



Spire Procedure

SPIRE Warm Units Integration Test
Procedures
A.A.Aramburu & Sunil D.Sidher

Ref:	SPIRE-RAL-PRC-2680
Issue:	1.3
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1. Introduction

This document describes the procedures to verify the correct integration of the SPIRE FM Warm Units (FM DPU and FM DRCU) **before** integration with the SPIRE FM FPU.

These procedures require the presence of the SPIRE personnel as the IEGSE will be required to assess the results of part of test data.

1.1 Scope

This procedure is intended to be used for the checkout of the correct integration of SPIRE FM Warm Units prior to the integration with SPIRE FM FPU during the FM **but can also be used during the AVM campaign as a tool to verify all relevant CCS templates**. The same CCS templates will be used for both the AVM and the FM.

Note:

- Where no explicit mention is made, it is assumed that FM and AVM procedures are the same.
- Where deviations from the behaviour of the FM units are expected (AVM), this is clearly identified and separate steps for each scenario are specified, i.e., *Procedure Steps for FM* and *Procedure Steps for AVM*.

1.2 Applicable Documents

AD#	Title	Reference	Issue#	Date
AD01	SPIRE Functional Test Specification	SPIRE-RAL-DOC-001652	1.4	22/07/2005
AD02	SPIRE ILT Warm Functional Test Procedure	SPIRE-RAL-PRC-002322	1.2	27/01/2006

1.3 Reference Documents

RD#	Title	Reference	Issue#	Date
RD01	SPIRE Instrument User Manual	SPIRE-RAL-PRJ-002395	1.0	08/04/2005
RD02	H/P OBT-UTC Time Synchronisation Technical Note	PT-CMOC-OPS-TN-6604-OPS- OGH	1.3	Sep 2004
RD03	Spire Instrument Block Diagram	SPIRE-RAL-DWG-000646	6.1	
RD04	DRCU Simulator HW/SW User Manual		1.0	26/11/2003

1.4 Change Record

Doc	Issue#	Changes	Date of Change
Draft	0.1	First Draft Version	03/07/2006
Issue	1.0	Included a general test sequence section. Included a check for the correct OBT setting Included a separated section for REDUDANT procedures.	01/08/2006
Issue	1.1	Updated procedure to conform to the rest of SPIRE FM procedures. This version was included in the AVM EIDP	22/08/2006
Issue	1.2	1. Corrected references to actual power ON/OFF of	02/01/2007



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		<p>the units including detailed specification of unit connectors.</p> <ol style="list-style-type: none"> 2. Corrected expected MCU frame counter 3. Assigned the same version (1.2) for all single procedures to match the doc version. 4. Substituted the denomination XXXXX for the warm units power on/off procedures, and removed reference within the Open Issues section. Included a reference to the OOL and frames issues of the DRCU simulator. 5. Removed the checking for the different telemetry packets SID as it requires knowledge of the packet structure in each case. 6. Included pass/fail criteria on each detailed test procedure. 7. Included a checking of DRCU 'ON' voltages on DRCU ON procedure. 8. Removed the MODE checking on DPU-ON 9. Included the distinction between prime and redundant TCL scripts. 10. Included margin errors on the voltages to check 11. 	
	1.3	<ol style="list-style-type: none"> 1. Corrected mismatched names of TCL scripts to execute (DRCU-ON for DRCU-START. FM references for WU-INT) 2. Corrected RT number on DPU-ON-R procedure 	

1.5 Duration

The estimated duration for executing the entire procedure, PRIME and REDUNDANT sequences, is estimated to be approximately **2 hours**.

1.6 Open Issues

There are some known issues with regard the DRCU simulator behaviour which will be present only on the AVM scenario:

1. The DRCU Simulator does not recognize certain SPIRE Get HK commands contained in both the nominal and critical requests. As a result, whenever the OBS is started the HK parameters related to these request go into Out of Limits according to the SPIRE MIB OOL checks (See Procedures: SPIRE-WU-INT-DPU-ON-P/R and SPIRE-WU-INT-DRCU-ON-P/R).
2. The generation of frames by the DRCU Simulator in response to a request for subsystem frames done by the DPU is not always reproducible. (Normally the DRCU Sim will produce more frames than it was asked for) This would inherently cause the AVM procedures to fail where the correct number of frames generated is checked as pass/fail criteria. On those cases the frame number should be regarded as an 'indicator' rather than an exact figure to expect.

These are non avoidable design features of the DRCU simulator that cannot be corrected at this stage. Hence were applicable the correspondent procedures make reference to this 'anomalous' behaviour explicitly.



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1.7 List of Acronyms

FM	Flight Model
AVM	Avionics Model
OBT	On Board Time
FPU	Focal Plane Unit
CCS	Central Checkout System
FM	Integrated System Test
EGSE	Electrical Ground Support Equipment
DPU	Digital Processing Unit
DRCU	Detector Readout and Control Unit



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2. Test Configuration

The following sections describe the required hardware and I-ESGE configuration for the test. The main differences between the AVM and the FM configurations are with respect to the hardware. On the SPIRE AVM hardware the Warm Units and the FPU are substituted by a DRCU simulator.

