Title: Test Report for SPIRE FM SMEC Test @ He1 after Vibration

CI-No: 125 200

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Table of Content

1	**Scope**	**5**
1.1	Objective	5
1.2	Test Flow	5
1.3	Procedure Execution Summary:	7
2	**Documents/Drawings**	**12**
2.1	Applicable Documents	12
2.2	Reference Documents	12
2.3	Other Documents	12
2.4	Acronyms & Abbreviations	12
3	**Main Observations and Problems Identified.**	**13**
3.1	SPIRE Launch Lock does not open during SMEC test on nominal side (NCR-4221, raised during 1st SMEC test)	13
3.2	SMEC Mechanism friction behaviour in start region (NCR-4222, raised during 1st SMEC test)	13
3.3	Launch Lock EGSE not properly functioning (NCR-4223, raised during 1st SMEC test, raised earlier)	13
3.4	SPIRE LPU wrong parameters for LCL in HPSDB (NCR-4000, raised earlier)	13
3.5	Data Rate higher than expected (NCR-4348, generated during this test)	13
3.6	Resistance Measurement for LL EGSE higher than expected	14
3.7	Loss of IEGSE – CCS connection (NCR-4355, generated during test)	14
3.8	Procedure Changes	14
4	**Conclusion**	**15**
4.1	Open Issues	15
4.2	Requirements Verified	15
5	**Appendix 1: SPIRE SMEC Test As-Run Procedure**	**16**

List of Tables

Table 1: SPIRE SMEC Test Summary 11

1 Scope

This document reports on the SMEC (SPIRE Mechanism) Test performed on the SPIRE FM Instrument to check correct operation, after Vibration Testing. Additionally to the SMEC performance the impact of micro-vibration caused by the SVM reaction wheels on the SMEC was performed.

This 2nd SMEC test was required, since, due to a friction problem on the mechanism (see NCR-4222), the 1st test after Acoustic testing failed on primary side and could not be started on secondary side due to limited test time.

The test configuration was with the S/C mounted on the MPT in horizontal position with +Y axis pointing upwards, accuracy ± 0.5°. The test was executed using the Herschel CCS & I-EGSE.

The test has been performed in accordance with ACS, ref. HP-2-ASED-SD-0381.

1.1 Objective

The objectives of this reduced Cold CFT were:

- To check the correct functional operation of the SPIRE FM Mechanism under He1 conditions on nominal and redundant side
- To check the impact of micro-vibration caused by the SVM reaction wheels on the SMEC.

1.2 Test Flow

The SMEC test flow was structured to reflect nominal operations of SPIRE during higher-level Satellite testing.

The flow is as follows:

The SMEC Test flow is as follows:

1. Power on and configure SPIRE I-EGSE for test
2. Power on and configure SVM for test including CCU
3. Power on NOMINAL SPIRE Prime DPU & DRCU and enable Mil1553B-bus interface
4. Run SMEC CFT Nominal Procedures according to AD 1
5. Run SMEC Micro-vibration Procedures (on Nominal only) according to AD 1
6. Power off MCU Prime
7. Disable Mil1553B-bus interface and Power off SPIRE Prime DRCU & DPU
8. Repeat above Steps 3, 4, 6 & 7 for Spire Redundant CFT Procedures

9. Power off SVM including CCU
10. Switch off all EGSE

1.3 Procedure Execution Summary:

This test has been run with the HERSCHEL S/C in horizontal position (X - axis horizontal, +Y- axis upwards, precision ±0.5°) and on SPIRE nominal side only.

The cryo L1 temperature was around 6 K.

The test duration of the SPIRE SMEC Test was ~ 17 hours 15 min.

The following protocols have been written documenting the SPIRE SMEC Test status:

TRR for SPIRE SMEC 2 Test on PFM SC	15.07.2008, HP-2-ASED-MN-1578
SPIRE SMEC test 2 PTR	18.07.2008, H-P-2-TAS-MN-10654

Location:	ESTEC, Noordwijk, NL
Test Case:	S/C Reconfiguration
Test Session Name:	2008_07_17_05_26_hercdmu_hpws22_REALTIME
Environment:	HP_2_ASED_SD_0381_iss1_SPIRE_SMEC_Post_Vibr_END_001
OBSW:	CDMS 3.4.0.9, ACMS 3.8
HPSDB:	H-P-2-ASP-LI-1441 issue 14
HPCCS Release:	HPCCS_2.0-1317

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

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

The following observations were made during the test**:**

Time (UTC)	Test Procedure / Step / Script / Command / Event / Anomaly	Remarks / Cause of anomaly / Corrective action	C/A type (T/P)	NCR ref. (P
05:35	Start with power on z010999mcvt001 power_on her_ist			
05:35	Error with POWER_ON_HER_IST			SPR#597
05:01	Space freed up on TMTC PC, SVM Power on started			
06::29	SVM powered			
06:58	CCU A + B ON, Space Monitoring mode (PVS#2)			
07:36	Verify Nominal Latch Command Relay Status			
07:46	**Switch ON for SPIRE PRIME SMEC**			
08:00	Procedure SPIRE-IST-COLD-FUNC-SCU-06-P			
08:10	Procedure SPIRE-IST-COLD-FUNC-MCU-01-P			
	SD-0381 STEP 19 (PVS#1-1)			
09:10	SCD06505 send 91C10001	Started Science data production		
09:16	SCD06505 0955FFFF	After command sent, wait 60 secs		
09:17	SCD06505 90550000	Force Feed Offset		
09:19	SCD06505 90558000	Force Feed Offset		
09:25	SCD06505 91C10000	Stopping Science data production		
09:25	SCD01505 HEX 7000	FLUSH_ FIFO		
09:34	SCD06505 90557850	Force Feed Offset		
	STEP 4 OF PROCEDURE SKIPPED			
09:34	SCD06505 9058A7F8	SMECENCSIG1OFF		
09:35	SCD06505 905A8EF8	SMECENCSIG2OFF		
09:50	SCD06505 90490004	Initialises encoder to 0		
	IEGSE Configuration changed must be changed			
10:20	Disconnect HSPIREEGSE	After disconnection, IEGSE was then re-configured		
10:22	Reconnect HSPIREEGSE			
	Continue with Main Procedure			
	SD-0381 Step 21			
	(Para 7.2.6.12 Skipping step 1)	Removal of step because of tuning		PVS#3
10:28	Problem reported on IEGSE side, SPIRE-IST-COLD-FUNC-SMEC-09-P.tcl	Problem reported, **"No Packet arrived"**		SPR#599
10:32	Script terminated and disconnected from IEGSE – re-configuration of IEGSE ongoing.			
	Problem traced to database problem - corrected			
10:37	Reconnect HSPIREEGSE			
10:38	Repeat of script execution: SPIRE-IST-COLD-FUNC-SMEC-09-P.tcl	**Packet now received correctly**		
10:38	Problem – Science_TM_FIFO_Full			NCR#4348

Time (UTC)	Test Procedure / Step / Script / Command / Event / Anomaly	Remarks / Cause of anomaly / Corrective action	C/A type (T/P)	NCR ref. (P
10:56	PVS#4 raised to configure downlink data rate to 1.5Mbps			PVS #4
10:57	SCD06505 9058A7F8	SMECENCSIG1OFF		
10:58	SCD06505 905A8EF8	SMECENCSIG2OFF		
10:58	SCD06505 90490004	Initialises encoder to 0		
10:59	Repeat of script execution: SPIRE-IST-COLD-FUNC-SMEC-09-P.tcl			
11:00	Same Problem – Science_TM_FIFO_Full, but the VC1 Q full is NOT reported.			
11:21	Send 3 extra TC : Re initialise encoder + set Feed forward gain offset + Start MCU science.			PVS #5
11:28	**LUNCH**			
	Continuation of the PVS #5 commands: Set POS n SMEC Move SMEC Re initialise encoder Move SMEC Stop MCU service Flush FIFO			PVS #6
12:49	Send extra commands : Disable selection Send DRCU Command Set sampling rate			
12:55	Continue from step 3			NCR 4348
12:56	Same Problem – Science_TM_FIFO_Full, but the VC1 Q full is NOT reported.			
13:01	TC Sequence error reported.			PVS #7
13:21	Send extra TC to recover Set SF offset Set scan end to 0 Set scan mode parameter to 1 Set scan mode to 4 Set scan mode to 1 Set SMEC loop mode parameter to 1	We received the same error that occurred at 12:56 (NCR 4348)		PVS#8
13:58	Send DRCU Command 91C10001 Skip step 23 Continue with steps 24 to 29 Perform step 23 Continue from step 30			PVS #8
14:00	ACMS switch on started in preparation for SMEC micro vibration			
14:52	SMEC micro vibration test started and started recording			

Time (UTC)	Test Procedure / Step / Script / Command / Event / Anomaly	Remarks / Cause of anomaly / Corrective action	C/A type (T/P)	NCR ref. (P
15:00	RWLs ON – Positive spin started			PVS #6
15:11	Negative Spin down started			
15:23	Spin down started			
16:08	Events Received Science_Pool_Cleared & Science_TM_FIFO_Clear Re-occurance of NCR 4348 Event received TC_sequence_error (16:06:58) ???			NCR 4348
16:44	Start SPIRE-IST-COLD-FUNC-SMEC-LVDT-P	For details see PVS 1		PVS#1
19:45	**Pwr ON Redundant side of SPIRE**			
20:00	Reoccurrence of NCR4289 SCAL Temp invalid cal curve			
21:12	Switch OFF SPIRE SMEC during night Shift	Night Shift to babysit SC		PVS#9
05:25	Between 05:25 and 05:30 message displayed: 238 backlog accumulated packet(s) discarded	**TO BE INVESTIGATED**		
06:17	Switch on SMEC SPIRE_IST_COLD_FUNC_SMEC_01_R Issue commands (as detailed in the PVS) to reconfigure the SMEC.			PVS #10
06:28	Continue from step 52 of SD--0381			
06:55	Issue commands for tuning			PVS #11
07:43	SCD05505 SCD06505 SCD06505	Disable selection DRCU Stop SMEC scan data. DRCU set T samples to 4.2		PVS #11
08:24	SPIRE_IST_COLD_FUNC_SMEC_07_R			
08;33	SPIRE_IST_COLD_FUNC_SMEC_04b_R			
08:47	Repeat micro-vibration test without accelerometer measurements			PVS #12
09:49	IEGSE link lost			
09:50	Links re-made			NCR to be raised?
09:51	SPIRE_IST_SMEC_RAMP_MICROVIBRATION restarted			
10:48	Terminate SPIRE_IST_SMEC_RAMP test			PVS #12
10:59 12:20 12:23 12:24	 Switching OFF SMEC Switching OFF SCU Switching OFF DRCU			PVS#13

Time (UTC)	Test Procedure / Step / Script / Command / Event / Anomaly	Remarks / Cause of anomaly / Corrective action	C/A type (T/P)	NCR ref. (P
12:25	Switch OFF SPIRE			
12:28	Continuing PVS#12 Switch off ACMS			
13:00	S/C OFF			

Table 1: SPIRE SMEC Test Summary

2 Documents/Drawings

2.1 Applicable Documents

AD1	IST INSTRUMENT COMMISSIONING SPIRE FM COLD FUNCTIONAL TEST	HP-2-ASED-TP-0217, Issue 1.3 formalised by ACS HP-2-ASED-SD-0381

2.2 Reference Documents

None

2.3 Other Documents

None

2.4 Acronyms & Abbreviations

See “as-run” procedure.

3 Main Observations and Problems Identified.

Two NCR´s (NCR-4348, NC-4355) have been raised following this run of the SPIRE SMEC Test and two can be closed (NCR-4221, NC-4287).

3.1 SPIRE Launch Lock does not open during SMEC test on nominal side (NCR-4221, raised during 1st SMEC test)

The first test has been executed until the step where the mechanism was unlocked. However, the Launch Lock was considered not open. After further analysis it was demonstrated that it did open. The confusion came from the not working LL EGSE (red and green diode). This EGSE has been replaced by a BoB with a DVM attached between pins 10 and 13 which measures the resistance in open (310 Ohm) and closed (273 Ohm) status.

This NCR can now be closed.

3.2 SMEC Mechanism friction behaviour in start region (NCR-4222, raised during 1st SMEC test)

The friction behaviour, as seen in the first test, could not be observed. Therefore, a discussion on a 3rd SMEC test is ongoing.

3.3 Launch Lock EGSE not properly functioning (NCR-4223, raised during 1st SMEC test, raised earlier)

The fact that the green light did not change was due to the unexpected high resistance of the magneto-resistance.

NCR can be closed after explanation of the difference to the expected ohm value and confirmation that this explains the LL EGSE to fail.

The disposition is to use an Ohmmeter instead of LL EGSE.

3.4 SPIRE LPU wrong parameters for LCL in HPSDB (NCR-4000, raised earlier)

The NCR remains open until CDMS software 2.6. A patch in database & procedure is required until that.

3.5 Data Rate higher than expected (NCR-4348, generated during this test)

The data rate was higher than expected (close to 130kbit/s) as the DCU data was activated unintentionally.

3.6 Resistance Measurement for LL EGSE higher than expected

The launch lock position has been checked with an Ohmmeter instead of the LL EGSE. The “closed” position was measured with 172 Ohm as expected, however, the “open” position was measured with 310 Ohm, which exceeds the specified value of 273 Ohm, but judged okay by RAL representative during the test execution. It was decided at the TRB to update the RAL procedure to reflect this new value, instead of raising an NCR.

3.7 Loss of IEGSE – CCS connection (NCR-4355, generated during test)

During the SPIRE SMEC test, the connection between the CCS and the IEGSE was lost. The connection is cut by the CCS when the IEGSE does not reply to a request of command parameters. This happened before during PACS and HIFI test when the request was send, but the CUS on the IEGSE was not yet ready. SPIRE indicates that the CUS database was indeed updated prior to this test, but that it should have been ready.
SPIRE will analyse further what happened.

3.8 Procedure Changes

Updates and clarifications in the CFT procedure (AD1), as required during the test execution, were included by redlining. All necessary modifications have bee reported in chapter 8.1, “Procedure Variation Summary”.

4 Conclusion

All planned procedures have been executed. The test has been successfully completed according to the QLA performed by SPIRE.
The SMEC is performing very well and is not affected by the Reaction wheels micro-vibration (frequency sweep + all 4 wheels full speed) when operating in closed loop.
The question of a 3rd SMEC test at the end of the sequence is under discussion (NC4222).

The detailed evaluation of the test results will be performed by RAL and a respective separate test report issued.

The Non-Conformance Reports (listed above) as raised during the test did not affect the test objectives.

4.1 Open Issues

- none

4.2 Requirements Verified

With the above test the requirement for the SPIRE CFT incl. SMEC test, according to chapter 4.7.3 of “Test Specification for HERSCHEL Instruments FM tests performed at satellite level”, ref. H-P-2-ASP-TS-1083, has been verified.

5 Appendix 1: SPIRE SMEC Test As-Run Procedure

(ref. HP-2-ASED-SD-0381, issue 1)

Location : ESTEC	Title: SPIRE SMEC Test at He1 after Vibration		
Facility : Class 100000	Model: FM	System: S/C	Date: 17/07/2008
CI No.: 125 200	Test Conductor:		NCR Ref:
	Prepared By: A. Koppe		CIL No:

Scope:
This ACS details the activities to be performed for the SPIRE SMEC test including Microvibration.
This ACS shall be used in conjunction with the following documents:
- RD1) SPIRE FM IST Instrument Commissioning CFT TP, HP-2-ASED-TP-0217, issue 1.3 (Annex 4)
- RD2) SPIRE-RAL-NOT-003015, iss. 3.0

Note: the SPIRE detector check is covered by a separate ACS, ref. HP-2-ASED-SD-0382 (execution TBC by ESA)

Annexes:
1 - Activity Control Sheet: Session Record
2 - Actual SCOE cable connection
3 - Actual S/C operational sheet
4 – Procedure Execution sheets

EGSE CCS SW version:	**On-Board S/W:** CDMS ASW: Version 3.4.0.9 ACMS ASW: Version 3.8 SPIRE OBSW: Version DPU 2.2.H Partition 1 ; main and redundant, Version DPU 2.2.H partition 2 ; main and redundant
HPSDB:	**SPIRE Merged MIB:** SPIRE MIB: 2.2.H1 PR SPIRE Merged MIB: H-P-ASP-LI-1424_04

Facilities required:	See AD1, § 5.4	
Personnel required:	See AD1, § 5.1	
Safety and Hazards:	See AD1, § 5.3	
NCR / Constraints:	**Safety critical NCRs identified:** None **Blocking NCRs:** None **Instruments:** SPIRE **S/C configuration:** S/C (X – axis) horizontal, +Y - axis up, accuracy ± 0.5° in both X - & Y - axis He1 conditions **Constraints:** SPIRE SMEC Launch Latch EGSE (BoB & DVM) connected	

No:	Activity	Proc/Drg/Result	Responsible & sign off
1.	Inform ASED Floor Manager of test start SPIRE test **Test duration: 2 days**		ok
2.	Fill in the session ID according to the sheet (Annex 1)	ok	
3.	Ensure that satellite configuration (SCOE cable connection sheet - Annex 2) is available, complete and signed	ok	

Release AIT:	Release SE:	Release PA/Safety:	Sign off (PA/QC/Team Leader)
Release Floor Manager:			
17.07.08 08:15			

