		S
SCB00500	SET_TABLE	2007.101.19.33.52	2007.101.19.33.52.769	E	E	E				EX	hp2-s	2007.101.19.34.00.516	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.49	2007.101.19.33.49.753	E	E	E				EX	hp2-s	2007.101.19.33.53.550	S	SS	S	S		S
SCB00500	SET_TABLE	2007.101.19.33.48	2007.101.19.33.48.738	E	E	E				EX	hp2-s	2007.101.19.33.53.531	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.46	2007.101.19.33.46.784	E	E	E				EX	hp2-s	2007.101.19.33.53.519	S	SS	S	S		S
SCB00500	SET_TABLE	2007.101.19.33.45	2007.101.19.33.45.706	E	E	E				EX	hp2-s	2007.101.19.33.53.494	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.43	2007.101.19.33.43.753	E	E	E				EX	hp2-s	2007.101.19.33.47.533	S	SS	S	S		S
SCB00500	SET_TABLE	2007.101.19.33.42	2007.101.19.33.42.737	E	E	E				EX	hp2-s	2007.101.19.33.47.520	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.40	2007.101.19.33.40.784	E	E	E				EX	hp2-s	2007.101.19.33.47.505	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.39	2007.101.19.33.39.706	E	E	E				EX	hp2-s	2007.101.19.33.47.496	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.38	2007.101.19.33.38.815	E	E	E				EX	hp2-s	2007.101.19.33.41.534	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.37	2007.101.19.33.37.737	E	E	E				EX	hp2-s	2007.101.19.33.41.527	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.36	2007.101.19.33.36.722	E	E	E				EX	hp2-s	2007.101.19.33.41.515	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.35	2007.101.19.33.35.784	E	E	E				EX	hp2-s	2007.101.19.33.41.508	S	SS	S	S		S
SCB00500	SET_TABLE	2007.101.19.33.34	2007.101.19.33.34.769	E	E	E				EX	hp2-s	2007.101.19.33.41.497	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.32	2007.101.19.33.32.753	E	E	E				EX	hp2-s	2007.101.19.33.41.474	S	SS	S	S		S
SCB00500	SET_TABLE	2007.101.19.33.31	2007.101.19.33.31.737	E	E	E				EX	hp2-s	2007.101.19.33.35.522	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.29	2007.101.19.33.29.784	E	E	E				EX	hp2-s	2007.101.19.33.35.509	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.28	2007.101.19.33.28.768	E	E	E				EX	hp2-s	2007.101.19.33.35.498	S	SS	S	S		S
SCB02500	UPDATE_TABLE	2007.101.19.33.27	2007.101.19.33.27.690	E	E	E				EX	hp2-s	2007.101.19.33.35.483	S	SS	S	S		S
SCB00500	SET_TABLE	2007.101.19.33.26	2007.101.19.33.26.862	E	E	E				EX	hp2-s	2007.101.19.33.29.531	S	SS	S	S		S

Step 5 14.2-14.8 (first 4 items pt)

6.2.16 Check correct functioning of the SCU REDUNDANT High Speed Link

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
16.1	On HPCCS Execute TCL script **SPIRE-WU-INT-SCU-02-R.tcl**		OK	OK		SVK
16.2	On I-EGSE verify:	SCUFRAMECNT TM5N	0/31 0x3FFF/1	0/31 0x3FFF/1		SVK
16.3	Verify that two telemetry packets with : • (type,subtype): (21,1). • APID : 0x509 (1289) have been received at CCS		OK	OK.		SVK

6.2.17 Check correct functioning of the MCU REDUNDANT Low Speed Link

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
17.1	On HPCCS Execute TCL script **SPIRE-WU-INT-MCU-01-R.tcl**		OK	OK		SVK
17.2	On I-EGSE check that the MCU is booted up successfully	**MCUBITSTAT** **MCUP5V** **MCUP14V** **MCUM14V** **MCUP15V**	0/-/1 ~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V ~ 15.0 ± 0.5V	0/1 5.00 14.13 -14.49 15.10		SVK

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
		MCUM15V	~ -15.0 ± 0.5V	-15.61		NOK

6.2.18 *Check correct functioning of the MCU REDUNDANT High Speed Link*

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
18.1	On HPCCS Execute TCL script **SPIRE-WU-INT-MCU-02-R.tcl**		OK	OK		SMG
18.2	On I-EGSE Record the values of MCUFRAMECNT at the start and end of the test	MCUFRAMECNT	FM: 0/297	0/297		SMG
18.3	Verify that the following type of MCU telemetry packets have been received at the CCS : ENG: - (type,subtype): (21,3). - APID 0x509 (1289) BSM - (type,subtype): (21,1). - APID 0x509 (1289) SMEC -(type,subtype): (21,1). - APID 0x509 (1289)		OK	OK OK OK		SMG

6.2.19 Check correct functioning of the DCU REDUNDANT Low Speed Link

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
19.1	On HPCCS Execute TCL script **SPIRE-WU-INT-DCU-01-R.tcl**		OK	OK		SNR
19.2	On I-EGSE check that:	PSWBIAS PMWBIAS PLWBIAS	0/0xff/0 0/0xff/0 0/0xff/0	0/FF/0 0/FF/0 0/FF/0		SNR