2.1 FM Test Configuration

This is the required hw/sw configuration prior to the start of the test:

SPIRE WU:

- The SPIRE FM DRCU should be interconnected with the SPIRE FM DPU, both PRIME and REDUNDANT interfaces.
- The SPIRE FM DRCU PRIME and REDUNDANT power interfaces to the Herschel satellite should be connected.
- The SPIRE FM DPU PRIME and REDUNDANT 1553 interfaces to the Herschel satellite should be connected.
- The SPIRE FM DPU PRIME and REDUNDANT power interfaces to the Herschel satellite should be connected.

HCDMU:

- The Bus list selected on the HCDMU should be for SPIRE PRIME Instrument, (i.e., 27 TM slots allocated for SPIRE telemetry). For the PRIME side tests the BUS Configuration should be SPIRE Prime (i.e, RT=21) and for the REDUNDANT side test the BUS Configuration should be SPIRE Redundant (i.e, RT=22)
- The HCDMU and CCS should be interconnected.

CCS & IEGSE:

- The CCS and the IEGSE should be interconnected via the Pipe GW.
- The SPIRE MIB should be imported on the CCS.
- The CCSHandler application software should be running on the IEGSE.
- IEGSE system is up and running.(Database, SCOS , QLA, EGSE Router and Gateway, TM ingestion)

2.2 AVM Test Configuration

Note: There is no redundancy on the AVM configuration

This is the required hw/sw configuration prior to the start of the test:

SPIRE WU:

- The SPIRE DRCU Simulator PC should be powered ON and the operating system running.
- The SPIRE DRCU Simulator PC should be interconnected with the SPIRE FM DPU following RD04.
- The SPIRE FM DPU PRIME 1553 interface to the Herschel satellite should be connected.
- The SPIRE FM DPU PRIME power interface to the Herschel satellite should be connected.



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HCDMU:

- The Bus list selected on the HCDMU should be for SPIRE PRIME Instrument, (i.e., 27 TM slots allocated for SPIRE telemetry). For the AVM tests the BUS Configuration should be SPIRE Prime (i.e, RT=21).
- The HCDMU and CCS should be interconnected.

CCS & IEGSE:

- The CCS and the IEGSE should be interconnected via the Pipe GW.
- The SPIRE MIB should be imported on the CCS.
- The CCSHandler application software should be running on the IEGSE.
- IEGSE system is up and running.(Database, SCOS , QLA, EGSE Router and Gateway, TM ingestion)



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3. Warm Units Integration Test Procedure Overview

3.1 General instructions for executing the test procedures

- Before carrying out the next procedure within the test sequence always ask for the go ahead by the SPIRE staff.
- Section 3.4 of this document specifies the sequence to be executed. Each of the steps in the sequence has a detailed specification later on sections 4.1 and 4.2. The operator should refer to the later in order to execute detailed steps.
- The procedure tables in section 4.1 and 4.2 include blank boxes where the actual values of parameters can be noted. Based on the comparison with the expected values the success or failure of a step should be recorded in the final column of the table.
- The last row in a procedure table should be used to record the overall Pass/Fail result of each test.
- Any text in boldface in the procedural steps generally indicates an action which may have to be performed manually by the CCS staff.

3.2 General Pass/Fail Criteria

Consecutive failure of 2 executions of the same procedure is enough to declare the overall test result as failed. If the repetition of a failed test execution is successful this one should be repeated once again as a 'health' check. In case of overall failure of the test procedure the switch off steps 9, 10 and 11 (or 22, 23 and 24) from the next section should be executed.

3.3 Constrains

A general constrain (inferred from the test configuration described above) is that the SPIRE DPU and DRCU power interfaces to the Herschel satellite must be connected and the DPU and DRCU must be interconnected before carrying out this procedure.

3.4 Test Sequence

This section specifies the sequence to be executed with estimated times for each execution. **During AVM although no redundancy is present the redundant procedures can still be tested with the AVM DPU PRIME as the uplink test sequences do not change, executing the redundant procedures on the PRIME DPU will not result in any harm to the unit.**

Step #	Procedure Name	Purpose	Duration
1	SPIRE-WU-INT-DPU-ON-P	DPU PRIME Power up and OBS start	5 min
2	SPIRE-WU-INT-DRCU-ON-P	DRCU PRIME Power up	5 min
3	SPIRE-WU-INT-SCU-01-P	SCU Low Speed Link check	5 min
4	SPIRE-WU-INT-SCU-02-P	SCU High Speed Link check	5 min
5	SPIRE-WU-INT-MCU-01-P	MCU Low Speed Link check	5 min
6	SPIRE-WU-INT-MCU-02-P	MCU High Speed Link check	5 min
7	SPIRE-WU-INT-DCU-01-P	DCU Low Speed Link check	5 min
8	SPIRE-WU-INT-DCU-02-P	DCU High Speed Link check	5 min
9	SPIRE-WU-INT-MCU-OFF-P	MCU power off	5 min
10	SPIRE-WU-INT-DRCU-OFF-P	DRCU PRIME power off	5 min
11	SPIRE-WU-INT-DPU-OFF-P	DPU PRIME power off	5 min
12	Reconfigure the 1553 Spacecraft		5 min