No:	Activity	Proc/Drg/Result	Responsible & sign off
4.	Fill in the S/C Operational Status Sheet (Annex 3)		
5.	Execute procedure RD1, § 1 to 7. **Note:** RD1, § 5.2 Environmental conditions are redefined for the SMEC test at **He1 conditions**: **L0 temperature: 4.2 K < T < 6.5 K** **L1 temperature: 4.2 K < T < 15 K** **L2 temperature: 5 K < T < 30 K** **L3 temperature: 5 K < T < 50 K** (Spire J-FET, T246 T247)	**L0 =** 5.01 (T225) **L1 =** 6.1 (T234) **L2 =** 7.53 (T248) **L3 =** 14.86 (T246)	
6.	From RD1, execute § 7.1 for EGSE setup		
	S/C Power ON & TEST ON SPIRE PRIME		
7.	From RD1, execute § 7.2.1 for EGSE & Satellite Switch On **Note: if S/C already on, SKIP step 7**	OK	
8.	Check on SPIRE Launch Latch EGSE (BoB & DVM) that Mechanism is latched (**R = 173 ± 0.5 Ohm**) (see AD2)	between pins 3 and 10 **R =** 172.9 Ω	ok
9.	From RD1, execute § 7.2.6.1 for Nominal Checkout of LPU PRIME, SPIRE-IST-COLD-LPU-01-P	OK	
10.	From RD1, execute § 7.2.6.2 for SPIRE PRIME DPU and DRCU switch on	OK	
11.	From RD1, execute § 7.2.6.3 - SCU DC Thermometry check PRIME, SPIRE-IST-COLD-FUNC-SCU-03-P	Ok	
12.	From RD1, execute § 7.2.6.4 for SCU AC Thermometry check PRIME, SPIRE-IST-COLD-FUNC-SCU-06-P	Ok	
13.	From RD1, execute § 7.2.6.5 for MCU Boot Check PRIME, SPIRE-IST-COLD-FUNC-MCU-01-P	Ok	
14.	From RD1, execute § 7.2.6.6 for MCU Nominal Science Contents Check, SPIRE-IST-COLD-FUNC-MCU-03-P	Ok	
15.	From RD1, execute § 7.2.6.7 for SMEC (PRIME) Encoder/LVDT Sensor Check, SPIRE-IST-COLD-FUNC-SMEC-01-P	Ok	
16.	From RD1, execute § 7.2.6.8 for SMEC (PRIME) Encoder Integrity Check, SPIRE-IST-COLD-FUNC-SMEC-03-P	OK	
17.	From RD1, execute § 7.2.6.9 to open the SMEC Launch Latch Prime (Unlatch it), SPIRE-IST-COLD-FUNC-SMEC-02A-P	Ok	
18.	Check on SPIRE Launch Latch EGSE (BoB & DVM) that Mechanism is unlatched (**R = 273 ± 0.5 Ohm**)	**R =** 309.6	OK to continue
19.	From RD1, execute § 7.2.6.10 for SMEC (PRIME) Open Loop Feed Forward Offset Test, SPIRE-IST-COLD-FUNC-FFOFFSET-P	ok	
20.	From RD1, execute § 7.2.6.12 for SMEC (PRIME) Open Loop Positioning Test, SPIRE-IST-COLD-FUNC-SMEC-04A-P	ok	

No:	Activity	Proc/Drg/Result	Responsible & sign off
21.	From RD1, execute § 7.2.6.~~13~~ 12 for SMEC (PRIME) Open Loop Scan Test, SPIRE-IST-COLD-FUNC-SMEC-09-P	NCR-4348. OK	
22.	From RD1, execute § 7.2.6.~~14~~ 13 for SMEC (PRIME) Close Loop Scan Test, SPIRE-IST-COLD-FUNC-SMEC-07-P	NCR-4348 ok	
23.	From RD1, execute § 7.2.6.~~15~~ 14 for SMEC (PRIME) Close Loop Positioning Test, SPIRE-IST-COLD-FUNC-SMEC-04B-P	ok	
24.	Acceleration Background measurement shall be performed (reaction wheels not turning) and acceleration level vs reaction wheel speed or vs time shall be recorded.	ok	
25.	From RD1, execute § 7.2.6.~~16~~ ~~17~~ SMEC Microvibration Pre-Test Configuration	ok	
26.	From RD1, execute § 7.2.6.~~18~~ ~~19~~ 17 Reaction Wheel Operation for Variable Frequency Microvibration, SPIRE-IST-SMEC-RAMP-MICROVIBRATION, **note:** at step 2 of this procedure § 7.2.6.~~17~~ ~~18~~ is started for Reaction Wheel operation	ok	
27.	Evaluate data from test while acceleration background measurement is made	ok	
28.	If severe reaction is found repeat step 26 at different mechanism speed, otherwise continue with next step (no severe reaction)	ok	
29.	From RD1, execute § 7.2.6.~~21~~ ~~22~~, SMEC Microvibration Post-Test Configuration	ok	
30.	From RD1, execute § 7.2.6.~~15~~ ~~16~~, SPIRE-IST-COLD-FUNC-SMEC-LVDT-P for SMEC (PRIME) Backup LVDT Close Loop Check	OK	
31.	From RD1, execute § 7.2.6.~~22~~ ~~23~~ to close the SMEC Launch Latch Scan Test (Latch it), SPIRE-IST-COLD-FUNC-SMEC-02B-P	OK	
32.	Check on SPIRE Launch Latch EGSE (BoB & DVM) that Mechanism is latched (**R = 173 ± 0.5 Ohm**)	R = 172,9 Ω	
33.	From RD1, execute § 7.2.6.~~23~~ ~~24~~ for SMEC (PRIME) Switch OFF, SPIRE-IST-COLD-FUNC-SMEC-OFF-P	ok	
34.	From RD1, execute § 7.2.6.~~24~~ ~~25~~ for MCU PRIME Switch OFF, SPIRE-IST-COLD-FUNC-MCU-OFF-P	ok	
35.	From RD1, execute § 7.2.6.~~25~~ ~~26~~ for SCU PRIME Switch OFF, SPIRE-IST-COLD-FUNC-SCU-OFF-P	ok	
36.	From RD1, execute § 7.2.6.~~26~~ ~~27~~ for SPIRE PRIME DPU and DRCU switch OFF	ok	
37.	Acceleration Background measurement shall be performed (reaction wheels not turning) and acceleration level vs reaction wheel speed or vs time shall be recorded. → Done during Step 24	ok	
	TEST ON SPIRE REDUNDANT		

No:	Activity	Proc/Drg/Result	Responsible & sign off
38.	Inform the SPIRE Expert to change the SPIRE I-EGSE setup for the Standalone SMEC Functional Tests (Redundant side)	ok	
39.	Change the CCS setup for the Standalone SMEC Functional Tests (Redundant side)	ok	
40.	From RD1, execute § 7.2.6.27 for Checkout of LPU REDUNDANT, SPIRE-IST-COLD-LPU-01-R	OK	
41.	From RD1, execute § 7.2.6.28 for SPIRE REDUNDANT DPU and DRCU switch on	ok	
42.	From RD1, execute § 7.2.6.30 - SCU DC Thermometry check REDUNDANT, SPIRE-IST-COLD-FUNC-SCU-03-R	OK	
43.	From RD1, execute § 7.2.6.31 for SCU AC Thermometry check REDUNDANT, SPIRE-IST-COLD-FUNC-SCU-06-R	ok	
44.	From RD1, execute § 7.2.6.32 for MCU Boot Check REDUNDANT, SPIRE-IST-COLD-FUNC-MCU-01-R	OK	
45.	From RD1, execute § 7.2.6.33 for MCU Redundant Science Contents Check, SPIRE-IST-COLD-FUNC-MCU-03-R	ok	
46.	From RD1, execute § 7.2.6.34 for SMEC (REDUNDANT) Encoder / LVDT Sensor Check, SPIRE-IST-COLD-FUNC-SMEC-01-R	ok	
47.	From RD1, execute § 7.2.6.35 for SMEC (REDUNDANT) Encoder Integrity Check, SPIRE-IST-COLD-FUNC-SMEC-03-R	ok	
48.	From RD1, execute § 7.2.6.36 to open the SMEC Launch Latch Redundant (Unlatch it), SPIRE-IST-COLD-FUNC-SMEC-02A-R	ok	
49.	Check on SPIRE Launch Latch EGSE (BoB & DVM) that Mechanism is unlatched (~~R = 273 ± 0.5 Ohm~~) 310 ± 10 Ω	R = 309.8 Ω	
50.	From RD1, execute § 7.2.6.37 for SMEC (REDUNDANT) Open Loop Feed Forward Offset Test, SPIRE-IST-COLD-FUNC-FFOFFSET-R	ok	
51.	From RD1, execute § 7.2.6.39 for SMEC (REDUNDANT) Open Loop Positioning Test, SPIRE-IST-COLD-FUNC-SMEC-04A-R	OK	
52.	From RD1, execute § 7.2.6.40 for SMEC (REDUNDANT) Open Loop Scan Test, SPIRE-IST-COLD-FUNC-SMEC-09-R	OK	
53.	From RD1, execute § 7.2.6.41 for SMEC (REDUNDANT) Close Loop Scan Test, SPIRE-IST-COLD-FUNC-SMEC-07-R	OK	
54.	From RD1, execute § 7.2.6.42 for SMEC (REDUNDANT) Close Loop Positioning Test, SPIRE-IST-COLD-FUNC-SMEC-04B-R	OK	
55.	From RD1, execute § 7.2.6.43, SPIRE-IST-COLD-FUNC-SMEC-LVDT-R for SMEC (REDUNDANT) Backup LVDT Close Loop Check	OK	
56.	From RD1, execute § 7.2.6.44 to close the SMEC Launch Latch Scan Test (Latch it), SPIRE-IST-COLD-FUNC-SMEC-02B-R	ok	

No:	Activity	Proc/Drg/Result	Responsible & sign off
	resistance before 310 Ω		
57.	Check on SPIRE Launch Latch EGSE (BoB & DVM) that Mechanism is latched (**R = 173 ± 0.5 Ohm**)	R = 172.9	
58.	From RD1, execute § 7.2.6.45 for SMEC (REDUNDANT) Switch OFF, SPIRE-IST-COLD-FUNC-SMEC-OFF-R	ok	
59.	From RD1, execute § 7.2.6.46 for MCU REDUNDANT Switch OFF, SPIRE-IST-COLD-FUNC-MCU-OFF-R	ok	
60.	From RD1, execute § 7.2.6.47 for SCU REDUNDANT Switch OFF, SPIRE-IST-COLD-FUNC-SCU-OFF-R	OK	
61.	From RD1, execute § 7.2.6.48 for SPIRE REDUNDANT DPU and DRCU switch OFF	ok	
	EGSE Switch OFF & S/C Power OFF		
62.	From RD1, execute § 7.2.7, Satellite & EGSE Switch Off After Test **Note: if S/C needs to be left on, SKIP steps 5, 6, 7.**	ok	
63.	Inform ASED Floor Manager of test end	ok	

APPENDIX 1

Activity Control Sheet: Session Record

Session ID	Start Date/Time	End Date/Time	QA Approval
2008_07_17_05_26_HERSCHEL_HPDWS22_REALTIME			

APPENDIX 2

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

S/C Lead Sign: HERSCHEL SAT AIT constrains sheet 17.07.08 07:28 incl. 10.08.08
Tel: ESTEC-54125

	Op	Comments	Non Op
CDMS			
CDMU	X		
1553 MIL-BUS A	X		
1553 MIL-BUS B	X		
PCS			
PCDU	X		
BAT		**BS SCOE connected**	X
Solar Array		**Not connected**	X
TCS	X		
TT&C	**X**		
MGA	X	**RF-SCOE connected to Test-Caps on Antenna**	
LGA1	X	**RF-SCOE connected to Test-Caps on Antenna**	
LGA2	X	**RF-SCOE connected to Test-Caps on Antenna**	
ACMS			
1553 MIL-BUS A	X		
1553 MIL-BUS B	X		
ACC	X		
RWL1,2,3,4	X		
SAS1	X		
SAS2	X		
AAD	X		
GYR	X		
STR1	X		
STR2	X		
CRS1	X		
CRS2	X		
RCS	**X**		
CCU	**X**	**Cryo SCOE NOT connected**	
SPIRE	**X**		
WUs			
FPU			
PACS	**X**	**PACS Safe Mode with simulated science data, NO higher level mode commanding allowed**	
WUs			
FPU			
HIFI	**X**	**!WARNING! If HIFI is switched ON, the cooler in the CleanRoom has to be switch ON too.**	
WUs			
FPU			
VMC	**X**		
SREM	**X**		
CryoCover		**Safe Plugs installed**	**X**
Telescope	**X**		

APPENDIX 1

Actual SCOE cable connection (to be confirmed by AIT)

SCOE CABLES CONNECTION to HERSCHEL S/C					
SKIN-01	PWR Panel (PCDU)				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
	BS Nom Power	SK01BJ09	PCDU	BS SCOE Cable Plugged ✓	
	BS Red Power	SK01BJ10	PCDU	BS SCOE Cable Plugged ✓	
	BDR1 AIT	SK01BJ11	PCDU	LPS SCOE Cable Plugged ✓	
	BDR2 AIT	SK01BJ12	PCDU	LPS SCOE Cable Plugged ✓	
	SA Nom Power	SK01AJ01	PCDU	POWER SCOE Cable Plugged ✓	
	SA Nom Power	SK01AJ02	PCDU	POWER SCOE Cable Plugged ✓	
	SA Nom Power	SK01AJ03	PCDU	POWER SCOE Cable Plugged ✓	
	SA Nom Power	SK01AJ04	Battery	EMC Dust Cap ✓	
	SA Red Power	SK01AJ05	PCDU	POWER SCOE Cable Plugged ✓	
	SA Red Power	SK01AJ06	PCDU	POWER SCOE Cable Plugged ✓	
	SA Red Power	SK01AJ07	PCDU	POWER SCOE Cable Plugged ✓	
SKIN-02	PWR Panel (ACC, CDMU, RCS, 1553 & Thruster)				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-02	DMS 1553 Bus_A	J01	CDMU	Bus Monitor Cable Plugged ✓	
SKIN-02	DMS 1553 Bus_B	J02	CDMU	Bus Monitor Cable Plugged ✓	
SKIN-02	ACMS 1553 Bus_A	J03	ACC	ACMS SCOE Cable Plugged ✓	
SKIN-02	ACMS 1553 Bus_B	J04	ACC	ACMS SCOE Cable Plugged ✓	
SKIN-02	LV1/FCV 20N CMD S/A M	J05	ACC/RCS	ACMS SCOE Cable Plugged ✓	

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17.07.08 07:20

SKIN-02	LV2/FCV 20N CMD S/A R	J06	ACC/RCS	ACMS SCOE Cable Plugged ✓	✓
SKIN-02	RCS Press/Tank Temp/PT Pwr	J07	ACC/PT&TH	ACMS SCOE Cable Plugged ✓	
SKIN-02	Thruster Temp M/LV1 Sts	J08	ACC/RCS	ACMS SCOE Cable Plugged ✓	
SKIN-02	CDMU and ACC EEPROM reprogramming input	J09	ACC/CDMU		Flight Plug SK02P09 Plugged ✓
SKIN-02	CDMU and ACC EEPROM reprogramming input	J10	ACC/CDMU		Flight Plug SK02P10 Plugged ✓
SKIN-02	Thruster Temp R/LV2 Sts	J11	ACC/RCS	ACMS SCOE Cable Plugged ✓	
SKIN-02	Thruster C/B Heaters M	J12	ACC/CBH	ACMS SCOE Cable Plugged ✓	
SKIN-02	Thruster C/B Heaters R	J13	ACC/CBH	ACMS SCOE Cable Plugged ✓	
SKIN-02	Str1/2 On/Off Cmd M/Str1 Sts	J14	ACC/STR-1		ACMS Flight Plug SK02P14 Plugged ✓
SKIN-02	Str1/2 On/Off Cmd R/Str2 Sts	J15	ACC/STR-2		ACMS Flight Plug SK02P15 Plugged ✓
SKIN-02	Gyro A On/Off Cmd	J16	ACC/GYRO-E1		ACMS Flight Plug SK02P16 Plugged ✓
SKIN-02	Gyro B On/Off Cmd	J17	ACC/GYRO-E2		ACMS Flight Plug SK02P17 Plugged ✓
SKIN-03	TTC Panel				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-03	Test point TC + protection jumper EPC1	SK03J01	XPND1/EPC1		~~Plastic cap~~ Flight Caps ✓
SKIN-03	Test point TC + protection jumper EPC2	SK03J02	XPND2/EPC2		~~Plastic cap~~ Flight Caps ✓
	RF LINK				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
	RF link for antenna LGA1	N/A	LGA1	RF SCOE LGA1 Plugged	LGA1 Anechoic Cap ✓
	RF link for antenna LGA2	N/A	LGA2	RF SCOE LGA2 Plugged	LGA2 Anechoic Cap ✓
	RF link for antenna MGA	N/A	MGA	RF SCOE MGA Plugged	MGA Anechoic Cap ✓
SKIN-04	ACMS Panel (RWE)				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-04	RWL1 Sgn	J01	ACC/RWL-1		ACMS Flight Plug SK04P01 Plugged ✓
SKIN-04	RWL2 Sgn	J02	ACC/RWL-2		ACMS Flight Plug SK04P02 Plugged ✓

17.12.07 FM Ops
17.7.07 04:20

SKIN-04	RWL3 Sgn	J03	ACC/RWL-3		ACMS Flight Plug SK04P03 Plugged ✓
SKIN-04	RWL4 Sgn	J04	ACC/RWL-4		ACMS Flight Plug SK04P04 Plugged ✓
SKIN-05	GYR/QRS Panel				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-05	CRS1 AOCS Sgn	J01	CRS-1/ACC		ACMS Flight Plug ✓
SKIN-05	CRS2 AOCS Sgn	J02	CRS-2/ACC		ACMS Flight Plug ✓
SKIN-05	GYRO RS422 / Test	J03	GYRO	ACMS SCOE Cable Plugged ✓	
SKIN-05	CRS 1/2 Stimuli	J04	CRS-1,2	ACMS SCOE Cable Plugged ✓	
SKIN-05	AAD Sgn M	J05	AAD/ACC	ACMS SCOE Cable Plugged ✓	
SKIN-05	SAS1/2 Sgn M	J06	SAS/ACC	ACMS SCOE Cable Plugged ✓	
SKIN-05	SAS1/2 Sgn R	J07	SAS/ACC	ACMS SCOE Cable Plugged ✓	
SKIN-05	AAD Sgn R	J08	AAD/ACC	ACMS SCOE Cable Plugged ✓	
SKIN-06	STR Panel				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-06	STR1 Stimuli	J01	STR1	ACMS SCOE Cable Plugged ✓	
SKIN-06	STR2 Stimuli	J02	STR2	ACMS SCOE Cable Plugged ✓	
	UMBILICAL				
	Connector Function	Connector	S/C unit	SCOE CABLE	
	Power/Data	HU1J01 ~~HU1J01~~	SYSTEM	SCOEs cable Plugged ✓	
	Power/Data	HU2J01 ~~HU2J01~~	SYSTEM	SCOEs cable Plugged ✓	