6.2.20 Check correct functioning of the DCU REDUNDANT High Speed Link

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
20.1	On HPCCS Execute TCL script **SPIRE-WU-INT-DCU-02-R.tcl**		OK	OK		
20.2	On I-EGSE check that:	DCUFRAMECNT	FM: 0/700	0/100		
20.3	Verify that the following type of DCU science telemetry packets have been received at the CCS : Full Photometer: - (type,subtype): (21,1). - APID 0x505 PSW - (type,subtype): (21,2). - APID 0x505 PMW -(type,subtype): (21,2). - APID 0x505		OK ~~0k~~	 OK (100) NOK (0) NOK (0)		 NCR-ASED-3210

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
	PLW -(type,subtype): (21,2). - APID 0x505 (1285) Full Spectrometer: - (type,subtype): (21,1). - APID 0x507 (1287) SSW - (type,subtype): (21,2). - APID 0x507 (1287) SLW -(type,subtype): (21,2). - APID 0x507 (1287)			NOK(0) NOK(0) NOK(0) NOK(0)		

6.2.21 *Switch Off MCU REDUNDANT*

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Remark	Pass/ Fail
21.1	On HPCCS Execute TCL script **SPIRE-WU-INT-MCU-OFF-R.tcl**		OK	OK		Sul
21.2	On I-EGSE check that the MCU is switched off:	MCUBITSTAT	1/-/0	1/0		Sul

6.2.22 Switch Off DRCU REDUNDANT

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH OFF DRCU REDUNDANT						
	DRCU-B Power Off Initial Conditions: DRCU-B ON						
22.1	Verify the following PCDU telemetry to verify FCU-B On: LCL52 Status **SpireHsfN_L**52 **WM72C565** LCL52 current **SpireHsfN_L**52 **WM708565**	ON =~~2.80.44~~A	+/-0.~~28A06~~A	ON 0·50	AND: ZAD03999 MIM: LCL_HERSCHEL		
22.2	On HPCCS start **SPIRE-WU-INT-DRCU-OFF-R.tcl** test script to configure DRCU for switch off	OK		OK			
22.3	On I-EGSE check that THSK parameter is not refreshing anymore	OK		OK			
22.4	On I-EGSE check that TM2N parameter is not incrementing anymore	OK		OK			
22.5	Power off FCU-B by issuing the following **SwOff_SpireHSPDU_N_L52** telecommand (CDMS-TC(8,4,112,5)) and verify on-board execution: **DC51D170**	OK		OK			
22.6	Verify the following PCDU telemetry to verify FCU-B OFF: LCL52 (FCU-B) Status **STS_LCL**52 **WM72C565** LCL52 (FCU-B) current **ITLM_LCL**52 **WM708565**	OFF 0.0 A	+/- 0.~~28-06~~ A	OFF 0.0 A			
22.7	HPCCS Operator to inform SPIRE Responsible that SPIRE DRCU/FCU Redundant powered off	OK		OK			

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SPIRE REDUNDANT DRCU POWER OFF COMPLETE						

6.2.23 Switch Off Redundant SPIRE Units

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	SWITCH OFF DPU REDUNDANT						
	DPU-B Power Off Initial Conditions: DPU-B ON						
23.1	Verify the following PCDU telemetry to verify DPU-B On: LCL12 Status **SpireHsdN_L**12 **WM82C565** LCL12 current **SpireHsN_L**12 **WM808565**	 ON 0.46 A	 +/- 0.046 A	 ON 0.44A	AND: ZAD03999 MIM: LCL_HERSCHEL	SM	
23.2	Disable and Switch off RTA SPIRE DPU-B (RTA=22) by issuing the following CMDS telecommand and verify on-board execution (x = don't care) : **ConfigureSDBFDIR**	 **DC005161**	 OK	 OK		FM	
	RTA DH011161 =22				**SPIRE-B**		
	F0 DH018161 =0				**RTA OFF**		
	F1 DH019161 =x				RTA Alive		
	F2 DH020161 =x				RTA Well_TC		
	F3 DH021161 =x				RTA Well_TM		
	F4 DH022161 =0				**RTA Invalid**		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	F5 DH023161 =x				RTA Vital/Non-vital		
	F6 DH024161 =x				RT Nominal Unit		
	F7 DH025161 =x				RT TM Retry On/Off		
	F8 DH026161 =x				Bus A Active		
	F9 DH027161 =x				Bus A Healthy/Unhealthy		
	F10 DH028161 =x				Bus B Healthy/Unhealthy		
	F11 DH029161 =x				SDBFDIR Enable/Disable		
	M0 DH030161 =1				**Mask F0**		
	M1 DH031161 =0				Mask F1		
	M2 DH032161 =0				Mask F2		
	M3 DH033161 =0				Mask F3		
	M4 DH034161 =1				**Mask F4**		
	M5 DH035161 =0				Mask F5		
	M6 DH036161 =0				Mask F6		
	M7 DH037161 =0				Mask F7		
	M8 DH038161 =0				Mask F8		
	M9 DH039161 =0				Mask F9		
	M10 DH040161 =0				Mask F10		
	M11 DH041161 =0				Mask F11		
	CNT DH042161 =1				**Vital RT Loop (1)**		
	M_C DH043161 =0				**Mask for CNT**		
23.3	After 10secs verify SPIRE-B RTA OFF: **SPIREB_OnOff DED21161** **SPIREB_ValidInval DED25161**	OFF Invalid		OFF Invalid	AND: ZAD12999	SMA	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
23.4	Power off DPU-B by issuing the following **SwOff_SpireHSPDU_N_L12** telecommand (CDMS-TC(8,4,112,5)) and verify on-board execution: **DC12B170**	OK		OK			
23.5	Verify the following PCDU telemetry to verify DPU-B OFF: LCL12 (DPU-B) Status **STS_LCL**12 **WM82C565**	OFF		OFF	AND: ZAD03999 MIM: LCL_HERSCHEL		
	LCL12 (DPU-B) current **ITLM_LCL**12 **WM808565**	0.0 A	+/- 0.046A	0.0A			
23.6	HPCCS Operator to inform SPIRE Responsible that SPIRE DPU Redundant powered off	OK		OK			
23.7	On HPCSS terminate SubscribeParams test script.	OK		OK			
	SPIRE DPU REDUNDANT POWER OFF COMPLETE						