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	bus from SPIRE DPU PRIME (RT = 21) to SPIRE DPU REDUNDANT (RT = 22).		
13	Change to SPIRE Redundant MIB on the CCS (If applicable)		5 min
14	SPIRE-WU-INT-DPU-ON-R	DPU RED Power up and OBS start	5 min
15	SPIRE-WU-INT-DRCU-ON-R	DRCU RED Power up	5 min
16	SPIRE-WU-INT-SCU-01-R	SCU Low Speed Link check	5 min
17	SPIRE-WU-INT-SCU-02-R	SCU High Speed Link check	5 min
18	SPIRE-WU-INT-MCU-01-R	MCU Low Speed Link check	5 min
19	SPIRE-WU-INT-MCU-02-R	MCU High Speed Link check	5 min
20	SPIRE-WU-INT-DCU-01-R	DCU Low Speed Link check	5 min
21	SPIRE-WU-INT-DCU-02-R	DCU High Speed Link check	5 min
22	SPIRE-WU-INT-MCU-OFF-R	MCU power off	5 min
23	SPIRE-WU-INT-DRCU-OFF-R	DRCU RED power off	5 min
24	SPIRE-WU-INT-DPU-OFF-R	DPU RED power off	5 min

Total: ~ 120 min



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4. Warm Units Integration Detailed Test Procedures

4.1.1 Prime Procedures

4.1.1.1 Procedure SPIRE-WU-INT-DPU-ON-P

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Version	1.3
Date	15 th February 2007
Purpose	To switch on the SPIRE DPU PRIME and start generating housekeeping
Initial configuration	SPIRE DPU and DRCU PRIME are switched off
Final configuration	SPIRE DPU PRIME is ON and SPIRE HK is being produced , SPIRE DRCU PRIME is OFF
Preconditions	<ul style="list-style-type: none"> • SPIRE FM DPU is electrically integrated with the Herschel Satellite • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • DPU AND OBS PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Nominal and critical HK reports start being generated at their nominal rates of 1Hz and 0.5Hz respectively.



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Procedure Steps for FM:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/Fail
1	Select DPU AND OBS PARAMETERS display is on the CCS	—	—	—	
2	Power ON the SPIRE DPU PRIME unit using the dedicated spacecraft LCL line and configure 1553 Spacecraft bus for SPIRE DPU PRIME (RT = 21)	—	—	—	
3	Wait for the boot software to produce at least 2 event packets (5,1)				
4	Execute TCL script SPIRE-WU-INT-DPU-START-P.tcl	—	—	—	
5	Check that Nominal and Critical HK packets are arriving at the CCS: SPIRE Nominal HK: <ul style="list-style-type: none"> • (type ,subtype) : (3,25) • APID : 0x502 SPIRE Critical HK: <ul style="list-style-type: none"> • (type ,subtype) : (3,25) • APID: 0x500 				
6	Check that THSK parameter is refreshing every second	THSK	Refreshing @ 1 Hz	—	
7	Check that TM2N parameter is incrementing by 1 every second	TM2N	Incrementing by 1 @ 1Hz	—	
8	Check that TM1N parameter is incrementing by 1 every 2 second	TM1N	Incrementing by 1 @ 0.5Hz		
9	On CCS check the consistency of the SPIRE on board time to the HCDMU time and the CCS. *	—	—		
10	On IEGSE check the consistency between SCOS time and THSK and QLA time.	THSK	Incrementing once per second		
Test Result (Pass/Fail):					

** Assuming that OBT is provided by the HCDMU following RD02, i.e, OBT is TAI, there should be a 33 second difference between OBS and CCS time (assuming CCS is using UTC). In the case the HCDMU is using UTC to specify the on board time, there should be no difference between THSK and the CCS/IEGSE system time.*



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Procedure Steps for AVM:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/Fail
1	Select DPU AND OBS PARAMETERS display is on the CCS	—	—	—	
2	Power ON the SPIRE DPU PRIME unit using the dedicated spacecraft LCL line and configure 1553 Spacecraft bus for SPIRE DPU PRIME (RT = 21)	—	—	—	
3	Wait for the boot software to produce at least 2 event packets (5,1)				
4	Execute TCL script SPIRE-WU-INT-DPU-START-P.tcl	—	—	—	
5	Check that Nominal and Critical HK packets are arriving at the CCS: SPIRE Nominal HK: <ul style="list-style-type: none"> • (type ,subtype) : (3,25) • APID : 0x502 SPIRE Critical HK: <ul style="list-style-type: none"> • (type ,subtype) : (3,25) • APID: 0x500 				
6	When the HK requests start being generated several HK parameters will go Out of Limits (Hard). This is a design feature of the DRCU Simulator and cannot be avoided.	PLIAP5V PLIAP9V PLIAM9V SLIAP5V SLIAP9V SLIAM9V LIAPiTEMP LIASiTEMP BIASTEMP DAQTEMP	-/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL		
7	Check that THSK parameter is refreshing every second	THSK	Refreshing @ 1 Hz	—	
8	Check that TM2N parameter is incrementing by 1 every second	TM2N	Incrementing by 1 @ 1Hz	—	
9	Check that TM1N parameter is incrementing by 1 every 2 second	TM1N	Incrementing by 1 @ 0.5Hz		
10	On CCS check the consistency of the SPIRE on board time to the HCDMU time and the CCS. *	—	—		
11	On IEGSE check the consistency between SCOS time and THSK and QLA time.	THSK	Incrementing once per second		