M. Müller FI. 17.7.08
16.07.08 19:00

Title: **IST Instrument Commissioning**
SPIRE FM Cold Functional Test

CI-No: 125200

Prepared by:	S. Hamer/A. Koppe	Date: 03.07.2008
Checked by:	S. Idler	7.7.08
Product Assurance:	R. Stritter	04.07.08
Configuration Control:	W. Wietbrock	08.07.08
Project Management:	W. Fricke	08/07/2008
TAS-F	D. Montet	

Distribution: See Distribution List (last page)

Issue	Date	Sheet	Description of Change	Release
1	08.05.08	All	First Formal Issue	
1.1	30.05.08	All	Updates to reflect redlining from 1st SMEC test in Hel plus addition of LL latch relay status check for nominal and redundant. Minor typos + replacement of outstanding S/C level TBCs/TBDs	
1.2	01.07.08		Typo in I-EGSE connection cmd removed (**YC00X966)** **Update of power on/off details for CFT**	
1.3	03.07.08		Implementation of new issue (2.5) of RD2, SPIRE Cold Functional Test Procedures, SPIRE-RAL-PRC-2398	

Table of Content

1	**Scope**	**10**
1.1	Objective	10
1.2	Test Flow	10
2	**Documents/Drawings**	**12**
2.1	Applicable Documents	12
2.2	Reference Documents	12
2.3	Other Documents	13
2.4	Acronyms & Abbreviations	13
3	**Configuration**	**17**
3.1	Satellite Configuration	17
3.2	EGSE Configuration	17
3.3	Set-up	17
4	**Test Sequence**	**18**
5	**Conditions**	**20**
5.1	Personnel	20
5.2	Environmental	21
5.3	General Precautions and Safety	21
5.3.1	General Safety Requirements, Precautions	22
5.3.2	ESD constraints	23
5.3.3	Cryo Specific Safety Requirements	23
5.3.4	Special QA Requirements	24
5.4	GSE	24
5.4.1	MGSE	24
5.4.2	CVSE	24
5.4.3	EGSE	24
5.4.4	OGSE	24
5.4.5	Special Equipment	25
6	**Verification Requirements and Test Criteria**	**26**

7	**Test Procedure**	**27**
7.1	Initial EGSE and Satellite Configuration for the Test	27
7.2	Step by Step Procedure	28
7.2.1	EGSE & Satellite Switch On for CFT	28
7.2.2	Cold Functional Tests - Nominal	31
7.2.2.1	Switch ON SPIRE PRIME	31
7.2.2.2	Procedure SPIRE-IST-COLD-FUNC-SCU-02-P	35
7.2.2.3	Procedure SPIRE-IST-COLD-FUNC-SCU-03-P	36
7.2.2.4	Procedure SPIRE-IST-COLD-FUNC-SCU-06-P	39
7.2.2.5	Procedure SPIRE-IST-COLD-FUNC-SCU-07-P	41
7.2.2.6	Procedure SPIRE-IST-COLD-FUNC-PCAL-01-P	43
7.2.2.7	Procedure SPIRE-IST-COLD-FUNC-SCAL-01-P	45
7.2.2.8	Procedure SPIRE-IST-COLD-FUNC-MCU-01-P	46
7.2.2.9	Procedure SPIRE-IST-COLD-FUNC-MCU-03-P	48
7.2.2.10	Procedure SPIRE-IST-COLD-FUNC-BSM-01-P	49
7.2.2.11	Procedure SPIRE-IST-COLD-FUNC-BSM-03-P	50
7.2.2.12	Procedure SPIRE-IST-COLD-FUNC-BSM-05A-P	51
7.2.2.13	Procedure SPIRE-IST-COLD-FUNC-BSM-05B-P	52
7.2.2.14	Procedure SPIRE-IST-COLD-FUNC-BSM-06-P	53
7.2.2.15	Procedure SPIRE-IST-COLD-BSM-OFF-P	54
7.2.2.16	Procedure SPIRE-IST-COLD-FUNC-SMEC-01-P	55
7.2.2.17	Procedure SPIRE-IST-COLD-FUNC-SMEC-03-P	56
7.2.2.18	Procedure SPIRE-IST-COLD-SMEC-OFF-P	57
7.2.2.19	Procedure SPIRE-IST-COLD-FUNC-DCU-02-P	58
7.2.2.20	Procedure SPIRE-IST-COLD-FUNC-DCU-11-PHOT-P	60
7.2.2.21	Procedure SPIRE-IST-COLD-FUNC-DCU-13-PHOT-P	62
7.2.2.22	Procedure SPIRE-IST-COLD-FUNC-DCU-14-PHOT-P	63
7.2.2.23	Procedure SPIRE-IST-COLD -PHOT-VSS-P	64
7.2.2.24	Procedure SPIRE-IST-COLD-PDET-OFF-P	65
7.2.2.25	Procedure SPIRE-IST-COLD-FUNC-DCU-11-SPEC-P	67
7.2.2.26	Procedure SPIRE-IST-COLD-FUNC-DCU-13-SPEC-P	69
7.2.2.27	Procedure SPIRE-IST-COLD-FUNC-DCU-14-SPEC-P	70
7.2.2.28	Procedure SPIRE-IST-COLD- SPEC-VSS-P	71

7.2.2.29	Procedure SPIRE-IST-COLD-SDET-OFF-P	72
7.2.2.30	Procedure SPIRE-IST-COLD-MCU-OFF-P	74
7.2.2.31	Procedure SPIRE-IST-COLD-SCU-OFF-P	75
7.2.2.32	Switch OFF SPIRE PRIME	76
7.2.3	Cold Functional Tests – Redundant	79
7.2.3.1	Switch ON SPIRE REDUNDANT	79
7.2.3.2	Procedure SPIRE-IST-COLD-FUNC-SCU-02-R	83
7.2.3.3	Procedure SPIRE-IST-COLD-FUNC-SCU-03-R	84
7.2.3.4	Procedure SPIRE-IST-COLD-FUNC-SCU-06-R	87
7.2.3.5	Procedure SPIRE-IST-COLD-FUNC-SCU-07-R	89
7.2.3.6	Procedure SPIRE-IST-COLD-FUNC-PCAL-01-R	91
7.2.3.7	Procedure SPIRE-IST-COLD-FUNC-SCAL-01-R	93
7.2.3.8	Procedure SPIRE-IST-COLD-FUNC-MCU-01-R	94
7.2.3.9	Procedure SPIRE-IST-COLD-FUNC-MCU-03-R	96
7.2.3.10	Procedure SPIRE-IST-COLD-FUNC-BSM-01-R	97
7.2.3.11	Procedure SPIRE-IST-COLD-FUNC-BSM-03-R	98
7.2.3.12	Procedure SPIRE-IST-COLD-FUNC-BSM-05A-R	99
7.2.3.13	Procedure SPIRE-IST-COLD-FUNC-BSM-05B-R	100
7.2.3.14	Procedure SPIRE-IST-COLD-FUNC-BSM-06-R	101
7.2.3.15	Procedure SPIRE-IST-COLD-BSM-OFF-R	102
7.2.3.16	Procedure SPIRE-IST-COLD-FUNC-SMEC-01-R	103
7.2.3.17	Procedure SPIRE-IST-COLD-FUNC-SMEC-03-R	104
7.2.3.18	Procedure SPIRE-IST-COLD-SMEC-OFF-R	105
7.2.3.19	Procedure SPIRE-IST-COLD-FUNC-DCU-02-R	106
7.2.3.20	Procedure SPIRE-IST-COLD-FUNC-DCU-11-PHOT-R	108
7.2.3.21	Procedure SPIRE-IST-COLD-FUNC-DCU-13-PHOT-R	110
7.2.3.22	Procedure SPIRE-IST-COLD-FUNC-DCU-14-PHOT-R	111
7.2.3.23	Procedure SPIRE-IST-COLD -PHOT-VSS-R	112
7.2.3.24	Procedure SPIRE-IST-COLD-PDET-OFF-R	113
7.2.3.25	Procedure SPIRE-IST-COLD-FUNC-DCU-11-SPEC-R	115
7.2.3.26	Procedure SPIRE-IST-COLD-FUNC-DCU-13-SPEC-R	117
7.2.3.27	Procedure SPIRE-IST-COLD-FUNC-DCU-14-SPEC-R	118

7.2.3.28	Procedure SPIRE-IST-COLD- SPEC-VSS-R	119
7.2.3.29	Procedure SPIRE-IST-COLD-SDET-OFF-R	120
7.2.3.30	Procedure SPIRE-IST-COLD-MCU-OFF-R	122
7.2.3.31	Procedure SPIRE-IST-COLD-SCU-OFF-R	123
7.2.3.32	Switch OFF SPIRE REDUNDANT	125
7.2.4	Satellite & EGSE Switch Off After CFT Tests	128
7.2.5	EGSE & Satellite Switch On for SMEC Tests	129
7.2.6	SMEC Tests	131
7.2.6.1	Verify Nominal Latch Command Relay Status	131
7.2.6.2	Switch ON for SPIRE PRIME SMEC	133
7.2.6.3	Procedure SPIRE-IST-COLD-FUNC-SCU-03-P	137
7.2.6.4	Procedure SPIRE-IST-COLD-FUNC-SCU-06-P	140
7.2.6.5	Procedure SPIRE-IST-COLD-FUNC-MCU-01-P	142
7.2.6.6	Procedure SPIRE-IST-COLD-FUNC-MCU-03-P	144
7.2.6.7	Procedure SPIRE-IST-COLD-FUNC-SMEC-01-P	145
7.2.6.8	Procedure SPIRE-IST-COLD-FUNC-SMEC-03-P	146
7.2.6.9	Procedure SPIRE-IST-COLD-FUNC-SMEC-02A-P	147
7.2.6.10	Procedure SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-P	149
7.2.6.11	Procedure SPIRE-IST-COLD-FUNC-SMEC-FFGAIN-P	152
7.2.6.12	Procedure SPIRE-IST-COLD-FUNC-SMEC-04A-P	155
7.2.6.13	Procedure SPIRE-IST-COLD-FUNC-SMEC-09-P	157
7.2.6.14	Procedure SPIRE-IST-COLD-FUNC-SMEC-07-P	159
7.2.6.15	Procedure SPIRE-IST-COLD-FUNC-SMEC-04B-P	161
7.2.6.16	Procedure SPIRE-IST-COLD-FUNC-SMEC-LVDT-P	162
7.2.6.17	SMEC Microvibration Pre-Test Configuration	164
7.2.6.18	Reaction Wheel Operation for Variable Frequency Microvibration	169
7.2.6.19	SMEC Variable Frequency Microvibration Test	171
7.2.6.20	Reaction Wheel Operation for Spot Frequency Microvibration	172
7.2.6.21	SMEC Spot Frequency Microvibration Test	174
7.2.6.22	Microvibration Post-Test Configuration	175
7.2.6.23	Procedure SPIRE-IST-COLD-FUNC-SMEC-02B-P	177
7.2.6.24	Procedure SPIRE-IST-COLD-SMEC-OFF-P	179
7.2.6.25	Procedure SPIRE-IST-COLD-MCU-OFF-P	180

7.2.6.26	Procedure SPIRE-IST-COLD-SCU-OFF-P	181
7.2.6.27	Switch OFF After SPIRE PRIME SMEC	182
7.2.6.28	Verify Redundant Latch Command Relay Status	185
7.2.6.29	Switch ON for SPIRE REDUNDANT SMEC	187
7.2.6.30	Procedure SPIRE-IST-COLD-FUNC-SCU-03-R	191
7.2.6.31	Procedure SPIRE-IST-COLD-FUNC-SCU-06-R	194
7.2.6.32	Procedure SPIRE-IST-COLD-FUNC-MCU-01-R	196
7.2.6.33	Procedure SPIRE-IST-COLD-FUNC-MCU-03-R	198
7.2.6.34	Procedure SPIRE-IST-COLD-FUNC-SMEC-01-R	199
7.2.6.35	Procedure SPIRE-IST-COLD-FUNC-SMEC-03-R	200
7.2.6.36	Procedure SPIRE-IST-COLD-FUNC-SMEC-02A-R	201
7.2.6.37	Procedure SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-R	203
7.2.6.38	Procedure SPIRE-IST-COLD-FUNC-SMEC-FFGAIN-R	206
7.2.6.39	Procedure SPIRE-IST-COLD-FUNC-SMEC-04A-R	209
7.2.6.40	Procedure SPIRE-IST-COLD-FUNC-SMEC-09-R	211
7.2.6.41	Procedure SPIRE-IST-COLD-FUNC-SMEC-07-R	213
7.2.6.42	Procedure SPIRE-IST-COLD-FUNC-SMEC-04B-R	215
7.2.6.43	Procedure SPIRE-IST-COLD-FUNC-SMEC-LVDT-R	216
7.2.6.44	Procedure SPIRE-IST-COLD-FUNC-SMEC-02B-R	217
7.2.6.45	Procedure SPIRE-IST-COLD-SMEC-OFF-R	219
7.2.6.46	Procedure SPIRE-IST-COLD-MCU-OFF-R	220
7.2.6.47	Procedure SPIRE-IST-COLD-SCU-OFF-R	221
7.2.6.48	Switch OFF After SPIRE REDUNDANT SMEC	223
7.2.7	Satellite & EGSE Switch Off After SMEC Tests	226
7.2.8	SPIRE SAFE Switch Off	228
8	**Summary Sheets**	**232**
8.1	Procedure Variation Summary	233
8.2	Non Conformance Report (NCR) Summary	234
8.3	Sign-off Sheet	235
APPENDIX 1		**236**
APPENDIX 2		**239**

Table of Figures

No table of figures entries found.

List of Tables

Table 8.1-1: Procedure Variation Sheet 233
Table 8.2-1: Non-Conformance Record Sheet.....234

1 Scope

This document describes the set of Cold Functional Tests (CFTs) to be performed on the SPIRE FM Instrument for IST Instrument Commissioning (refs. AD6 & AD9) in Hell conditions.

It also includes the SMEC Functional & Microvibration Tests. However, these have to be run independently of the other parts of the CFT, as they require a very specific test and satellite configuration and will be run in Hel conditions

Both redundancies are tested within this procedure.

Constraints General

- This procedure requires the presence of SPIRE personnel as the I-EGSE will be required to assess the results online as part of the pass/fail criteria.
- Before carrying out the next procedure within the test sequence always ask for the go ahead by the SPIRE staff.

Constraints Specific

- Specific constraints apply if Launch Lock Latch status monitoring EGSE is fitted, see section 5.4.3.
- The **CFT** part of the procedure **shall** only be performed in Hell conditions
- The **SMEC** part of the procedure **shall** only be performed in Hel conditions, with satellite Horizontal with +Y axis up, and a recommended Cryostat fill level at < 50%.
- **SMEC** Microvibration tests shall be performed with minimal external acoustic noise/vibration (e.g. at night)
- For **SMEC** Functional tests:
  - Level 1 temperature between 10 K and 20 K with a stability of ca. 2 K is tolerable, since the encoder is less sensitive as it gets warmer
  - For Level 0 and Level 2 section 5.2 applies

1.1 Objective

The objective of the test is to functionally check the FM instrument as much as feasibly possible in Hel or Hell conditions and in an AIT environment.