6.2.24 Satellite & EGSE Switch Off

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value		P	N
	Satellite & EGSE Switch Off						
	Initial Conditions: Nominal & Redundant SPIRE warm units OFF						
24.1	From HPCCS Test Conductor console issue command to disconnect from SPIRE I-EGSE **disconnect HIEGSE**	OK		O K.			
24.2	Confirm from HPCSS and SPIRE I-EGSE that the disconnection was successful	OK		O K			
24.3	Switch OFF I-EGSE i.a.w. AD 5						
24.4	Switch OFF Satellite/SVM, HPCCS and SCOEs i.a.w. procedure AD 2 Sections 7.7 to 7.11	OK		O K			
24.5	Confirm both Satellite and EGSE powered down	OK		O K			
	End Conditions: Satellite and EGSE OFF			O K.			
	END OF TEST						

7 Summary Sheets

7.1 Procedure Variation Summary

	Test Change	Curr. No.: 1 Date 17/04/07 Page 1 of 1	
Test designation SPIRE FM UFT	Test Procedure TP-0148	Issue 1	Rev. –
Test step changed 14.2 – 14.4	Reason for Change Test Step Order Incorrect		

RAL (SPIRE) Identified during test that test steps 14.2 – 14.4 were to be executed in the wrong place during DPU power on.

It was agreed to move these steps to be performed after 14.7.

N.B. Post execution of PVS.
Move of these test steps resulted in loss of TM link with DPU, CDMS reporting Sick TM (NCR-3211 refers)

It was therefore agreed to revert to original test step order which was successful.

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

Table 7.1-1: Procedure Variation Sheet

7.2 Non Conformance Report (NCR) Summary

NCR - No.	NCR - Title	Date	Open Closed	PA sig.
	See test report			

Table 7.2-1: Non-Conformance Record Sheet

7.3 Sign-off Sheet

	Date	Signature
Test Manager		
Operator		
PA Responsible		
ESA Representative		

END OF DOCUMENT

	Name	Dep./Comp.		Name	Dep./Comp.
X	Alberti von Mathias Dr.	ASG22		Schweickert Gunn	ASG22
	Baldock Richard	FAE12	X	Sonn Nico	ASG51
	Barlage Bernhard	AED13		Steininger Eric	AED32
	Bayer Thomas	ASA42	X	Stritter Rene	AED11
	Brune Holger	ASA45		Suess Rudi	OTN/ASA44
	Edelhoff Dirk	AED2		Wagner Klaus	ASG22
	Fehringer Alexander	ASG13	X	Wietbrock Walter	AET12
X	Fricke Wolfgang Dr.	AED 65		Wöhler Hans	ASG22
	Geiger Hermann	ASA42		Wössner Ulrich	ASE252
	Grasl Andreas	OTN/ASA44	X	Theunissen Martijn/Dutch Space	ASA43
	Grasshoff Brigitte	AET12	X	Martin Olivier	ASA43
X	Hamer Simon	Terma			
X	Hendry David	Terma			
	Hengstler Reinhold	ASA42			
	Hinger Jürgen	ASG22			
X	Hohn Rüdiger	AED65			
	Hölzle Edgar Dr.	AED32			
	Huber Johann	ASA42			
	Hund Walter	ASE252			
	Idler Siegmund	AED312			
	Iványi 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

E N D O F D O C U M E N T

	Name	Dep./Comp.		Name	Dep./Comp.
X	Alberti von Mathias Dr.	ASG22		Schweickert Gunn	ASG22
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	Grasshoff Brigitte	AET12	X	Theunissen Martijn	DutchSpace
X	Hamer Simon	Terma			
X	Hendry David	Terma			
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	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:**	
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	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:**	
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	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