Test Result (Pass/Fail):



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4.1.1.2 Procedure SPIRE-WU-INT-DRCU-ON-P

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Version	1.3
Date	15 th February 2007
Purpose	To switch on the SPIRE DRCU PRIME and start generating housekeeping
Initial configuration	SPIRE DPU is ON and the DRCU are switched off
Final configuration	SPIRE DPU and DRCU are ON and SPIRE HK is being produced
Preconditions	<ul style="list-style-type: none"> • SPIRE FM DPU and DRCU are electrically integrated with the Herschel Satellite • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DRCU housekeeping telemetry shows expected 'ON' voltages

Procedure steps for FM:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-DRCU-START-P-STEP1.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	THSK	Not refreshing	—	
3	Check that TM2N parameter is not incrementing anymore	TM2N	Not incrementing	—	
4	Power ON the SPIRE DRCU PRIME unit using the dedicated spacecraft LCL line.	—	—	—	
5	Execute TCL script SPIRE-WU-INT-DRCU-START-P-STEP2.tcl	—	—	—	
6	Check that THSK parameter is again refreshing every second	THSK	Refreshing @ 1Hz		
7	Check that TM2N parameter is again incrementing every second	TM2N	Incrementing by 1 @ 1Hz	—	
8	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	—	

Test Result (Pass/Fail):



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Procedure Steps for AVM:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-DRCU-START-P-STEP1.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	THSK	Not refreshing	—	
3	Check that TM2N parameter is not incrementing anymore	TM2N	Not incrementing	—	
4	Start DRCU simulator application software.*	—	—	—	
5	Execute TCL script SPIRE-WU-INT-DRCU-START-P-STEP2.tcl	—	—		
6	Check that THSK parameter is again refreshing every second	THSK	Refreshing @ 1Hz	—	
7	Check that TM2N parameter is again incrementing every second	TM2N	Incrementing by 1 @ 1Hz	—	

Test Result (Pass/Fail):

** It is assumed that the DRCU simulator PC is already ON. Double click on the Transmit.exe icon on the desktop of the PC to start the application software.*



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4.1.1.3 Procedure SPIRE-WU-INT-SCU-01-P

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the SCU PRIME Low Speed Link
Initial configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-P and SPIRE-WU-INT-DRCU-ON-P procedures have been executed. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	SCUTEMPSTAT and SUBKSTAT HK parameters show expected values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/Fail
1	Execute TCL script SPIRE-WU-INT-SCU-01-P.tcl	SCUTEMPSTAT SUBKSTAT	0/0xFFFF 0/1		
Test Result (Pass/Fail):					



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4.1.1.4 Procedure SPIRE-WU-INT-SCU-02-P

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the SCU PRIME High Speed Link
Initial configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-P and SPIRE-WU-INT-DRCU-ON-P procedures have been executed. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on CCS
Duration	5 minutes
Pass/Fail criteria	Two SCU Nominal Science telemetry packets are received at CCS with : <ul style="list-style-type: none"> • (type,subtype): (21,1). • APID : 0x508

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-SCU-02-P.tcl	SCUFRAMECNT TM5N	0/31 0x3FFF/1		
2	Verify that two telemetry packets with : <ul style="list-style-type: none"> • (type,subtype): (21,1). • APID : 0x508 have been received at CCS				

Test Result (Pass/Fail):



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4.1.1.5 Procedure SPIRE-WU-INT-MCU-01-P

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the MCU PRIME Low Speed Link
Initial configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced
Final configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced and MCU is booted.
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-P and SPIRE-WU-INT-DRCU-ON-P procedures have been executed. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • MCU PARAMETERS display is selected on the CCS • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCU housekeeping telemetry shows expected 'ON' voltages

Procedure Steps for FM:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Pass/Fail
1	Execute TCL script SPIRE-WU-INT-MCU-01-P.tcl	—	—	—	—
2	Check that the MCU is booted up successfully	MCUBITSTAT MCUP5V MCUP14V MCUM14V MCUP15V MCUM15V	0/-/1 ~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V ~ 15.0 ± 0.5V ~ -15.0 ± 0.5V		
Test Result (Pass/Fail):					

Procedure Steps for AVM:



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Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Pass/Fail
1	Execute TCL script SPIRE-WU-INT-MCU-01-P.tcl	—	—	—	—
2	Check that the MCU is booted up successfully	MCUBITSTAT	0/-/1		
Test Result (Pass/Fail):					