1.2 Test Flow

The CFT flow is as follows:

1. Power on and configure SPIRE I-EGSE for test

2. Power on and configure SVM for IST Instrument Commissioning (IST START)
3. Power on NOMINAL SPIRE Prime DPU & DRCU and enable Mil1553B-bus interface
4. Run Nominal CFT Procedures
5. Power off MCU Prime
6. Disable Mil1553B-bus interface and Power off SPIRE Prime DRCU & DPU
7. Repeat Steps 3 – 6 for Spire Redundant CFT Procedures
8. Power off SVM including CCU (IST END)
9. Switch off all EGSE

The SMEC flow is as follows:

1. Power on and configure SPIRE I-EGSE for test
2. Power on and configure SVM for test including CCU
3. Power on NOMINAL SPIRE Prime DPU & DRCU and enable Mil1553B-bus interface
4. Run SMEC CFT Nominal Procedures
5. Run SMEC Microvibration Procedures (on Nominal only)
6. Power off MCU Prime
7. Disable Mil1553B-bus interface and Power off SPIRE Prime DRCU & DPU
8. Repeat Steps 3, 4, 6 & 7 for Spire Redundant SMEC CFT Procedures
9. Power off SVM including CCU
10. Switch off all EGSE

2 Documents/Drawings

2.1 Applicable Documents

AD 1	FM SPIRE PFM Final Electrical Integration Procedure	HP-2-ASED-TP-0166
AD 2	Herschel PCDU & CDMS Nominal Switch On/Off Procedure	HP-2-ASED-PR-0070
AD 3	Herschel SAT Emergency Switch Off Procedure	HP-2-ASED-PR-0071
AD 4	PA Plan	HP-2-ASED-PL-0007
AD 5	I-EGSE Switch ON/OFF Procedure	TBI
AD 6	Test Specification for Herschel Instrument AVM & FM Tests Performed at Satellite Level, Issue 2	H-P-2-ASP-TS-1083
AD 7	H-P GDIR	H-P-1-ASPI-SP-0027
AD 8	SPIRE I-EGSE Set-Up, Issue ~~2.1~~2.2	SPIRE-RAL-DOC-002841
AD 9	Herschel Integrated Satellite Test Specification, Issue 6	H-P-2-ASP-SP-0939
AD 10	Herschel IST Lead Procedure	HP-2-ASED-TP-0134
AD11	SPIRE SMEC Launch Lock ~~latch monitoring~~Status EGSE ~~Procedure~~, issue 3.0	SPIRE-RAL-NOT-003015 ~~TBD~~
AD12	S/C Configuration for IST Instrument Commissioning, Issue 1	HP-2-ASED-TP-0237

2.2 Reference Documents

RD 1	Herschel Planck Central Checkout System System User Manual	H-P-4-TE-MA-0010
RD 2	SPIRE Cold Functional Test Procedures, Iss. ~~2.4~~2.5	SPIRE-RAL-PRC-2398
RD 3	Herschel CDMU ASW S/W Interface	H-P-4-SSF-IC-0001

	Control Document	
RD 4	Herschel CDMU BSW S/W Interface Control Document	H-P-4-SES-NT-0076
RD 5	SPIRE IID-B	SCI-PT-IIDB/SPIRE-02124
RD 6	SPIRE Functional Test Specification Iss. 1.4	SPIRE-RAL-DOC-001652
RD 7	SPIRE Instrument User Manual Iss. 1.0	SPIRE-RAL-PRJ-002395
RD 8	H/P OBT-UTC Time Synchronisation Technical Note Iss. 1.3	PT-CMOC-OPS-TN-6604-OPS- OGH
RD 9	SPIRE IST SPT Procedure; Iss 3.1	SPIRE-RAL-PRC-2398

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

CFT	Cold Functional Test
CIR	CDMU In Reconfiguration
CLCW	Command Link Control Word
CLTU	Command Link Transmission Unit
CPDU	Command Pulse Distribution Unit
CRS	Coarse Rate Sensor
CTR	Central on board Reference Time
DCU	Detector Control Unit (SPIRE)
DEC	Detectors Electronics Control unit (PACS)
DMC	Detector and Mechanism Control unit (PACS)
DPU	Digital Processing Unit
DRCU	Detector Readout & Control Unit (SPIRE)
EEPROM	Electrically Erasable PROM
EGSE	Electrical Ground Support Equipment
FCL	Fold-back Current Limiter
FCU	FPU Control Unit (Spire)
FCV	Flow Control Valves
FDIR	Failure Detection, Isolation, and Recovery
FPU	Focal Plane Unit
GDIR	General Design and Interface Requirement
GRP	Group Heaters Switch
HBR	High Bit Rate
HL/HLC	High Level command
HP/HPC	High Priority commands
HPLM	Herschel PayLoad Module
HPSDB	Herschel Planck System Data Base
HW	Hardware
i.a.w.	In accordance with
I/F	InterFace
I/O	Input/Output
ICD	Interface Control Document
IST	Integrated System Test

LCL	Latching Current Limiter
LV	Latching Valves
LBR	Low Bit Rate
MAP	Multiplexed Access Point
MBR	Medium Bit Rate
MCU	Mechanisms Control Unit (SPIRE)
MEC	Mechanisms Electronics Control unit (PACS)
ML 16	Memory Load command (ML 16)
MM	Memory Module
MOIS	Mission Operations Information System
MTL	Mission Timeline
NRZ-L	Non Return to Zero – Litton
OBCP	On-Board Control Procedure
OBDH	On-Board Data Handling
OBMF	On-Board Monitoring Function
OBRT/OBT	On-Board Reference Time
OIRD	Operation Interface Requirement Document
PACS	Photodetector Array Camera & Spectrometer
P/L	Payload
PCDU/PCS	Power Control Distribution Unit/Power Control Subsystem
PM	Processor Module
PROM	Programmable Read Only Memory
PSK	Phase Shift Keying
RA	Rate Anomaly
RAM	Random Access Memory
RCS	Reaction Control Subsystem
RD	Reference Document
RF	Radio Frequency
RM	Reconfiguration Module
RT	1553 Remote Terminal
RTU	RT Unit
RTA	RTU

RWL	Reaction Wheel Assembly
SA	1553 Remote Terminal Sub Address
SAS	Sun Acquisition Sensor
SCOE	Special Check-out Equipment
SCU	Subsytems Control Unit (SPIRE)
SIR	S/C In Reconfiguration
SIT	Subsystem Integrated Test
SP	Sun Pointing
SPIRE	Spectral & Photometric Imaging Receiver
SPU	Signal Processing Unit (PACS)
SSMM	Solid State Mass Memory
STR	Star Tracker
SVM	Service Module
SW	Software
TAI	International Atomic Time
TC	TeleCommand
TFG	Transfer Frame Generator
TM	TeleMetry
TTC	Telemetry Tracking & Command subsystem
TTR	Telemetry Telecommand and Reconfiguration
UFT	Unit Functional Test
VC	Virtual Channel
WD	Watchdog

3 Configuration

3.1 Satellite Configuration

The test requires use of the FM SVM powered on including the CCU (connected to cryostat temperature and pressure sensors). Note this also means that the cryostat valves (commandable from the CCS) may also be connected therefore this has to be considered as a SAFETY critical area to be addressed in section 5.

For the CFT in Hell the satellite configuration will be as per the IST SPIRE Commissioning Configuration ref. AD10.

For SMEC parts of the CFT a minimum SVM configuration can be used as per AD2.

The Cryostat and therefore the satellite must be horizontal (+Y axis up) to perform the SMEC parts (section 7.2.6) of the CFT.

SPIRE FM units will be powered ON as per this procedure and assumes that FPU has already been successfully integrated to the warm units.

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 8.

3.3 Set-up

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

4 Test Sequence

Ensure that the latest delivery of SPIRE CFT & SPT test scripts are installed on the CCS prior to start of test.

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

I-EGSE Software	Version	Comment
SPIRE MIB version		
SPIRE CUS version		
SCOS version		

The HPCSS HPSDB must also include the same SPIRE MIB version.

5 Conditions

5.1 Personnel

Responsibility	Name / Organisation
Test Director	
Test Conductor	
EGSE Operator	
PA Responsible	
Instrument Representative	
Customer Representative	
ESA Representative	

5.2 Environmental

The actual clean room and spacecraft environmental conditions for the test shall be recorded below.

Clean Room Conditions	Nominal	Actual
Clean Room Class	class 100000 or better	
Temperature	22°C ± 3°C	
Rel. Humidity	40 % - 60 %	
Pressure	Ambient	

S/C Environmental	Required	Actual
S/C Orientation	CFT: 20deg from Z, +Y down SMEC: Horizontal, +Y up	
Cryostat Status (Hel/Hell)	CFT: Hell SMEC: Hel	
Cryostat Level 0 Temp	CFT: T < 2.0K SMEC: 4.2K < T < 6.5K	
Cryostat Level 1 Temp (T235-T236)	CFT: T < 6.2K SMEC: 10K < T < 20K **	
Cryostat Level 2 Temp	CFT: T < 12K SMEC: 5K < T < 30K	
Cryostat Level 3 Temp	CFT: ~~10K~~ 5K < T < ~~15K~~ 50K * SMEC: N/A	

~~* For JFET switch ON only~~

** Stability of 2K/test period (ref. HP-2-ASED-MN-1528 10/04/08)

5.3 General Precautions and Safety

Non-test specific precautions and safety considerations are detailed in section 5.3 of AD 2. Specific safety issues and general precautions for the tests to be performed are detailed in the following sections.

5.3.1 General Safety Requirements, Precautions

In the event of unrecoverable anomaly requiring emergency switch off of the satellite, the switch off shall be performed in accordance with AD 3.

5.3.2 ESD constraints

Normal ESD constraints are to be observed during the test.

5.3.3 Cryo Specific Safety Requirements

During the test the CCU may be connected to the Cryostat sensors and valves. Although no valve operation is performed in this test all Cryogenic specific safety requirements shall be considered when running this procedure as indicated below.

Safety instruction for cryogenic hazards coming from the Helium system are as follows:

1	Helium itself is a non-toxic gas. The hazards to be expected are personal injuries from frostbites (cold surfaces, cold gas plumes), asphyxiation due to insufficient oxygen in the remaining air, loss of orientation due to dense fog generation and impacts of cold damaged structures.
2	Due to the amount of stored energy the Herschel cryostat is a pressure vessel and the general rules for pressure vessel design have to be followed. In addition to these general rules, the safety regulations at CSG launch site have to be considered. The application of these rules leads to a safety concept, which is based on the 'leak before burst' criterion. Herschel is based on the following safety and reliability philosophy: a. Two failure tolerant b. Three independent paths for overpressure relief c. Passive safety system for all operation modes (no active controls for monitoring is required at any time) As emergency situations may occur at unexpected points in time and typically need immediate action, the full hierarchy of the project cannot be deployed and consultation of all knowledgeable persons may not be possible.
3	The main intent of immediate actions will therefore be to ensure safety of personnel and to bring the S/C into a safe waiting condition. The priority of safeguarding is 1) Personnel 2) S/C 3) Facility 4) Support equipment The second aim is to keep the cryostat near the foreseen test conditions in order to continue the test without unnecessary time delay if the failure can be corrected.
4	The ASED test director (or his representative) will be informed by the test personnel of any non-conformances, alarm and unforeseen events that might lead to emergency situations. The ASED test director (or his representative) will initiate immediate steps and call the decision committee (ASED test director, ASED PA, ESA test director, ASP representative, ETS representative) if necessary.

5	Prior to begin a pre-task briefing shall be performed to inform all participants about purpose of operation, possible hazards and emergency shut down
6	In case of operation of the Cryostat safety system the following IMMEDIATE activities shall be performed: • Operation of the safety valve: EVERYBODY has to leave the test room, except test Conductor and necessary CVSE operations personnel • Operation of burst disc: EVERYBODY has to leave the test room

5.3.4 Special QA Requirements

None.

5.4 GSE

Non-test specific GSE details are provided in section 5.4 of AD 2. Specific GSE needs for the tests to performed are detailed in the following sections.

5.4.1 MGSE

None.

5.4.2 CVSE

None.

5.4.3 EGSE

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

For SMEC tests the Launch Lock latch monitoring EGSE maybe fitted to the S/C according to AD11.

5.4.4 OGSE

None.

5.4.5 Special Equipment

None.

6 Verification Requirements and Test Criteria

This is a functional check of all SPIRE PFM subsystems in Hel or Hell conditions and AIT configuration as per AD6 and AD9.

Functional performance and status parameter actual values recorded will be checked during the test and must be the same as the nominal status value indicated.

The test will only be deemed successful once all offline analysis of the results has been performed. Typically, the PTR will be held before completion of this activity and therefore only a preliminary assessment of the test success can be provided to allow disconnection of any specific GSE required for the test and which needs to be removed before further activities can be performed.

Enter Start Date|Time:			

7 Test Procedure

7.1 Initial EGSE and Satellite Configuration for the Test

The Spire FM Final Integration according to the Test Procedure ref. AD 1 must be successfully completed before the execution of this procedure.

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

In case of anomaly on SPIRE requiring immediate switch off as directed by SPIRE responsible supporting the test section 7.2.8 shall be executed.

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

Enter Start Date|Time:			

7.2 Step by Step Procedure

Test Location:	
Test Session Id:	
Test Environment:	

7.2.1 EGSE & Satellite Switch On for CFT

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	Satellite & EGSE Switch On						
0	Confirm all constraints for the CFT as defined in Section 1 have been fulfilled prior to starting the test	OK					
1	Confirm I-EGSE physically connected to HPCCS	OK					
2	Switch on & configure SPIRE I-EGSE i.a.w. **AD5 & AD 8**	OK					
3	Confirm SPIRE I-EGSE is in the correct configuration as per AD5 & AD 8 and TIME synchronised with HPCCS	OK					
4	Switch on HPCCS, SCOEs and Satellite/SVM and configure into Basic Test Mode, with SSMM initialised OBCP/EAT load/active and CCU monitoring in Mode 1 i.a.w. AD 10 sections 7.1 and 7.2. In	OK					

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

7.2.5 *EGSE & Satellite Switch On for SMEC Tests*

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	Satellite & EGSE Switch On						
0	Confirm all constraints for the SMEC Test as defined in Section 1 have been fulfilled prior to starting the test	OK					
1	Confirm I-EGSE physically connected to HPCCS	OK		OK		✓	
2	Switch on & configure SPIRE I-EGSE i.a.w. **AD5 & AD 8**	OK					
3	Confirm SPIRE I-EGSE is in the correct configuration as per AD5 & AD 8 and TIME synchronised with HPCCS	OK					
4	Switch on HPCCS, SCOEs and Satellite/SVM and configure into Basic Test Mode i.a.w. AD 2 Section 7.1 to 7.5.	OK		OK		✓	
5	Confirm that EGSE and Satellite are in the correct configuration as per AD 2	OK		OK		✓	
6	If not already on, from HPCCS power ON CCU A & CCU B by executing test script: **K102999ECVT001_ASDGENCCU_ABPWRON**	OK		OK		✓	
7	If not already enabled, from HPCCS enable Monitoring Mode 1 (512sec cycle) for CCU A & B by executing test script: **K102999ECVT001_ASDGENCCU_MnEBOTH1**	OK		OK		✓	
8	Connect HPCCS to CRYOSCOE and verify CryoSCOE data is being received on the CCS by executing the following script: **K102999ECVT035_ASDGEN_SCOE_CCU_LOG**	OK		N/A		N/A	

PVS2-1

PVS2-2

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Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
9	From HPCCS Test Conductor console issue command to connect to SPIRE I-EGSE **connect HSPIREEGSE**	OK		OK		✓	
10	Confirm from HPCCS and SPIRE I-EGSE that the connection has been established	YZS29940= CONNECTED		CONNECTED	**AND SYS_PARS**	✓	
11	Verify that I-EGSE is receiving CCU Cryo packets	OK		OK		✓	
12	On HPCCS start the following test script: **ALL_SubscribeParams.tcl**	OK		OK		✓	
13	Verify HPCCS-IEGSE connection by sending test command: ~~YC00X066~~YC00X966 From the manual command stack (repeater value of "0")	OK		OK		✓	
14	If required load Synoptics INSTRUMENTS on HPCCS to display SPIRE status overview			N.A		✓	
	READY FOR START OF SPIRE SMEC TESTS						

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7.2.6 *SMEC Tests*

7.2.6.1 Verify Nominal Latch Command Relay Status

Verify launch lock relays are positioned to allow SMEC launch lock to be unlatched.

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
	All TCs to be sent from the Manual Command Stack					
1.	*Send **DC904180** and verify from the resulting (14,4) packet that packet 120 (dec) is not already enabled (i.e. NOT present in the list). If present skip steps 2 – 4*	120 not present	OK	Step 1 to 5 only required on CDMS ASW 3.4	✓	
2.	*Send **ZCB00999** to allocate new diagnostic packet*	OK	OK		✓	
3.	*Send **DC900180** with repeater value 1 and parameters: DH019180 = 26, DH020180=120*	OK	OK		✓	
4.	*Send **DC904180** and verify from the resulting (14,4) packet that packet 120 (dec) is nowenabled (i.e. present in the list)*	120 present	OK		✓	
5.	*From TMPH verify that packets with SPID = **264000999** are cyclically arriving on the CCS*	Packets Arriving	OK		✓	
6.	Close LCL25, by sending **DC25D170**	OK	OK	State of LCL #25 switches to ON	✓	
7.	Verify LCL25 closed: **WM12B565** =	ON	ON		✓	
8.	Record Current **WM107565**	N/A	0.01		✓	

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Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
9.	Send HLC 5 to switch relays to LCL position **DCT01170, DHT01170="CMD_ID_HLC5"**	OK	OK		✓	
10.	Verify Current **WM107565 =**	130-180 mA	180 mA	Current between 130-180mA	✓	
11.	Send HLC 6 to switch relays to MCU position **DCT01170, DHT01170="CMD_ID_HLC6"**	OK	OK		✓	
12.	Verify Current **WM107565 =**	0 mA	0.01	Current off	✓	
13.	Open LCL25, by sending **DC25B170**	OK	OK	State of LCL #25 switches to OFF	✓	
14.	Verify LCL25 open: **WM12B565 =**	OFF	OFF		✓	
	SMEC Nominal LL latch relay position verification complete					

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7.2.6.2 Switch ON for SPIRE PRIME SMEC

The following will switch ON and configure SPIRE Prime instrument in REDY (Standby) mode. HKTM packets will be generated on APIDs 1280 dec and 1282 decimal (these can be observed using TMPH with corresponding filter – note however a limited number of TMPHs should be running at one time).