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4.1.1.6 Procedure: SPIRE-WU-INT-MCU-02-P

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Version	1.3
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Purpose	To check the correct functioning of the MCU PRIME High Speed Link
Initial configuration	SPIRE DPU and DRCU are switched ON, SPIRE HK is being produced and MCU is booted.
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-P and SPIRE-WU-INT-DRCU-ON-P procedures have been executed. • SPIRE-WU-INT-MCU-01-P has been run successfully • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	<p>The following MCU telemetry packet types are received at CCS with :</p> <p>ENG:</p> <ul style="list-style-type: none"> - (type,subtype): (21,3). - APID 0x508 <p>BSM</p> <ul style="list-style-type: none"> - (type,subtype): (21,1). - APID 0x508 <p>SMEC</p> <ul style="list-style-type: none"> - (type,subtype): (21,1). - APID 0x508

Procedure Steps:



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Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-WU-INT-MCU-02-P.tcl	—	—	—	—
2	Record the values of MCUFRAMECNT at the start and end of the test	MCUFRAMECNT	FM: 0/297 AVM: 0/~300		
3	Verify that the following type of MCU telemetry packets have been received at the CCS : ENG: - (type,subtype): (21,3). - APID 0x508 BSM - (type,subtype): (21,1). - APID 0x508 SMEC -(type,subtype): (21,1). - APID 0x508	—	—	—	
Test Result (Pass/Fail):					



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4.1.1.7 Procedure SPIRE-WU-INT-DCU-01-P

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the DCU PRIME Low Speed Link
Initial configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced and MCU is booted.
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-P and SPIRE-WU-INT-DRCU-ON-P procedures have been executed. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • BIAS PARAMETERS display is selected on the CCS • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	PSWBIAAS,PMWBIAAS and PLWBIAAS HK parameters show expected values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-DCU-01-P.tcl	PSWBIAAS PMWBIAAS PLWBIAAS	0/0xff/0 0/0xff/0 0/0xff/0	— — —	— — —

Test Result (Pass/Fail):



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4.1.1.8 Procedure SPIRE-WU-INT-DCU-02-P

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the DCU PRIME High Speed Link
Initial configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced and MCU is booted.
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-P and SPIRE-WU-INT-DRCU-ON-P procedures have been executed. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • DCU PARAMETERS display is selected on the CCS • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	<p>The following DCU telemetry packet types are received at CCS with :</p> <p>Full Photometer: - (type,subtype): (21,1). - APID 0x504</p> <p>PSW - (type,subtype): (21,2). - APID 0x504</p> <p>PMW -(type,subtype): (21,2). - APID 0x504</p> <p>PLW -(type,subtype): (21,2). - APID 0x504</p> <p>Full Spectrometer: - (type,subtype): (21,1). - APID 0x506</p> <p>SSW - (type,subtype): (21,2). - APID 0x506</p> <p>SLW -(type,subtype): (21,2). - APID 0x506</p>

Procedure Steps:



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Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-DCU-02-P.tcl	DCUFRAMECNT	FM: 0/700 AVM: 0/~700		
2	<p>Verify that the following type of DCU science telemetry packets have been received at the CCS :</p> <p>Full Photometer: - (type,subtype): (21,1). - APID 0x504</p> <p>PSW - (type,subtype): (21,2). - APID 0x504</p> <p>PMW - (type,subtype): (21,2). - APID 0x504</p> <p>PLW - (type,subtype): (21,2). - APID 0x504</p> <p>Full Spectrometer: - (type,subtype): (21,1). - APID 0x506</p> <p>SSW - (type,subtype): (21,2). - APID 0x506</p> <p>SLW - (type,subtype): (21,2). - APID 0x506</p>	—	—	—	
Test Result (Pass/Fail):					



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4.1.1.9 Procedure SPIRE-WU-INT-MCU-OFF-P

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Version	1.3
Date	15 th February 2007
Purpose	To switch OFF the MCU PRIME
Initial configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced and MCU PRIME is OFF.
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-P and SPIRE-WU-INT-DRCU-ON-P procedures have been executed. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified MCU HK Parameter shows expected value.

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-WU-INT-MCU-OFF-P.tcl	—	—	—	—
2	Check that the MCU is switched off	MCUBITSTAT	1/-/0		

Test Result (Pass/Fail):



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4.1.1.10 Procedure SPIRE-WU-INT-DRCU-OFF-P

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Version	1.3
Date	15 th February 2007
Purpose	To switch OFF the DRCU PRIME
Initial configuration	SPIRE DPU and DRCU PRIME are switched ON, SPIRE HK is being produced and MCU is OFF.
Final configuration	SPIRE DPU PRIME is ON (but no HK is being produced) and DRCU PRIME is switched OFF.
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-P and SPIRE-WU-INT-DRCU-ON-P procedures have been executed. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	THSK and TM2N stop refreshing/incrementing

Procedure Steps for FM:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-WU-INT-DRCU-OFF-P.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	THSK	Not refreshing	—	
3	Check that TM2N parameter is not incrementing anymore	TM2N	Not incrementing	—	
4	Power OFF the SPIRE DRCU PRIME unit.	—	—	—	
Test Result (Pass/Fail):					



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Procedure Steps for AVM:

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



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4.1.1.11 Procedure SPIRE-WU-INT-DPU-OFF-P

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Version	1.3
Date	15 th February 2007
Purpose	To switch OFF the DPU PRIME
Initial configuration	SPIRE DPU PRIME is ON (but no HK is being generated) and the DRCU PRIME is OFF.
Final configuration	SPIRE DPU and DRCU PRIME are switched OFF.
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DRCU-OFF-P procedure has been executed. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Power to SPIRE DPU PRIME is OFF

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Power OFF the SPIRE DPU PRIME unit.	—	—	—	

Test Result (Pass/Fail):



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4.1.2 Redundant Procedures

4.1.2.1 Procedure SPIRE-WU-INT-DPU-ON-R

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Version	1.3
Date	15 th February 2007
Purpose	To switch on the SPIRE DPU REDUNDANT and start generating housekeeping
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched off
Final configuration	SPIRE DPU REDUNDANT is ON and SPIRE HK is being produced , SPIRE DRCU REDUNDANT is OFF
Preconditions	<ul style="list-style-type: none"> • SPIRE FM DPU is electrically integrated with the Herschel Satellite • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • DPU AND OBS PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Nominal and critical HK reports start being generated at their nominal rates of 1Hz and 0.5Hz respectively.

Procedure Steps for FM:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/Fail
1	Select DPU AND OBS PARAMETERS display is on the CCS	—	—	—	
2	Power ON the SPIRE DPU REDUNDANT unit using the dedicated spacecraft LCL line and configure 1553 Spacecraft bus for SPIRE DPU REDUNDANT (RT = 22)	—	—	—	
3	Wait for the boot software to produce at least 2 event packets (5,1)				
4	Execute TCL script SPIRE-WU-INT-DPU-START-R.tcl	—	—	—	
5	Check that Nominal and Critical HK packets are arriving at the CCS: SPIRE Nominal HK: <ul style="list-style-type: none"> • (type ,subtype) : (3,25) • APID : 0x503 SPIRE Critical HK: <ul style="list-style-type: none"> • (type ,subtype) : (3,25) • APID: 0x501 				
6	Check that THSK parameter is refreshing every second	THSK	Refreshing @ 1 Hz	—	



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Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/Fail
7	Check that TM2N parameter is incrementing by 1 every second	TM2N	Incrementing by 1 @ 1Hz	—	
8	Check that TM1N parameter is incrementing by 1 every 2 second	TM1N	Incrementing by 1 @ 0.5Hz		
9	On CCS check the consistency of the SPIRE on board time to the HCDMU time and the CCS. *	—	—		
10	On IEGSE check the consistency between SCOS time and THSK and QLA time.	THSK	Incrementing once per second		

Test Result (Pass/Fail):

- *Assuming that OBT is provided by the HCDMU following RD02, i.e, OBT is TAI, there should be a 33 second difference between OBS and CCS time (assuming CCS is using UTC). In the case the HCDMU is using UTC to specify the on board time, there should be no difference between THSK and the CCS/IEGSE system time*



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Procedure Steps for AVM:

Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/Fail
Select DPU AND OBS PARAMETERS display is on the CCS	—	—	—	
Power ON the SPIRE DPU PRIME unit using the dedicated spacecraft LCL line and configure 1553 Spacecraft bus for SPIRE DPU PRIME (RT = 22)	—	—	—	
Wait for the boot software to produce at least 2 event packets (5,1)				
Execute TCL script SPIRE-WU-INT-DPU-START-R.tcl	—	—	—	
Check that Nominal and Critical HK packets are arriving at the CCS: SPIRE Nominal HK: <ul style="list-style-type: none"> • (type ,subtype) : (3,25) • APID : 0x502 SPIRE Critical HK: <ul style="list-style-type: none"> • (type ,subtype) : (3,25) • APID: 0x500 				
When the HK requests start being generated several HK parameters will go Out of Limits (Hard). This is a design feature of the DRCU Simulator and cannot be avoided.	PLIAP5V PLIAP9V PLIAM9V SLIAP5V SLIAP9V SLIAM9V LIAPiTEMP LIASiTEMP BIASiTEMP DAQTEMP	-/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL -/ OOL		
Check that THSK parameter is refreshing every second	THSK	Refreshing @ 1 Hz	—	
Check that TM2N parameter is incrementing by 1 every second	TM2N	Incrementing by 1 @ 1Hz	—	
Check that TM1N parameter is incrementing by 1 every 2 second	TM1N	Incrementing by 1 @ 0.5Hz		
On CCS check the consistency of the SPIRE on board time to the HCDMU time and the CCS. *	—	—		
On IEGSE check the consistency between SCOS time and THSK and QLA time.	THSK	Incrementing once per second		
Test Result (Pass/Fail):				