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

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
1.	On HPCCS start Packet History displays for the following APIDs:1280,1282	OK	OK		✓	
2.	From the HPCCS test conductor console start the test script to power on SPIRE Prime: **S102999SCVT031_ASDCFTSPIR_PWR_ON_P**	OK	OK	AND: ZAD07999, ZAD14999 MIM: LCL_HERSCHEL		

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Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
3.	On HPCCS when prompted: "SPIRE Switch ON for Cold FT related tests in Hel/Hell conditions only - Select NO to abort TS if not correct" **Select YES**	YES	YES		✓	
	If **YES** is selected the test script will go on to automatically power on all SPIRE warm units, force boot the DPU ASW and configure the instrument to Standby mode. Reply to prompts as indicated below.					
4.	On HPCCS when prompted: "Check Telemetry Updating Correctly and OBT is Consistent with CDMU - OK to continue" Select OK	OK	OK	**AND: SA_1_559**	✓	

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Enter Start Date|Time:			

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
5.	If I-EGSE connected when prompted on HPCCS, perform check requested then select **OK**: "Check IEGSE Time Consistent - OK to continue when RAL confirm"	OK	OK		✓	
6.	On HPCCS when prompted: "Check Telemetry No Longer Updating - OK to continue" Check that parameters: THSK TM2N Select OK to continue	 Not refreshing Not incrementing OK	 OK	Note: Two TC failures on SCR00500 are expected because HKTM has been stopped	 ✓	
7.	On HPCCS when prompted: "Check Telemetry Updating Correctly - OK to continue" Check that parameters: THSK TM2N	 Refreshing @ 1Hz Incrementing by 1 @ 1Hz	 OK OK	**AND: SA_1_559**	 ✓	

Enter Date/Time:	17/07/08	07.57	Sign Off:	QA: D.Lamarby

Enter Start Date|Time:			

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
	Select OK to continue	OK		OK	✓	
8.	On HPCCS when all autonomous actions have been completed by the power on script **S102999SCVT031_ASDCFTSPIR_PWR_ON_P** it will prompt: "Set Bus Profile Back to Original Setting?" Select NO	NO	NO		✓	
9.	At the prompt: "Bus Profile left unchanged" Select OK to continue	OK	OK		✓	
10.	Verify HK TM packets are being received on APIDs 1280 & 1282	OK	OK		✓	
	SPIRE DPU & DRCU powered					

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Enter Start Date|Time:	17/07/08	07:59	

7.2.6.3 Procedure SPIRE-IST-COLD-FUNC-SCU-03-P

Version	2.4
Date	6th December 2007
Purpose	SCU DC thermometry check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and DC thermometry is ON
Constraints	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	8 minutes
Pass/Fail Criteria	SCU DC thermometry channels show temperature readings according to the actual instrument temperature

Procedure Steps:

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

Enter Date/Time:	17/07/08.		Sign Off:	QA: D. Lamaby

Enter Start Date|Time:			

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
	SCU_DC_Therm				
3	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0/0xFFFF/0xFFFF		
4	If the instrument is at He I temperatures check the values of SCU DC thermometry channels.		(All Values TBC)		
		PUMPHTRTEMP	~4.2K	4.65	
		PUMPHSTEMP	~4.4K	5.70	
		EVAPHSTEMP	~4.3K	5.5	
		SHUNTTEMP	~4.2K	4.2	
		EMCFILTEMP	~4.8K	7.99	
		SL0TEMP	~4.2K	4.2	
		PL0TEMP	~4.2K	4.3	
		OPTTEMP	~4.8K	6.0	
		BAFTEMP	~4.8K	8.4	
		BSMIFTEMP	~4.7K	6.1	
		SCAL2TEMP	~4.8K	5.1	
		SCAL4TEMP	~4.8K	7.99	
		SCALTEMP	~4.8K	8.00	
		SMECIFTEMP	~4.7K	7.87	
		SMECTEMP	~4.7K	7.9	
		BSMTEMP	~4.8K	8.00	
5	If the instrument is at He II		(All Values TBC)		

Enter Date/Time:	17/07/08.		Sign Off:	QA: D.Lamondy

Enter Start Date|Time:			

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
	temperatures check the values of SCU DC thermometry channels.	PUMPHTRTEMP PUMPHSTEMP EVAPHSTEMP SHUNTTEMP EMCFILTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	-/~4.6K -/~3.0K -/~3.0K -/~1.7K -/~4.6K -/~1.7K -/~1.7K -/~4.6K -/~4.6K -/~4.5K -/~4.6K -/~4.6K -/~4.6K -/~4.6K -/~4.6K -/~4.5K	 N/A He 1 	N/A
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08		Sign Off:	QA: D.Lamarby.

Enter Start Date|Time:			

7.2.6.4 Procedure SPIRE-IST-COLD-FUNC-SCU-06-P

Version	2.4
Date	6th December 2007
Purpose	SCU AC thermometry check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and DC thermometry is ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Constraints	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail Criteria	SCU AC thermometry channel shows temperature readings according to the actual instrument temperature

Enter Date/Time:	17/07/08		Sign Off:	QA: Diamonby.

Enter Start Date|Time:	17/07/08	08:09	

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SCU-06-P.tcl	—	—	—	OK
2	**Wait for the parameter BBFULLTYPE to get set to SCU_AC_Therm**	—	—	—	Ok
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	0/1/1	0/1	Ok
4	If the instrument is at He I temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~4K	4.36K	Ok
5	If the instrument is at He II temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~1.7K	N/A	N/A Ne1
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	08:11	Sign Off:	QA: D. Lamonby.

Enter Start Date|Time:			

7.2.6.5 Procedure SPIRE-IST-COLD-FUNC-MCU-01-P

Version	2.4
Date	6th December 2007
Purpose	MCU (PRIME) Boot Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCU voltages and board temperatures show expected 'ON' values

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Enter Start Date|Time:	17/07/08:	08:13	

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-MCU-01-P.tcl	—	—	—	OK
2	Check that the MCU is booted up successfully	MCUBITSTAT	0/1/1	1	OK
3	Check MCU HK parameter values and ensure that the values are refreshing	MCUP5V MCUP14V MCUM14V MCUP15V MCUM15V MCUMACTEMP MCUSMECTEMP MCUBSMTEMP	~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V ~ 15.0 ± 0.5V ~ -15.0 ± 0.5V ~300K ~300K ~300K	5.01 14.14 -14.47 15.54 -15.63 291.26 296.30 295.80	OK OK OK OK OK OK.
Test Result (Pass/Fail):					

just outside tolerance limits. RAL temp OK. Procedure Update reqd.

Enter Date/Time:	17/07/08	08:15	Sign Off:	QA: D.Lamonby

Enter Start Date|Time:	17/07/08	08:19	

7.2.6.6 Procedure SPIRE-IST-COLD-FUNC-MCU-03-P

Version	2.4
Date	6th December 2007
Purpose	MCU Nominal Science Contents Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	Unchanged.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified MCU HK parameters show expected increment

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-MCU-03-P.tcl	MCUFRAMECNT	0/-/297	0/297	OK
Test Result (Pass/Fail):					

Enter Date/Time:	170708	08:21.	Sign Off:	QA: D.Lamonby

Enter Start Date|Time:	17/09/08	08:22	

7.2.6.7 Procedure SPIRE-IST-COLD-FUNC-SMEC-01-P

Version	2.4
Date	6th December 2007
Purpose	SMEC (PRIME) Encoder/LVDT Sensor Check.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected ON values.

Procedure Steps:

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

Enter Date/Time:	17/09/08	08:22	Sign Off:	QA: D.Lamonby

Enter Start Date|Time:	17/07/08	08:24	

7.2.6.8 Procedure SPIRE-IST-COLD-FUNC-SMEC-03-P

Version	2.4
Date	6th December 2007
Purpose	SMEC (PRIME) Encoder Integrity Check.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCUENGSMECENCSIG1/2 increase as the encoder power is increased

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-03-P.tcl	—	—	—	OK
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	OK
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	08:25	Sign Off:	QA: D. Lemonon

Enter Start Date|Time:	17/07/08		

7.2.6.9 Procedure SPIRE-IST-COLD-FUNC-SMEC-02A-P

Version	~~2.42.5~~
Date	~~6th December 20073rd~~ July 2008
Purpose	Open the SMEC Launch Latch Prime (Unlatch it)
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and SMEC is latched
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and SMEC is ON and Unlatched
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	~~5~~ 20 minutes
Pass/Fail criteria	The SMEC latch is open.

Procedure Steps:

Enter Start Date|Time:	17/07/08	08:38	

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-02A-P.tcl	—	—	—	OK.
2	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	08:46,	Sign Off:	QA: Diamanty.

Enter Start Date|Time:			

7.2.6.10 Procedure SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-P

Version	~~1.01.1~~
Date	~~6th December 20073rd~~ July 2008
Purpose	SMEC (PRIME) Open Loop Feed Forward Offset Test
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • SMEC PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	~~40~~ 60 minutes
Pass/Fail criteria	Optimum SMEC Feed Forward Offset is determined

RVS1-1

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-P.tcl	—	—	—	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	

Enter Date/Time:	17-7-08		Sign Off:	QA: D Lemonby.

Enter Start Date|Time:			

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
3	Based on the results of this test it may be necessary to set the SMEC FF Offset manually. **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9055xxxx** • **param 2 = 0** **I-EGSE staff will supply the 16-bit parameter value xxxx to this command.**	SMECFFOFFSET	-/ - /xxxx		
4	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9058xxxx** • **param 2 = 0** **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x905Axxxx** • **param 2 = 0** **The 16 bit parameters xxxx will be provided by I-EGSE staff**	SMECENCSIG1OFF SMECENCSIG2OFF	-/-/~ Commanded Value -/-/~ Commanded Value		

PVS1-1

Enter Date/Time:	17-7-08.		Sign Off:	QA : D.Lamonby

Enter Start Date|Time:			

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
5	**Note that it may be necessary to repeat this test to fine tune the Feed Forward Offset** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	
Test Result (Pass/Fail):					

RVS1-1

Enter Date/Time:	17-7-08		Sign Off:	QA: D. Lamonby.

Enter Start Date|Time:			

7.2.6.11 Procedure SPIRE-IST-COLD-FUNC-SMEC-FFGAIN-P

Version	1.0
Date	6th December 2007
Purpose	SMEC (PRIME) Open Loop Scan Test for different Feed Forward Gain settings
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • SMEC PARAMETERS display is selected on the CCS • The Herschel Cryostat should be tilted horizontal • Test SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-P has been executed successfully
Duration	100 minutes
Pass/Fail criteria	Optimum SMEC Feed Forward Gain is determined

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-FFGAIN-P.tcl	—	—	—	
2	Wait for the I-EGSE staff to confirm the success or failure of this test	—	—	—	
3	Based on the results of this test it may be necessary to set the SMEC FF Gain manually. SPIRE_SEND_DRCU_COMMAND • param 1 = 0x9054xxxx • param 2 = 0 I-EGSE staff will supply the 16-bit parameter value xxxx to this command.	SMECFFGAIN	-/ - /xxxx		

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
4	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: SPIRE_SEND_DRCU_COMMAND • param 1 = 0x9058xxxx • param 2 = 0 SPIRE_SEND_DRCU_COMMAND • param 1 = 0x906Axxxx • param 2 = 0 The 16 bit parameters xxxx will be provided by I-EGSE staff	SMECENCSIG1OFF SMECENCSIG2OFF	-/-/~ Commanded Value -/-/~ Commanded Value		
5	Note that it may be necessary to repeat this test to fine tune the Feed Forward Gain	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:	17/07/08		

7.2.6.11 Procedure SPIRE-IST-COLD-FUNC-SMEC-04A-P

Version	2.42.5
Date	6th December 20073rd July 2008
Purpose	SMEC (PRIME) Open Loop Positioning Test.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5-30 minutes
Pass/Fail criteria	SMEC moves to the commanded positions

Procedure Steps:

Enter Start Date|Time:	17107108	09:53	

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-04A-P.tcl	—	—	—	Ok.
2	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	Ok.
Test Result (Pass/Fail):					

Enter Start Date|Time:	17/07/08		

7.2.6.12 Procedure SPIRE-IST-COLD-FUNC-SMEC-09-P

Version	2.42.5
Date	6th December 20073rd July 2008
Purpose	SMEC (PRIME) Open Loop Scan Test.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • SMEC PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5-30 minutes
Pass/Fail criteria	SMEC performs a scan between the commanded positions

Enter Start Date|Time:	17\07\08	10?24	

Procedure Steps:

PVS3-1

PVS3-2.

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9058xxxx** • **param 2 = 0** A7F8 **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x905Axxxx** • **param 2 = 0** 8EF8 0x90490004 **The 16 bit parameters xxxx will be provided by I-EGSE staff**	SMECENCSIG1OFF SMECENCSIG2OFF Init Enc	-/-/~ Commanded Value -/-/~ Commanded Value	Skip.	
2	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-09-P.tcl	—	—	— 1st Run NOK 2nd Run OK.	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	— 3rd Run OK.	
Test Result (Pass/Fail):					

PVS-3-2
RVS4
PVS3-3

SPR-599
NCR - 4348

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Enter Start Date|Time:	17/07/08		

7.2.6.13 Procedure SPIRE-IST-COLD-FUNC-SMEC-07-P

Version	2.42.5
Date	6th December 20073rd July 2008
Purpose	SMEC (PRIME) Close Loop Scan Test.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	SMEC is in closed loop
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	10 60 minutes
Pass/Fail criteria	SMEC performs a scan between the commanded positions and the loop remains closed

Enter Start Date|Time:	17/07/08.	11:21	

PVS5

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	**Before this test a SMEC calibration table on the I-EGSE may have to be changed. Please confirm with the I-EGSE staff before continuing with the next test.**	—	—	—	
2	Execute TCL script SPIRE-IST-COLD-SMEC-INIT-P.tcl	SMECLOOPMODE	6/-/1	1	OK
3	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-07-P.tcl	—	—	—	12:55
4	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	
Test Result (Pass/Fail):					

PVS6

Enter Date/Time:	17/07/08	13:45	Sign Off:	QA D.Lamarby

Enter Start Date|Time:	17/07/08	16:00	

7.2.6.14 Procedure SPIRE-IST-COLD-FUNC-SMEC-04B-P

Version	~~2.42.5~~
Date	~~6th December 2007~~ 3rd July 2008
Purpose	SMEC (PRIME) Close Loop Positioning Test.
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON. SMEC is in closed loop.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	~~10~~ 20 minutes
Pass/Fail criteria	SMEC moves to the commanded positions and remains in closed loop

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-04B-P.tcl	SMECLOOPMODE	1/1/1	1/1/1	16:03
2	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	

Test Result (Pass/Fail):

Enter Date/Time:	17/07/08	16:12	Sign Off:	

Enter Start Date|Time:			

7.2.6.15 Procedure SPIRE-IST-COLD-FUNC-SMEC-LVDT-P

Version	1.0
Date	6th December 2007
Purpose	SMEC (PRIME) Backup LVDT Close Loop Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON. SMEC is in closed loop.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	90 minutes
Pass/Fail criteria	SMEC remains in closed loop on LVDT

PVS1-2

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-LVDT-P.tcl	SMECLOOPMODE	1/-/4		
2	**Manual commanding may be necessary during this test. Details to be specified**	—	—	—	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	

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Enter Start Date|Time:			

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
Test Result (Pass/Fail):					

PVS1-2

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:	17/07/08	14:00	

7.2.6.16 SMEC Microvibration Pre-Test Configuration

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	ACMS Switch ON						
1	From Test Conductor Console, execute script: 'A102109SPVT003_ACMS_CONFIG25'	OK	ok				
2	At the following main menu: HERSCHEL/PLANCK - MAIN MENU 1.0 - INIT PHASE ========== **1. Select/Load ACMS_CONFIG Input File** 2. Perform LAUNCH CONFIGURATION 3. On Board SW Updates 4. ACMS Power ON (in Pre-Sep configuration) 5. Modify ACC SGM/RM CONTENT (Enter sub-menu 1.1) 6. ACMS SCOE Configuration 77. JUMP to another Entry Point 88. Continue ACMS_CONFIG to menu 2.0 STBY/PRE-SEP 99. Terminate ACMS_CONFIG	Select option 1 and click OK then Continue	1 → ok Continue → ok				

Enter Date/Time:	17/07/08	14:01	Sign Off:	PA/QA: (P. Hall)

Enter Start Date|Time:	17/07/08	14:01	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	select the point number 1 and press the relevant button:"CONTINUE".						
3	Sequence pops-up asking for the input file. Write SPIRE_UV and press OK	Write "SPIRE_UV" and press OK	ok				
4	At sequence completion, the same main menu appears. *Select point number 6* **to switch on the ACMS SCOE then click OK, Continue**	Select Option 6 and click OK, Continue	ok continue	→ok →ok	ACMS SCOE is switched-on in 'executing' mode. Note: Until ACC is not fully powered-on, some WARNING ALARMS might come down in the On-Board Event History.		
5	On AND YA001939 'AMCS SCOE - AS_PSEUDO 1 of 1' check that parameters: YMACT939 (ACMS SCOE state) YMASE939 (Simulator stata) YMAMS939 (MILFE state) YMAUS939 (UIFE state) Turned to: 'executing'	Parameters set to 'executing'	V				

Enter Date/Time:	17/07/08	14:00	Sign Off:	PA/QA

Enter Start Date|Time:	17/02/08	14:10	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
6	At sequence completion, the same main menu appears. *Select point number 4* **to switch on the ACC then click OK, Continue**	Select Option 4 and click OK, Continue	4 Continue ok		Expected Out of Limit of AEYYY109 (synchronisation). ACC may become INVALID for a short time. SPR 245: Out of Limit of HKA_ANTHx_Data	✓	
7	From a Packet History tool, select filter 'APID 512' and check that ACMS HK and ETM is correctly flowing down.	OK	OK			✓	
8	From On-Board Event History Display check that no 'NO-GO' are present.	OK	OK			✓	
9	From ACMS MASTER (ACMS_CONFIG25) sequence, move to Menu 3 (if not already there) with option 88. Click OK and then Confirm	OK	88, Continue → ok		14:19	✓	
10	From ACMS_CONFIG25, Menu 3, select option 1: 'Override Separation Flag' then Click button OK and then Confirm	Select 1, then OK and Continue	1, Continue		ACC goes in SAM Mode	✓	

14:20

Enter Date/Time:	17/02/08	14:20	Sign Off:	PA	17/7/08.

Enter Start Date|Time:	17/7/08	14:20	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N	
11	Sequence A102109SPVT034_ACMS_SAM_MON shall pop-up following the opening of separation straps, at prompt: 'Do you want to continue to monitor Sam Sun Pointing mode ? Enter your choice: no Then click OK	no	no		ACMS SAM Point Coarse is reached	V		
12	From ACMS_CONFIG25 Master Sequence, Menu 4.0, select option 6 'Transition to OCM' **Click OK and then Confirm**	Select 6, then OK and Continue	ok, Continue			V		14:30
13	Sequence 'A102109SPVT036_ACMS_STR_ON' shall pop-up. At prompt: 'Do You want to change current Str in Use' check if STR already selected is the correct one and answer **'no'**	no	no		STR-1 is switched ON and put in ATFAD mode	V		14:34
14	When scripts are completed, From ACMS synoptic check that ACC Mode is turned to: 'OCM pnt fine'	OK	OK			V		14:43
	Synchronise CCS Time With ETS for Accelerometer Measurement Timing							

Enter Date/Time:	17/7/08	14:48	Sign Off:	PA

Enter Start Date|Time:	12/03/08	14:48	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
15	For correlation of test results, record time of ETS Accelerometer Test Equipment and at the same time record the CCS time:					✓	
	ETS Time (Accelerometer Measurement T.E. Clock):			14:48:15		✓	
	CCS Time:			14:48:00		✓	
16	If not already active request ETS to start accelerometer acquisitions as per Appendix 2					✓	

Enter Date/Time:	12/03/08	14:48	Sign Off:		PA

Enter Start Date|Time:	17/07/08	14:54	

7.2.6.17 Reaction Wheel Operation for Variable Frequency Microvibration

This section should be performed in parallel with section 7.2.6.18 step 32. It takes approximately 40 mins to run.

Step	Reaction Wheel Activation	Nominal Value	Tolerance	Actual Value	Remark	P	N	
1	From Test Conductor Console, execute script: 'A102109SPVT213_ACMS_RWL_SPIRE_uVIB'	OK	OK			✓		14:53
2	Setup the 'TM Plotting Tool' to follow RWL spinning for the followiing monitoring parameters: AEWR1002 AEWR2002 (AAω) AEWR3002 AEWR4002	OK	OK			✓		
3	At the following prompt: 'Positive Spin. Click OK' Check from ACMS Synoptic that RWL 1-2-3-4 are ON. Then Click OK to start positive spinning	Click OK	OK			✓		15:00
	On the 'TM Plotting Tool' follow RWL positive spinning		OK			✓		
4	At the following prompt: 'Negative Spin. Click OK' Click OK to start negative spinning	Click OK				✓		15:11

Enter Date/Time:	17/07/08	15:11	Sign Off:		

Enter Start Date|Time:	17/02/08	15:23	

Step	Reaction Wheel Activation	Nominal Value	Tolerance	Actual Value	Remark	P	N
	On the 'TM Plotting Tool' follow RWL negative spinning	✓				✓	
6	At the following prompt: 'Click OK to spin-down RWL to 0 [Nms]' Click OK to bring RWLs to 0 [Nms]	Click OK	ok			✓	

Enter Date/Time:	17/07/08	15:31	Sign Off:		

Enter Start Date|Time:	17/07/08	14:58	

7.2.6.18 SMEC Variable Frequency Microvibration Test

The previous section (7.2.6.17) must be performed in parallel with this section step 23, which is assumed to take around 40 mins to run. Make sure that for this micro-vibration test the accelerometer acquisition has been activated before continuing.

Step	Description	Parameters	Expected Values	Actual Values	Success/ Failure
1	Execute stand alone script SPIRE-IST-SMEC-RAMP-MICROVIBRATION.tcl Generate high rate MCU engineering data – we are looking for fluctuations in SMEC velocity Set SMEC continuously scanning at 0.5 mm/s (TBC) over full range Number of scans set to make this a 1 hour test **An ABORT TEST pop up should visibe on the operator screen – only press if advised by I-EGSE staff.**	N/A	N/A	N/A	→ 14:53:05
	When given the go-ahead from SPIRE I-EGSE Operator, perform the following step				
2	Perform Section 7.2.6.17 to start reaction wheel operation i.a.w. agreed profile (see Appendix 2)	N/A	N/A	N/A	
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	14:54	Sign Off:	

Enter Start Date|Time:			

7.2.6.19 Reaction Wheel Operation for Spot Frequency Microvibration

This section should be performed in parallel with section 7.2.6.20 step 3. It takes approximately 40 mins to run.

Step	Reaction Wheel Activation	Nominal Value	Tolerance	Actual Value	Remark	P	N
1	From Test Conductor Console, execute script: 'A102109SPVT213_ACMS_RWL_SPIRE_uVIB'	OK					
2	Setup the 'TM Plotting Tool' to follow RWL spinning for the following monitoring parameters: AEWR1002 AEWR2002 AEWR3002 AEWR4002	OK					
3	At the following prompt: 'Positive Spin. Click OK' Check from ACMS Synoptic that RWL 1-2-3-4 are ON. Then Click OK to start positive spinning	Click OK					
	On the 'TM Plotting Tool' follow RWL positive spinning						
4	At the following prompt: 'Negative Spin. Click OK' Click OK to start negative spinning	Click OK					

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

Step	Reaction Wheel Activation	Nominal Value	Tolerance	Actual Value	Remark	P	N
	On the 'TM Plotting Tool' follow RWL negative spinning						
6	At the following prompt: 'Click OK to spin-down RWL to 0 [Nms]' Click OK to bring RWLs to 0 [Nms]	Click OK					

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

7.2.6.20 SMEC Spot Frequency Microvibration Test

The previous section (7.2.6.17) must be performed in parallel with this section step 3, which is assumed to take around 40 mins to run. Make sure that for this micro-vibration test the accelerometer acquisition has been activated before continuing.

Step	Description	Parameters	Expected Values	Actual Values	Success/ Failure
1	On HPCCS execute test script SPIRE-IST-SMEC-SPOT-MICROVIBRATION Generate high rate data – we are looking for fluctuations in SMEC velocity Scan SMEC at 0.1 mm/s over full range for four scans	N/A	N/A	N/A	
	The following 2 steps shall be run in parallel				
2	Perform Section 7.2.6.17 to start reaction wheel operation i.a.w. agreed profile (see Appendix 2)	N/A	N/A	N/A	
3	On HPCCS execute test script SPIRE-IST-SMEC-SPOT-MICROVIBRATION Generate high rate data – we are looking for fluctuations in SMEC velocity Scan SMEC at 0.1 mm/s over full range for four scans	N/A	N/A	N/A	
Test Result (Pass/Fail):					

Enter Start Date|Time:	17/07/08	15:39	

7.2.6.21 Microvibration Post-Test Configuration

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	ACMS Switch OFF						
7.5.5.12.1	Ensure RWLs have spun down before switching OFF	✓				✓	
7.5.5.12.2	From ACMS_CONFIG25 main menu: • **Select the point number 99** and confirm the selection pressing the relevant button "CONTINUE".	Continue	✓			✓	
7.5.5.12.3	The following menu will appear: HERSCHEL/PLANCK - MAIN MENU 9.0 - ACMS OFF PHASE ========== ***select the point number 1*** 'Switch Off ACMS' and confirm the selection pressing the relevant button "CONTINUE".	Continue	1 Continue			✓		15:39
7.5.5.12.4	Check the "ACMS_OFF" Test Sequence has been successfully ended.	OK	OK				

Enter Date/Time:	17/07/08	15:53	Sign Off:		

Enter Start Date|Time:	17/07/08	15:39	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
7.5.5.12.5	By the same above menu, ***select the point number 99*** to end the ACMS_CONFIG25 Master Sequence". Click OK to Confirm	OK	ok			✓	
	Re-Synchronise Time With ETS for Accelerometer Measurement Timing						
7.5.5.12.6	For correlation of test results re-record time of ETS Accelerometer Test Equipment and at the same time record the CCS time:						
	ETS Time (Accelerometer Measurement T.E. Clock):						
	CCS Time:						
7.5.5.12.7	Notify ETS that accelerometer acquisitions can be stopped						

Enter Date/Time:	17/07/08	15:54	Sign Off:	

Enter Start Date|Time:	17/07/08	18:15	

7.2.6.22 Procedure SPIRE-IST-COLD-FUNC-SMEC-02B-P

Version	2.42.5
Date	6th December 20073rd July 2008
Purpose	Close the SMEC Launch Latch (Latch it)
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and SMEC is ON and unlatched
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted and SMEC is ON and Latched
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5-30 minutes
Pass/Fail criteria	The SMEC latch is closed

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-02B-P.tcl	— Resistance changed	→	— 172.9 Ω Latch ok V	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	18:30	Sign Off:	

Enter Start Date|Time:			

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:	17/07/08	18:18	

7.2.6.23 Procedure SPIRE-IST-COLD-SMEC-OFF-P

Version	2.4
Date	6th December 2007
Purpose	SMEC (PRIME) Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are OFF.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected OFF values.

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute SPIRE-IST-COLD-SMEC-OFF-P.tcl	—	—	—	✓
2	Check that the power to the SMEC sensors is switched off	SMECENCPWR SMECLVDTPWR	1/-/0 1/-/0	1/-/0 1/-/0	✓
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	18:40	Sign Off:		

Enter Start Date|Time:	17/07/08	18:20	

7.2.6.24 Procedure SPIRE-IST-COLD-MCU-OFF-P

Version	2.4
Date	6th December 2007
Purpose	MCU PRIME Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is OFF.
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is ON. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • 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-IST-COLD-MCU-OFF-P.tcl	—	—	—	✓
2	Check that the MCU is switched off	MCUBITSTAT	1/-/0	1/-/0	✓
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	18:21	Sign Off:	

Enter Start Date|Time:	12/07/08	18:22	

7.2.6.25 Procedure SPIRE-IST-COLD-SCU-OFF-P

Version	2.4
Date	6th December 2007
Purpose	SCU PRIME Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is OFF
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified SCU HK Parameters show expected value.

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-SCU-OFF-P.tcl	—	—	— ✓	✓
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0xFFFF/-/0	0	✓
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0	1/-/0	✓
Test Result (Pass/Fail):					

Enter Date/Time:	12/07/08	18:23	Sign Off:	

Enter Start Date|Time:	17/07/08	18:24	

7.2.6.26 Switch OFF After SPIRE PRIME SMEC

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
8.	From the HPCCS test conductor console start the test script to power OFF SPIRE Prime: **S102999SCVT032_ASDCFTSPIR_PWR_OFF_P**	OK			V	
9.	On HPCCS when prompted: "SPIRE Switch OFF for CFT related tests in Hel/Hell conditions only - Select NO to abort TS if not correct" **Select YES**	YES	YES		V	
	If **YES** is selected the test script will go on to automatically power off all SPIRE warm units.				V	

Enter Start Date|Time:	17/07/08	18:29	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
	Note that during Switch OFF of SPIRE the following (5,2) and (5,4) event messages on APID 1280 may be expected and do not indicate a problem: e) EVID 1313 No_MCU_Response_Error f) EVID 21773 ALARM_LSMCU_DEAD However, be aware that if FDIR is enabled for SPIRE in the CDMU then this may trigger an OBCP	Not seen			V	
10.	On HPCCS when prompted: "Check Telemetry No Longer Updating - OK to continue" Check that parameters: THSK TM2N	 Not refreshing Not incrementing		AND: SA_1_559	V	
11.	Select OK to continue	OK			V	

Enter Date/Time:	17/07/08	18:25	Sign Off:	

Enter Start Date|Time:	17/07/08	18:25	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
12.	On HPCCS when all autonomous actions have been completed by the power on script **S102999SCVT032_ASDCFTSPIR_PWR_OFF_P** it will prompt: "Bus profile left as SPIRE PRIME, change manually after if required - OK to continue"				V	
13.	Select OK to continue	OK	ok		V	
14.	On HPCCS stop Packet History displays for the following APIDs:1280,1282	OK	ok		V	
	SPIRE PRIME OFF				V	

Enter Date/Time:	17/07/08	18:28	Sign Off:		

Enter Start Date|Time:	17/07/08	19:34	

7.2.6.27 Verify Redundant Latch Command Relay Status

Verify launch lock relays are positioned to allow SMEC launch lock to be unlatched.

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
	All TCs to be sent from the Manual Command Stack				✓	
1.	*Send **DC904180** and verify from the resulting (14,4) packet that packet 120 (dec) is not already enabled (i.e. NOT present in the list). If present skip steps 2 – 4*	120 not present	120 is present from previous test	Step 1 to 5 only required on CDMS ASW 3.4	✓	
2.	*Send **ZCB00999** to allocate new diagnostic packet*	OK	/		✓	
3.	*Send **DC900180** with repeater value 1 and parameters: DH019180 = 26, DH020180=120*	OK	/		✓	
4.	*Send **DC904180** and verify from the resulting (14,4) packet that packet 120 (dec) is nowenabled (i.e. present in the list)*	120 present			✓	
5.	*From TMPH verify that packets with SPID = **264000999** are cyclically arriving on the CCS*	Packets Arriving			✓	
6.	Close LCL26, by sending **DC26D170**	OK		State of LCL #26 switches to ON	✓		19:44
7.	Verify LCL26 closed: **WMA2B565** =	ON	1 (ON)		✓	
8.	Record Current **WMA07565**	N/A	0,01045 A		✓	
9.	Send HLC 5 to switch relays to LCL position **DCT01170, DHT01170="CMD_ID_HLC21"**	OK	OK		✓		19:46

Enter Date/Time:	17/07/08	19:46	Sign Off:		

Enter Start Date|Time:	17/07/08	19:46	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
10.	Verify Current **WMA07565 =**	130-180 mA	180 mA	Current between 130-180mA	V	
11.	Send HLC 6 to switch relays to MCU position **DCT01170, DHT01170="CMD_ID_HLC22"**	OK			V	
12.	Verify Current **WMA07565**	0 mA	0,01 mA	Current off	V	
13.	Open LCL26, by sending **DC26B170**	OK		State of LCL #26 switches to OFF	V	
14.	Verify LCL26 open: **WMA2B565 =**	OFF			V	
	SMEC Redundant LL latch relay position verification complete				V	

Enter Date/Time:	17/07/08	19:48	Sign Off:	

Enter Start Date|Time:	17/07/08	19:48	

7.2.6.28 Switch ON for SPIRE REDUNDANT SMEC

The following will switch ON and configure SPIRE Redundant instrument in REDY (Standby) mode. HKTM packets will be generated on APIDs 1281 dec and 1283 decimal (these can be observed using TMPH with corresponding filter – note however a limited number of TMPHs should be running at one time).

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

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
11.	On HPCCS start Packet History displays for the following APIDs:1281,1283	OK			✓	
12.	From the HPCCS test conductor console start the test script to power on SPIRE Redundant: **S102999SCVT033_ASDCFTSPIR_PWR_ON_R**	OK		AND: ZAD07999, ZAD14999 MIM: LCL_HERSCHEL	✓	

19:49

Enter Date/Time:	17/07/08	19:49	Sign Off:	

Enter Start Date|Time:	17/07/08 15:40	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
13.	On HPCCS when prompted: "SPIRE Switch ON for Cold FT related tests in Hel/Hell conditions only - Select NO to abort TS if not correct" **Select YES**	YES	YES		✓	
	If **YES** is selected the test script will go on to automatically power on all SPIRE warm units, force boot the DPU ASW and configure the instrument to Standby mode. Reply to prompts as indicated below.				✓	
14.	On HPCCS when prompted: "Check Telemetry Updating Correctly and OBT is Consistent with CDMU - OK to continue" **Select OK**	OK		**AND: SA_1_559**	✓	
15.	If I-EGSE connected when prompted on HPCCS, perform check requested then select **OK**: "Check IEGSE Time Consistent - OK to continue when RAL confirm"	OK			✓	

Enter Date/Time:	17/07/08	19:53	Sign Off:	

Enter Start Date|Time:	17/07/08	19:53	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
16.	On HPCCS when prompted: "Check Telemetry No Longer Updating - OK to continue" Check that parameters: THSK TM2N Select OK to continue	 Not refreshing Not incrementing OK		Note: Two TC failures on SCR00500 are expected because HKTM has been stopped	V	
17.	On HPCCS when prompted: "Check Telemetry Updating Correctly - OK to continue" Check that parameters: THSK TM2N Select OK to continue	 Refreshing @ 1Hz Incrementing by 1 @ 1Hz OK	 √ √	**AND: SA_1_559**	V	

Enter Date/Time:	17/07/08	19:54	Sign Off:		

Enter Start Date|Time:	17/07/08	19:55	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
18.	On HPCCS when all autonomous actions have been completed by the power on script **S102999SCVT033_ASDCFTSPIR_PWR_ON_R** it will prompt: "Set Bus Profile Back to Original Setting?" Select NO	NO	No		✓	
19.	At the prompt: "Bus Profile left unchanged" Select OK to continue	OK	ok		✓	
20.	Verify HK TM packets are being received on APIDs 1281 & 1283	OK	ok		✓	
	SPIRE DPU & DRCU Redundant powered				✓	

Enter Date/Time:	17/07/08	19:56	Sign Off:		

Enter Start Date|Time:	17/07/08	19:56	

7.2.6.29 Procedure SPIRE-IST-COLD-FUNC-SCU-03-R

Version	2.4
Date	6th December 2007
Purpose	SCU DC thermometry check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and DC thermometry is ON
Constraints	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	8 minutes
Pass/Fail Criteria	SCU DC thermometry channels show temperature readings according to the actual instrument temperature

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SCU-03-R.tcl	—	—	—	V 19:58
2	**Wait for the parameter BBFULLTYPE to get set to SCU_DC_Therm**	—	—	—	✓

Enter Date/Time:	17/07/08	19:59	Sign Off:	

Enter Start Date|Time:	17/07/08	19:59	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
3	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0/0xFFFF/0xFFFF	0x 0000 0xFFFF	V
4	If the instrument is at He I temperatures check the values of SCU DC thermometry channels.		(All Values TBC)		V
		PUMPHTRTEMP	~4.2K	4.6K	
		PUMPHSTEMP	~4.4K	5.73K	
		EVAPHSTEMP	~4.3K	5.5K	
		SHUNTTEMP	~4.2K	4.2K	
		EMCFILTEMP	~4.8K	8.8K	
		SL0TEMP	~4.2K	4.3K	
		PL0TEMP	~4.2K	4.3K	
		OPTTEMP	~4.8K	8.16K	
		BAFTEMP	~4.8K	8.6K	
		BSMIFTEMP	~4.7K	8.16K	
		SCAL2TEMP	~4.8K	8.03K	
		SCAL4TEMP	~4.8K	8.03K	
		SCALTEMP	~4.8K	25.7K → NCR 242 89	
		SMECIFTEMP	~4.7K	7.94K	
		SMECTEMP	~4.7K	7.9K	
		BSMTEMP	~4.8K	8.13K	
5	If the instrument is at He II temperatures check the values of	PUMPHTRTEMP	(All Values TBC) -/~4.6K	N/A	

Enter Date/Time:	17/07/08	20:22	Sign Off:		