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4.1.2.2 Procedure SPIRE-WU-INT-DRCU-ON-R

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Version	1.3
Date	15 th February 2007
Purpose	To switch on the SPIRE DRCU REDUNDANT and start generating housekeeping
Initial configuration	SPIRE DPU is ON and the DRCU are switched off
Final configuration	SPIRE DPU and DRCU are ON and SPIRE HK is being produced
Preconditions	<ul style="list-style-type: none"> • SPIRE FM DPU and DRCU are electrically integrated with the Herschel Satellite • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	DRCU housekeeping telemetry shows expected 'ON' voltages

Procedure Steps for FM:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-DRCU-START-R-STEP1.tcl	---	---	---	
2	Check that THSK parameter is not refreshing anymore	THSK	Not refreshing	---	
3	Check that TM2N parameter is not incrementing anymore	TM2N	Not incrementing		
4	Power ON the SPIRE DRCU REDUNDANT unit using the dedicated spacecraft LCL line.	---	---	---	
5	Execute TCL script SPIRE-WU-INT-DRCU-START-R-STEP2.tcl	---	---	---	
6	Check that THSK parameter is again refreshing every second	THSK	Refreshing @ 1Hz		
7	Check that TM2N parameter is again incrementing every second	TM2N	Incrementing by 1 @ 1Hz		
8	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	---	

Test Result (Pass/Fail):



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Procedure Steps for AVM:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-DRCU-START-R-STEP1.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	THSK	Not refreshing	—	
3	Check that TM2N parameter is not incrementing anymore	TM2N	Not incrementing	—	
4	Start DRCU simulator application software.*	—	—	—	
5	Execute TCL script SPIRE-WU-INT-DRCU-START-R-STEP2.tcl	—	—		
6	Check that THSK parameter is again refreshing every second	THSK	Refreshing @ 1Hz	—	
7	Check that TM2N parameter is again incrementing every second	TM2N	Incrementing by 1 @ 1Hz	—	

Test Result (Pass/Fail):

** It is assumed that the DRCU simulator PC is already ON. Double click on the Transmit.exe icon on the desktop of the PC to start the application software.*



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4.1.2.3 Procedure SPIRE-WU-INT-SCU-01-R

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the SCU REDUNDANT Low Speed Link
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-R and SPIRE-WU-INT-DRCU-ON-R procedures have been executed. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	SCUTEMPSTAT and SUBKSTAT HK parameters show expected values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/Fail
1	Execute TCL script SPIRE-WU-INT-SCU-01-R.tcl	SCUTEMPSTAT SUBKSTAT	0/0xFFFF 0/1		
Test Result (Pass/Fail):					



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4.1.2.4 Procedure SPIRE-WU-INT-SCU-02-R

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the SCU REDUNDANT High Speed Link
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-R and SPIRE-WU-INT-DRCU-ON-R procedures have been executed. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Two SCU Nominal Science telemetry packets are received at CCS with : <ul style="list-style-type: none"> • (type,subtype): (21,1). • APID : 0x509

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-SCU-02-R.tcl	SCUFRAMECNT TM5N	0/31 0x3FFF/1		
2	Verify that two telemetry packets with : <ul style="list-style-type: none"> • (type,subtype): (21,1). • APID : 0x509 have been received at CCS				

Test Result (Pass/Fail):



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4.1.2.5 Procedure SPIRE-WU-INT-MCU-01-R

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Version	1.3
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Purpose	To check the correct functioning of the MCU REDUNDANT Low Speed Link
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced
Final configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced and MCU is booted.
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-R and SPIRE-WU-INT-DRCU-ON-R procedures have been executed. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • MCU PARAMETERS display is selected on the CCS • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCU housekeeping telemetry shows expected 'ON' voltages

Procedure Steps for FM:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Pass/Fail
2	Execute TCL script SPIRE-WU-INT-FUNC-MCU-01-R.tcl	—	—	—	—
3	Check that the MCU is booted up successfully	MCUBITSTAT MCUP5V MCUP14V MCUM14V MCUP15V MCUM15V	0/-/1 ~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V ~ 15.0 ± 0.5V ~ -15.0 ± 0.5V		
Test Result (Pass/Fail):					



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Procedure Steps for AVM:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Pass/Fail
1	Execute TCL script SPIRE-WU-INT-MCU-01-R.tcl	—	—	—	—
2	Check that the MCU is booted up successfully	MCUBITSTAT	0/-/1		

Test Result (Pass/Fail):



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4.1.2.6 Procedure: SPIRE-WU-INT-MCU-02-R

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the MCU REDUNDANT High Speed Link
Initial configuration	SPIRE DPU and DRCU are switched ON, SPIRE HK is being produced and MCU is booted.
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-R and SPIRE-WU-INT-DRCU-ON-R procedures have been executed. • SPIRE-WU-INT-MCU-01-R has been run successfully • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	<p>The following MCU telemetry packet types are received at CCS with :</p> <p>ENG:</p> <ul style="list-style-type: none"> - (type,subtype): (21,3). - APID 0x509 <p>BSM</p> <ul style="list-style-type: none"> - (type,subtype): (21,1). - APID 0x509 <p>SMEC</p> <ul style="list-style-type: none"> - (type,subtype): (21,1). - APID 0x509