Enter Start Date|Time:	17/07/08	20:02	

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
	SCU DC thermometry channels.	PUMPHSTEMP EVAPHSTEMP SHUNTTEMP EMCFILTEMP SL0TEMP PL0TEMP OPTTEMP BAFTEMP BSMIFTEMP SCAL2TEMP SCAL4TEMP SCALTEMP SMECIFTEMP SMECTEMP BSMTEMP	-/~3.0K -/~3.0K -/~1.7K -/~4.6K -/~1.7K -/~1.7K -/~4.6K -/~4.6K -/~4.5K -/~4.6K -/~4.6K -/~4.6K -/~4.6K -/~4.6K -/~4.5K	N/A	
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	✓	
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	20:03	Sign Off:		

Enter Start Date|Time:	17/07/08	20:03	

7.2.6.30 Procedure SPIRE-IST-COLD-FUNC-SCU-06-R

Version	2.4
Date	6th December 2007
Purpose	SCU AC thermometry check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and DC thermometry is ON
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Constraints	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	2 minutes
Pass/Fail Criteria	SCU AC thermometry channel shows temperature readings according to the actual instrument temperature

Enter Start Date|Time:	17/07/08	20:04	

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SCU-06-R.tcl	—	—	—	V 20:03
2	**Wait for the parameter BBFULLTYPE to get set to SCU_AC_Therm**	—	—	—	V
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	0/1/1		V
4	If the instrument is at He I temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~4K	4,4K	V
5	If the instrument is at He II temperatures check the value of SCU AC thermometry channel.	SUBKTEMP	~1.7K	N/A	~~V~~
6	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	V
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	20:05	Sign Off:	

Enter Start Date|Time:	17/07/08	20:06	

7.2.6.31 Procedure SPIRE-IST-COLD-FUNC-MCU-01-R

Version	2.4
Date	6th December 2007
Purpose	MCU (REDUNDANT) Boot Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCU voltages and board temperatures show expected 'ON' values

Enter Start Date|Time:	17/07/08	20:06	

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-MCU-01-R.tcl	—	—	—	20:06
2	Check that the MCU is booted up successfully	MCUBITSTAT	0/1/1	1	✓
3	Check MCU HK parameter values and ensure that the values are refreshing	MCUP5V MCUP14V MCUM14V MCUP15V MCUM15V MCUMACTEMP MCUSMECTEMP MCUBSMTEMP	~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V ~ 15.0 ± 0.5V ~ -15.0 ± 0.5V ~300K ~300K ~300K	5.0V 14.13V -14.5 15.5V -15.6 299K 298K 297K	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	20:09	Sign Off:		

Enter Start Date|Time:	17/07/08	20:09	

7.2.6.32 Procedure SPIRE-IST-COLD-FUNC-MCU-03-R

Version	2.4
Date	6th December 2007
Purpose	MCU Nominal Science Contents Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	Unchanged.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified MCU HK parameters show expected increment

Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-MCU-03-R.tcl	MCUFRAMECNT	0/-/297	0/-/297	V

20:09

Test Result (Pass/Fail):	

Enter Date/Time:	17/07/08	20:11	Sign Off:		

Enter Start Date|Time:	17/07/08	20:12	

7.2.6.33 Procedure SPIRE-IST-COLD-FUNC-SMEC-01-R

Version	2.4
Date	6th December 2007
Purpose	SMEC (REDUNDANT) Encoder/LVDT Sensor Check.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected ON values.

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-01-R.tcl	—	—	—	V 20:12
2	Check that power to the SMEC LED and LVDT sensor is on	SMECENCPWR SMECLVDTPWR	0/-/3 0/-/1	0/-/3 0/-/1	
Test Result (Pass/Fail):					

RETUNE

Enter Date/Time:	17/07/08	20:14	Sign Off:	

Enter Start Date|Time:	17/07/08	20:14	

7.2.6.34 Procedure SPIRE-IST-COLD-FUNC-SMEC-03-R

Version	2.4
Date	6th December 2007
Purpose	SMEC (REDUNDANT) Encoder Integrity Check.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	MCUENGSMECENCSIG1/2 increase as the encoder power is increased

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-03-R.tcl	—	—	—	V 20:15
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	V
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	20:17	Sign Off:		

Enter Start Date|Time:	17/07/08	20:18	

7.2.6.35 Procedure SPIRE-IST-COLD-FUNC-SMEC-02A-R

Version	~~2~~ 42.5
Date	~~6th December 2007~~ 3rd July 2008
Purpose	Open the SMEC Launch Latch REDUNDANT (Unlatch it)
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and SMEC is latched
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and SMEC is ON and Unlatched
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	~~5~~ 20 minutes
Pass/Fail criteria	The SMEC latch is open.

Procedure Steps:

Enter Date/Time:	17/07/08	20:18	Sign Off:		

Enter Start Date|Time:	17/07/08	20:18	

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-02A-R.tcl	—	—	—	V 20:31
2	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	V
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	20:33	Sign Off:	

Enter Start Date|Time:			

7.2.6.36 Procedure SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-R

Version	~~1.01.1~~
Date	~~6th December 2007~~3rd July 2008
Purpose	SMEC (REDUNDANT) Open Loop Feed Forward Offset Test
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • SMEC PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	~~40~~ 60 minutes
Pass/Fail criteria	Optimum SMEC Feed Forward Offset is determined

PVS1-3

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-R.tcl	—	—	—	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
3	Based on the results of this test it may be necessary to set the SMEC FF Offset manually. **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9055xxxx** • **param 2 = 0** **I-EGSE staff will supply the 16-bit parameter value xxxx to this command.**	SMECFFOFFSET	-/ - /xxxx		
4	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9058xxxx** • **param 2 = 0** **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x905Axxxx** • **param 2 = 0** **The 16 bit parameters xxxx will be provided by I-EGSE staff**	SMECENCSIG1OFF SMECENCSIG2OFF	-/-/~ Commanded Value -/-/~ Commanded Value		

RVS1-3

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
5	**Note that it may be necessary to repeat this test to fine tune the Feed Forward Offset** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	
Test Result (Pass/Fail):					

PVS1-3

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

7.2.6.38 Procedure SPIRE-IST-COLD-FUNC-SMEC-FFGAIN-R

Version	1.0
Date	6th December 2007
Purpose	SMEC (REDUNDANT) Open Loop Scan Test for different Feed Forward Gain settings
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • SMEC PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal** • Test SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-R has been executed successfully
Duration	100 minutes
Pass/Fail criteria	Optimum SMEC Feed Forward Gain is determined

Enter Start Date|Time:			

Procedure Steps:

Step	Description	Parameter—Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-FFGAIN-R.tcl	—	—	—	
2	Wait for the I-EGSE staff to confirm the success or failure of this test	—	—	—	
3	Based on the results of this test it may be necessary to set the SMEC FF Gain manually. SPIRE_SEND_DRCU_COMMAND • param 1 = 0x9054xxxx • param 2 = 0 I-EGSE staff will supply the 16-bit parameter value xxxx to this command.	SMECFFGAIN	-/-/xxxx		

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
4	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: SPIRE_SEND_DRCU_COMMAND • param 1 = 0x9068xxxx • param 2 = 0 SPIRE_SEND_DRCU_COMMAND • param 1 = 0x906Axxxx • param 2 = 0 The 16 bit parameters xxxx will be provided by I-EGSE staff	SMECENCSIG1OFF SMECENCSIG2OFF	-/-/~ Commanded Value -/-/~ Commanded Value		
5	Note that it may be necessary to repeat this test to fine tune the Feed Forward Gain	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:	17/07/08	21:02	

7.2.6.37 Procedure SPIRE-IST-COLD-FUNC-SMEC-04A-R

Version	2.42.5
Date	6th December 20073rd July 2008
Purpose	SMEC (REDUNDANT) Open Loop Positioning Test.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5-30 minutes
Pass/Fail criteria	SMEC moves to the commanded positions

Procedure Steps:

Enter Date/Time:	17/07/08	21:03	Sign Off:	

Enter Start Date|Time:	17/07/08	21:03	

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-04A-R.tcl	—	—	—	21:05
2	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	21:10	Sign Off:	

Enter Start Date|Time:	18/07/08.		

7.2.6.38 Procedure SPIRE-IST-COLD-FUNC-SMEC-09-R

Version	2.42.5
Date	~~6th December 2007~~3rd July 2008
Purpose	SMEC (REDUNDANT) Open Loop Scan Test.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • SMEC PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	5-30 minutes
Pass/Fail criteria	SMEC performs a scan between the commanded positions

Enter Start Date|Time:	18|07|08.	06:27	

RVS10

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9058xxxx** • **param 2 = 0** **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x905Axxxx** • **param 2 = 0** **The 16 bit parameters xxxx will be provided by I-EGSE staff**	SMECENCSIG1OFF SMECENCSIG2OFF	-/-/~ Commanded Value -/-/~ Commanded Value	See RVS10 Step 2 3rd & 4th commands OK	
2	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-09-R.tcl	—	—	—	
3	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:	18|07|08	06:53	Sign Off:	PA J. HALL

Enter Start Date|Time:	18/07/08		

7.2.6.39 Procedure SPIRE-IST-COLD-FUNC-SMEC-07-R

Version	2.42.5
Date	6th December 2007 3rd July 2008
Purpose	SMEC (REDUNDANT) Close Loop Scan Test.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	SMEC is in closed loop
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	10 60 minutes
Pass/Fail criteria	SMEC performs a scan between the commanded positions and the loop remains closed

Enter Start Date|Time:	18/07/08	~~07:38~~ 06:53	

PVS17-1

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	**Before this test a SMEC calibration table on the I-EGSE may have to be changed. Please confirm with the I-EGSE staff before continuing with the next test.**	—	—	— PVS11	
2	Execute TCL script SPIRE-IST-COLD-SMEC-INIT-R.tcl	SMECLOOPMODE	6/-/1	6/1	Ok.
3	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-07-R.tcl	—	—	—	07:49 Ok
4	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	
Test Result (Pass/Fail):					

PVS11-2

PVS11-3

07:38 FIFO full observed again

Enter Date/Time:	18/07/08	~~07:38~~ 08:30	Sign Off:	PA J. HALL

Enter Start Date|Time:	18/07/08	08:33	

7.2.6.40 Procedure SPIRE-IST-COLD-FUNC-SMEC-04B-R

Version	~~2.42.5~~
Date	~~6th December 2007~~3rd July 2008
Purpose	SMEC (REDUNDANT) Close Loop Positioning Test.
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON. SMEC is in closed loop.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	~~10~~ 20 minutes
Pass/Fail criteria	SMEC moves to the commanded positions and remains in closed loop

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-04B-R.tcl	SMECLOOPMODE	1/1/1		
2	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	

PVS 12
PVS 13

Test Result (Pass/Fail):

Enter Date/Time:	18/07/08	11:30	Sign Off:	PA

Enter Start Date|Time:			

7.2.6.41 Procedure SPIRE-IST-COLD-FUNC-SMEC-LVDT-R

Version	1.0
Date	6th December 2007
Purpose	SMEC (REDUNDANT) Backup LVDT Close Loop Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON. SMEC is in closed loop.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	90 minutes
Pass/Fail criteria	SMEC remains in closed loop on LVDT

PVS12
PVS1-4

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-LVDT-R.tcl	SMECLOOPMODE	1/-/4		
2	**Manual commanding may be necessary during this test. Details to be specified**	—	—	—	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	
Test Result (Pass/Fail):					

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:	17/07/08	12:10	

7.2.6.42 Procedure SPIRE-IST-COLD-FUNC-SMEC-02B-R

Version	~~2.42.5~~
Date	~~6th December 2007~~3rd July 2008
Purpose	Close the SMEC Launch Latch (Latch it)
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and SMEC is ON and unlatched
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted and SMEC is ON and Latched
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	~~5~~30 minutes
Pass/Fail criteria	The SMEC latch is closed

Procedure Steps:

Enter Start Date|Time:	17/07/08	12:10	

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-02B-R.tcl	—	—	—	✓ 12:13
2	**Wait for the I-EGSE staff to confirm the success or failure of this test** The I-EGSE staff will need to analyse the test data before continuing the test sequence.	—	—	—	✓
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	12:14	Sign Off:		PA

Enter Start Date|Time:	17/07/08	12:10	

7.2.6.43 Procedure SPIRE-IST-COLD-SMEC-OFF-R

Version	2.4
Date	6th December 2007
Purpose	SMEC (REDUNDANT) Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are OFF.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected OFF values.

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute SPIRE-IST-COLD-SMEC-OFF-R.tcl	—	—	—	V 12:20
2	Check that the power to the SMEC sensors is switched off	SMECENCPWR SMECLVDTPWR	1/-/0 1/-/0	1/-/0 1/-/0	V
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	12:20	Sign Off:	PA

Enter Start Date|Time:	17/07/08	12:21	

7.2.6.44 Procedure SPIRE-IST-COLD-MCU-OFF-R

Version	2.4
Date	6th December 2007
Purpose	MCU REDUNDANT Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is OFF.
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is ON. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • 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-IST-COLD-MCU-OFF-R.tcl	—	—	—	✓ 12:21
2	Check that the MCU is switched off	MCUBITSTAT	1/-/0	1/-/0	✓
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	12:22	Sign Off:	PA

Enter Start Date|Time:	12/07/08	12:22	

7.2.6.45 Procedure SPIRE-IST-COLD-SCU-OFF-R

Version	2.4
Date	6th December 2007
Purpose	SCU REDUNDANT Switch OFF
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON.
Final configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is OFF
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	5 minutes
Pass/Fail criteria	Specified SCU HK Parameters show expected value.

Procedure Steps:

Enter Start Date|Time:	17/07/08	12:22	

Step	Description	Parameter - Unit	Expected Values Before/During/After	Actual Values Before/During/After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-SCU-OFF-R.tcl	—	—	—	✓
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0xFFFF/-/0	0	✓
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0	0	✓
Test Result (Pass/Fail):					

Enter Date/Time:	17/07/08	12:84	Sign Off:	PA

Enter Start Date|Time:	17/07/08	12:24	

7.2.6.46 Switch OFF After SPIRE REDUNDANT SMEC

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
8.	From the HPCCS test conductor console start the test script to power OFF SPIRE REDUNDANT: **S102999SCVT034_ASDCFTSPIR_PWR_OFF_R**	OK	ok		V	
9.	On HPCCS when prompted: "SPIRE Switch OFF for CFT related tests in Hel/Hell conditions only - Select NO to abort TS if not correct" **Select YES**	YES	YES		V	
	If **YES** is selected the test script will go on to automatically power off all SPIRE warm units.				V	

Enter Start Date|Time:	17/07/08	12:26	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
	Note: During Switch OFF of SPIRE, the following (5,1) and (5,4) event messages on APID 1281 may be expected and do not indicate a problem: g) EVID 1313 No_MCU_Response_Error h) EVID 21773 ALARM_LSMCU_DEAD However, be aware that if FDIR is enabled for SPIRE in the CDMU then this may trigger an OBCP				V	
10.	On HPCCS when prompted: "Check Telemetry No Longer Updating - OK to continue" Check that parameters: THSK TM2N	 Not refreshing Not incrementing	 V	AND: SA_1_559	V	
11.	Select OK to continue	OK	ok		V	

Enter Date/Time:	17/07/08	12:27	Sign Off:		NA

Enter Start Date|Time:	17/07/08	12:27	

Step-No.	Test-Step-Description	Nominal Value	Actual Value	Remarks	P	N
12.	On HPCCS when all autonomous actions have been completed by the power on script **S102999SCVT034_ASDCFTSPIR_PWR_OFF_R** it will prompt: "Bus profile left as SPIRE PRIME, change manually after if required - OK to continue"				✓	
13.	Select OK to continue	OK	ok		✓	
14.	On HPCCS stop Packet History displays for the following APIDs:1281,1283	OK	ok		✓	
	SPIRE REDUNDANT OFF				✓	

Enter Date/Time:	17/07/08	12:29	Sign Off:		PA:

Enter Start Date|Time:	12/07/08	12:30	

7.2.7 *Satellite & EGSE Switch Off After SMEC Tests*

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value		P	N
	Satellite & EGSE Switch Off						
	Initial Conditions: Nominal & Redundant SPIRE warm units OFF					✓	
1	On HPCSS terminate **ALL_SubscribeParams.tcl** test script.	OK				✓	
2	From HPCCS Test Conductor console issue command to disconnect from SPIRE I-EGSE **disconnect HSPIREEGSE**	OK				✓	
3	Confirm from HPCSS and SPIRE I-EGSE that the disconnection was successful	YZS29940= DISCONNECTED			**AND SYS_PARS**	✓	
4	Switch OFF I-EGSE i.a.w. AD 5	OK				✓	
5	Stop monitoring CryoSCOE data on the CCS by selecting Stop Record & Exit from the following script: **K102999ECVT035_ASDGEN_SCOE_CCU_LOG**	OK not running				✓	
6	From HPCCS disable Monitoring Mode 1 (512sec cycle) for CCU A & B by executing test script: **K102999ECVT001_ASDGENCCU_MnDBOTH1**	OK	ok			✓	
7	From HPCCS power OFF CCU A & CCU B by executing test script: **K102999ECVT001_ASDGENCCU_ABPWROFF**	OK	ok			✓	12:41
8	Switch OFF Satellite/SVM, HPCCS and SCOEs i.a.w. procedure	OK					

Enter Date/Time:	17/07/08	13:00	Sign Off:	

Enter Start Date|Time:	17/07/08	13:00	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value		P	N
	AD 2 Sections 7.7 to 7.11.					✓	
9	Confirm both Satellite and EGSE powered down	OK		EGSE OFF		✓	
	End Conditions: Satellite and EGSE OFF					✓	
	END OF SMEC TESTS						

Enter Date/Time:	17/07/08	13:20	Sign Off:	

Enter Start Date|Time:			

7.2.8 SPIRE SAFE Switch Off

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

Version	2.4
Date	6th December 2007
Purpose	To switch OFF the SPIRE instrument if an anomaly should occur
Initial configuration	SPIRE can be in ANY configuration as specified in the test sequence in section 4.1
Final configuration	SPIRE is OFF
Preconditions	• SPIRE FM DPU is electrically integrated with the Herschel Satellite • SPIRE MIB is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	~5-8 minutes
Pass/Fail Criteria	SPIRE is OFF. All instrument subsystems are completely powered OFF.