Procedure Steps:



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Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-WU-INT-MCU-02-R.tcl	—	—	—	—
2	Record the values of MCUFRAMECNT at the start and end of the test	MCUFRAMECNT	FM: 0/297 AVM : 0/~300		
3	Verify that the following type of MCU telemetry packets have been received at the CCS : ENG: - (type,subtype): (21,3). - APID 0x509 BSM - (type,subtype): (21,1). - APID 0x509 SMEC -(type,subtype): (21,1). - APID 0x509	—	—	—	
Test Result (Pass/Fail):					



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4.1.2.7 Procedure SPIRE-WU-INT-DCU-01-R

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the DCU REDUNDANT Low Speed Link
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced and MCU is booted.
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-R and SPIRE-WU-INT-DRCU-ON-R procedures have been executed. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • BIAS PARAMETERS display is selected on the CCS • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	PSWBIAAS,PMWBIAAS and PLWBIAAS HK parameters show expected values

Procedure Steps:

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/Failure
1	Execute TCL script SPIRE-WU-INT-DCU-01-R.tcl	PSWBIAAS PMWBIAAS PLWBIAAS	0/0xff/0 0/0xff/0 0/0xff/0	— — —	— — —

Test Result (Pass/Fail):



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4.1.2.8 Procedure SPIRE-WU-INT-DCU-02-R

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Version	1.3
Date	15 th February 2007
Purpose	To check the correct functioning of the DCU REDUNDANT High Speed Link
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced and MCU is booted.
Final configuration	Identical
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-R and SPIRE-WU-INT-DRCU-ON-R procedures have been executed. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	<p>The following DCU telemetry packet types are received at CCS with :</p> <p>Full Photometer:</p> <ul style="list-style-type: none"> - (type,subtype): (21,1). - APID 0x505 <p>PSW</p> <ul style="list-style-type: none"> - (type,subtype): (21,2). - APID 0x505 <p>PMW</p> <ul style="list-style-type: none"> - (type,subtype): (21,2). - APID 0x505 <p>PLW</p> <ul style="list-style-type: none"> - (type,subtype): (21,2). - APID 0x505 <p>Full Spectrometer:</p> <ul style="list-style-type: none"> - (type,subtype): (21,1). - APID 0x507 <p>SSW</p> <ul style="list-style-type: none"> - (type,subtype): (21,2). - APID 0x507 <p>SLW</p> <ul style="list-style-type: none"> - (type,subtype): (21,2). - APID 0x507

Procedure Steps:



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



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4.1.2.9 Procedure SPIRE-WU-INT-MCU-OFF-R

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Version	1.3
Date	15 th February 2007
Purpose	To switch OFF the MCU REDUNDANT
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced and MCU REDUNDANT is OFF.
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-R and SPIRE-WU-INT-DRCU-ON-R procedures have been executed. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified MCU HK Parameter shows expected value.

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-WU-INT-MCU-OFF-R.tcl	—	—	—	—
2	Check that the MCU is switched off	MCUBITSTAT	1/-/0		

Test Result (Pass/Fail):



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4.1.2.10 Procedure SPIRE-WU-INT-DRCU-OFF-R

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Version	1.3
Date	15 th February 2007
Purpose	To switch OFF the DRCU REDUNDANT
Initial configuration	SPIRE DPU and DRCU REDUNDANT are switched ON, SPIRE HK is being produced and MCU is OFF.
Final configuration	SPIRE DPU REDUNDANT is ON (but no HK is being produced) and DRCU REDUNDANT is switched OFF.
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DPU-ON-R and SPIRE-WU-INT-DRCU-ON-R procedures have been executed. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	THSK and TM2N stop refreshing/incrementing

Procedure Steps for FM:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-WU-INT-DRCU-OFF-R.tcl	—	—	—	
2	Check that THSK parameter is not refreshing anymore	THSK	Not refreshing	—	
3	Power OFF the SPIRE DRCU REDUNDANT unit.	—	—	—	
Test Result (Pass/Fail):					



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Procedure Steps for AVM:

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



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4.1.2.11 Procedure SPIRE-WU-INT-DPU-OFF-R

Version	1.3
Date	15 th February 2007
Purpose	To switch OFF the DPU REDUNDANT
Initial configuration	SPIRE DPU REDUNDANT is ON (but no HK is being generated) and the DRCU REDUNDANT is OFF.
Final configuration	SPIRE DPU and DRCU REDUNDANT are switched OFF.
Preconditions	<ul style="list-style-type: none"> • SPIRE-WU-INT-DRCU-OFF-R procedure has been executed. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • IEGSE is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Power to SPIRE DPU REDUNDANT is OFF

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Power OFF the SPIRE DPU REDUNDANT unit.	—	—	—	

Test Result (Pass/Fail):