Notes:

1. All HK parameters relevant to this procedure can be located on the FUNCTIONAL TEST PARAMETERS CCS display

2. The expected values of HK parameters before the execution of a switch-off script are not indicated in the table below because the scripts can be run from any instrument configuration without harming the instrument.

Enter Start Date|Time:			

Step	Description	Parameter - Unit	Expected value before/after	Actual value before/after
1.	Execute Procedures: ▪ SPIRE-IST-COLD-PDET-OFF-P/R ▪ SPIRE-IST-COLD-BSM-OFF-P/R	PLIABITSAT PSWJFETSTAT PMLWJFETSTAT CHOPSENSPWR JIGGSENSPWR	- / 0 - / 0 - / 0 - / 0 - / 0	
2.	Execute Procedures: ▪ SPIRE-IST-COLD-SDET-OFF-P/R ▪ SPIRE-IST-COLD-SMEC-OFF-P/R	SLIABITSAT SPECJFETSTAT SMECENCPWR SMECLVDTPWR	- / 0 - / 0 - / 0 - / 0	
3.	Execute Procedures: ▪ SPIRE-IST-COLD-MCU-OFF-P/R ▪ SPIRE-IST-COLD-SCU-OFF-P/R	MCUBITSTAT SCUTEMPSTAT SUBKSTAT	- / 0 - / 0 - / 0	
4.	Power off according to procedure 7.2.2.32 for PRIME and 7.2.3.32 for REDUNDANT			

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

7.2.9 SPIRE SAFE Switch Off for Standalone SMEC Test Sequence

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

Version	1.0
Date	6th December 2007
Purpose	To switch OFF the SPIRE instrument if an anomaly should occur
Initial configuration	SPIRE can be in ANY configuration as specified in the test sequence in section 7.2.6
Final configuration	SPIRE is OFF
Preconditions	• SPIRE FM DPU is electrically integrated with the Herschel Satellite • SPIRE MIB is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS
Duration	~5-10 minutes
Pass/Fail Criteria	SPIRE is OFF. All instrument subsystems are completely powered OFF.

Notes:

3. All HK parameters relevant to this procedure can be located on the FUNCTIONAL TEST PARAMETERS CCS display

4. The expected values of HK parameters before the execution of a switch-off script are not indicated in the table below because the scripts can be run from any instrument configuration without harming the instrument.

Enter Start Date|Time:			

	Description	Parameter - Unit	Expected value before/after	Actual value before/after
1.	Execute Procedures: * SPIRE-IST-COLD-SMEC-02B-P/R * SPIRE-IST-COLD-BSM-OFF-P/R	 CHOPSENSPWR JIGGSENSPWR	 - / 0 - / 0	
2.	Execute Procedures: * SPIRE-IST-COLD-SMEC-OFF-P/R	SMECENCPWR SMECLVDTPWR	- / 0 - / 0	
3.	Execute Procedures: * SPIRE-IST-COLD-MCU-OFF-P/R	MCUBITSTAT	- / 0	
4	Power off according to procedure 7.2.6.26 for PRIME and 7.2.6.46 for REDUNDANT			

Enter Date/Time:			Sign Off:	

8 Summary Sheets

8.1 Procedure Variation Summary

	Test Change	Curr. No.: Date Page of	
Test designation	Test Procedure	Issue	Rev.
Test step changed	Reason for Change		
Prepared by:	Resp. Test Leader	Project Engineer	
PA/QA	Prime	Customer	

Table 8.1-1: Procedure Variation Sheet

8.2 Non Conformance Report (NCR) Summary

NCR - No.	NCR - Title	Date	Open Closed	PA sig.

Table 8.2-1: Non-Conformance Record Sheet

8.3 Sign-off Sheet

	Date	Signature
Test Director		
Operator		
PA Responsible		
ESA Representative		

APPENDIX 1

Actual SCOE cable connection (to be confirmed by AIT)

SCOE CABLES CONNECTION to HERSCHEL S/C					
SKIN-01	PWR Panel (PCDU)				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
	BS Nom Power	SK01BJ09	PCDU	BS SCOE Cable Plugged	
	BS Red Power	SK01BJ10	PCDU	BS SCOE Cable Plugged	
	BDR1 AIT	SK01BJ11	PCDU	LPS SCOE Cable Plugged	
	BDR2 AIT	SK01BJ12	PCDU	LPS SCOE Cable Plugged	
	SA Nom Power	SK01AJ01	PCDU	POWER SCOE Cable Plugged	
	SA Nom Power	SK01AJ02	PCDU	POWER SCOE Cable Plugged	
	SA Nom Power	SK01AJ03	PCDU	POWER SCOE Cable Plugged	
	SA Nom Power	SK01AJ04	Battery	EMC Dust Cap	
	SA Red Power	SK01AJ05	PCDU	POWER SCOE Cable Plugged	
	SA Red Power	SK01AJ06	PCDU	POWER SCOE Cable Plugged	
	SA Red Power	SK01AJ07	PCDU	POWER SCOE Cable Plugged	
SKIN-02	PWR Panel (ACC, CDMU, RCS, 1553 & Thruster)				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-02	DMS 1553 Bus_A	J01	CDMU	Bus Monitor Cable Plugged	
SKIN-02	DMS 1553 Bus_B	J02	CDMU	Bus Monitor Cable Plugged	
SKIN-02	ACMS 1553 Bus_A	J03	ACC	ACMS SCOE Cable Plugged	
SKIN-02	ACMS 1553 Bus_B	J04	ACC	ACMS SCOE Cable Plugged	
SKIN-02	LV1/FCV 20N CMD S/A M	J05	ACC/RCS	ACMS SCOE Cable Plugged	

SKIN-02	LV2/FCV 20N CMD S/A R	J06	ACC/RCS	ACMS SCOE Cable Plugged	
SKIN-02	RCS Press/Tank Temp/PT Pwr	J07	ACC/PT&TH	ACMS SCOE Cable Plugged	
SKIN-02	Thruster Temp M/LV1 Sts	J08	ACC/RCS	ACMS SCOE Cable Plugged	
SKIN-02	CDMU and ACC EEPROM reprogramming input	J09	ACC/CDMU		Flight Plug SK02P09 Plugged
SKIN-02	CDMU and ACC EEPROM reprogramming input	J10	ACC/CDMU		Flight Plug SK02P10 Plugged
SKIN-02	Thruster Temp R/LV2 Sts	J11	ACC/RCS	ACMS SCOE Cable Plugged	
SKIN-02	Thruster C/B Heaters M	J12	ACC/CBH	ACMS SCOE Cable Plugged	
SKIN-02	Thruster C/B Heaters R	J13	ACC/CBH	ACMS SCOE Cable Plugged	
SKIN-02	Str1/2 On/Off Cmd M/Str1 Sts	J14	ACC/STR-1		ACMS Flight Plug SK02P14 Plugged
SKIN-02	Str1/2 On/Off Cmd R/Str2 Sts	J15	ACC/STR-2		ACMS Flight Plug SK02P15 Plugged
SKIN-02	Gyro A On/Off Cmd	J16	ACC/GYRO-E1		ACMS Flight Plug SK02P16 Plugged
SKIN-02	Gyro B On/Off Cmd	J17	ACC/GYRO-E2		ACMS Flight Plug SK02P17 Plugged

SKIN-03	TTC Panel				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-03	Test point TC + protection jumper EPC1	SK03J01	XPND1/EPC1		Plastic cap
SKIN-03	Test point TC + protection jumper EPC2	SK03J02	XPND2/EPC2		Plastic cap
	RF LINK				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
	RF link for antenna LGA1	N/A	LGA1	RF SCOE LGA1 Plugged	LGA1 Anechoic Cap
	RF link for antenna LGA2	N/A	LGA2	RF SCOE LGA2 Plugged	LGA2 Anechoic Cap
	RF link for antenna MGA	N/A	MGA	RF SCOE MGA Plugged	MGA Anechoic Cap
SKIN-04	ACMS Panel (RWE)				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-04	RWL1 Sgn	J01	ACC/RWL-1		ACMS Flight Plug SK04P01 Plugged
SKIN-04	RWL2 Sgn	J02	ACC/RWL-2		ACMS Flight Plug SK04P02 Plugged

SKIN-04	RWL3 Sgn	J03	ACC/RWL-3		ACMS Flight Plug SK04P03 Plugged
SKIN-04	RWL4 Sgn	J04	ACC/RWL-4		ACMS Flight Plug SK04P04 Plugged
SKIN-05	GYR/QRS Panel				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-05	CRS1 AOCS Sgn	J01	CRS-1/ACC		ACMS Flight Plug
SKIN-05	CRS2 AOCS Sgn	J02	CRS-2/ACC		ACMS Flight Plug
SKIN-05	GYRO RS422 / Test	J03	GYRO	ACMS SCOE Cable Plugged	
SKIN-05	CRS 1/2 Stimuli	J04	CRS-1,2	ACMS SCOE Cable Plugged	
SKIN-05	AAD Sgn M	J05	AAD/ACC	ACMS SCOE Cable Plugged	
SKIN-05	SAS1/2 Sgn M	J06	SAS/ACC	ACMS SCOE Cable Plugged	
SKIN-05	SAS1/2 Sgn R	J07	SAS/ACC	ACMS SCOE Cable Plugged	
SKIN-05	AAD Sgn R	J08	AAD/ACC	ACMS SCOE Cable Plugged	
SKIN-06	STR Panel				
	Connector Function	Skin Connector	S/C unit	SCOE CABLE	Flight Connector
SKIN-06	STR1 Stimuli	J01	STR1	ACMS SCOE Cable Plugged	
SKIN-06	STR2 Stimuli	J02	STR2	ACMS SCOE Cable Plugged	
	UMBILICAL				
	Connector Function	Connector	S/C unit	SCOE CABLE	
	Power/Data	HU1J01	SYSTEM	SCOEs cable Plugged	
	Power/Data	HU2J01	SYSTEM	SCOEs cable Plugged	

APPENDIX 2

Accelerometer Measurement & ACMS Reaction Wheel Profile for Microphonics Test

During reaction wheel activation the accelerometers on OBA and reaction wheel panel according to the Table A4-1 below shall be read. NB: The measurement precision is given by the type of accelerometers used for the test, which is in the order of a few milli-g.

ZONE	CHANNELS ID	DESCRIPTION
OPTICAL BENCH	PACRYO201X	OBA
	PACRYO202Y	OBA
	PACRYO203Z	OBA
	PACRYO204X	OBA
	PACRYO205Z	OBA
	PACRYO206Y	OBA
-Y +Z PANEL	381X	RWL#4 to bracket I/F
	381Y	RWL#4 to bracket I/F
	381Z	RWL#4 to bracket I/F
	382X	RWL#4/RWL#2 to bracket I/F
	382Y	RWL#4/RWL#2 to bracket I/F
	382Z	RWL#4/RWL#2 to bracket I/F
	386X	RWL#3 to bracket I/F
	386Y	RWL#3 to bracket I/F
	386Z	RWL#3 to bracket I/F
	384X	RWL#1 to bracket I/F
	384Y	RWL#1 to bracket I/F
	384Z	RWL#1 to bracket I/F
	383X	RWL#2 to bracket I/F
	383Y	RWL#2 to bracket I/F
	383Z	RWL#2 to bracket I/F

Table A4--1: Measurement Channels for Micro-vibration Test (RD8)

It should be noted that the test configuration, as required in chapter 4.1 of RD8, can not be achieved and the test has to be performed under the conditions of this procedure.

Hmax	25	N.m.s
Tmax	0,05	N.m
Friction	0,005	N.m
DT	10	Min

time (min)	H (N.m.s)
-10	0
0	0
9,25925926	25
10	25
28,5185185	-25
30	-25
39,2592593	0
50	0

Table A4-2: Reaction Wheel Profile

	Test Change	Curr. No.:1 Date 17/07/2008 Page 1 of 1	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed See below	Reason for Change Late changing SPIRE Procedure		

The attached test steps shall be performed instead of the following sections of TP-0217:

1) 7.2.6.10 SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-P 08:56. - 09:52
2) 7.2.6.16 SPIRE-IST-COLD-FUNC-SMEC-LVDT-P 16:44 — 18:00
3) 7.2.6.37 SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-R 20:34 -
4) 7.2.6.43 SPIRE-IST-COLD-FUNC-SMEC-LVDT-R 11:30

Prepared by: S. Hamer	Resp. Test Leader	Project Engineer
PA/QA J.Hall 17/7/08 08:34.	Prime	Customer

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-P.tcl	—	—	—	✓
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	
3	Based on the results of this test it may be necessary to set the SMEC FF Offset manually. **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9055xxxx** • **param 2 = 0** **I-EGSE staff will supply the 16-bit parameter value xxxx to this command.**	SMECFFOFFSET Start Science MCU FFOffset " " Stop Science MCU	-/ - /xxxx 91C10001 9055FFFE 90550000 90558000 91C10000	Wait 60secs	OK SCD06505
4	Based on the results of this test it may be necessary to set the SMEC FF Gain manually. **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9054xxxx** • **param 2 = 0** **I-EGSE staff will supply the 16-bit parameter value xxxx to this command.**	SCD01505 FFoffset. SMECFFGAIN	0x70000 FEUSWAFO 0x90557850 (SCD06505) -/ - /xxxx	Skip	
5	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9058xxxx** • **param 2 = 0** A7F8 **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x905Axxxx** • **param 2 = 0** 8EF8 **The 16 bit parameters xxxx will be provided by I-EGSE staff**	SMECENCSIG1OFF SMECENCSIG2OFF	-/-/~ Commanded Value -/-/~ Commanded Value	OK OK	OK OK

Set Encoder Position.

5 & SPIRE-SEND_DRCU_COMMAND

SCD06505 0x90490004.

PVS1- (1)

17/07/08 08:56

5.2.3 Procedure SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-P

Version	1.2
Date	10th July 2008
Purpose	SMEC (PRIME) Open Loop Feed Forward Offset Test
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • SMEC PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	60 minutes
Pass/Fail criteria	Optimum SMEC Feed Forward Offset and Gain are determined

PVSL - ①

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
6	**Note that it may be necessary to repeat this test to fine tune the Feed Forward Offset.** **The I-EGSE staff will need to analyse the test data before continuing the test sequence.**	—	—	—	
Test Result (Pass/Fail):				7/02/08 09:40	

5.2.8 Procedure SPIRE-IST-COLD-FUNC-SMEC-LVDT-P

Version	1.1
Date	10th July 2008
Purpose	SMEC (PRIME) Backup LVDT Close Loop Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON. SMEC is in closed loop.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU PRIME is switched ON • SPIRE MCU PRIME is booted. • SPIRE MIB PRIME is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	90 minutes
Pass/Fail criteria	SMEC remains in closed loop on LVDT

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	**Manual commanding will be necessary during this test. Details to be specified.**	—	—	—	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test.** **The I-EGSE staff will need to analyse the test data before continuing the test sequence.**	—	—	—	
Test Result (Pass/Fail):					

17/07/08 16:44

✓ 1) SCD06505 90C10001 stat/engineering/science data
✓ 2) SCD06505 90SE1EA2 set SMEC LVDT offset
✓ 3) SCD06505 9049 0001 SMEC move
✓ 4) SCD06505 9045 1F40 ~~position~~ position
✓ 5) SCD06505 9044 0006 open loop
✓ 6) SCD06505 9044 0004 close loop LVDT
17/07/08 16:50 ✓ 7) SCD06505 90557970 increase offset (17:00)
✓ 8) SCD06505 9044 0004 close loop LVDT (17:07)

9) Scan 5mm to 10mm 17:16

✓ SCD06505	9045 2710	Scan end to 10mm
✓ "	9046 1388	
✓ "	9048 0004	number of scans
✓ "	9049 0002	start scan

10) more scan

✓ SCD06505 9048 0004

~~SCD06505 9049 0002~~

11) change PID SMEC parameters + scan

✓ SCD06505	904B07D0	17:33
✓ "	904A07D0	
✓ "	904D07D0	
✓ "	9048 000A	

12) change PID SMEC parameters + scan

✓ SCD06505	904B03E8	17:39
✓ "	9048 000A	

13)

✓ SCD06505	904B07D0	17:44
✓ SCD06505	904D03E8	
✓ SCD06505	9048 000A	

14)

✓ SCD06505	904A03E8	17:48	SMEC KT parameter 2000 → 1000
✓ SCD06505	904D07D0		
✓ SCD06505	9048 000A		

15)

✓ SCD06505	904A07D0	17:55
✓ SCD06505	904B02BC	
✓ "	9048 000A	

16) SCD06505 9c4A 03E8 17:39 PUS 1-2C
SCD06505 9c48 000A

17) SCD06505 91C1 0000 18:06

Flush FIFO ox 200

SCD01505

PVS1 (3)

5.3.3 Procedure SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-R

Version	1.2
Date	10th July 2008
Purpose	SMEC (REDUNDANT) Open Loop Feed Forward Offset Test
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • SMEC PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	60 minutes
Pass/Fail criteria	Optimum SMEC Feed Forward Offset and Gain are determined

PVS1

17/07/08 20:35

Procedure Steps:

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-FFOFFSET-R.tcl	—	—	—	20:36
2	**Wait for the I-EGSE staff to confirm the success or failure of this test**	—	—	—	
3	Based on the results of this test it may be necessary to set the SMEC FF Offset manually. **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9055xxxx** → 9055 77BA • **param 2 = 0** **I-EGSE staff will supply the 16-bit parameter value xxxx to this command.**	SMECFFOFFSET	-/ - /xxxx	[illegible]	V 20:58
4	Based on the results of this test it may be necessary to set the SMEC FF Gain manually. **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9054xxxx** • **param 2 = 0** **I-EGSE staff will supply the 16-bit parameter value xxxx to this command.**	SMECFFGAIN skipped	-/ - /xxxx	[illegible]	V
5	A manual reset of the encoder signals 1 and 2 offsets may be required. If this is the case Two MANUAL commands will be required to be sent from the CCS: **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x9058xxxx** • **param 2 = 0** 0x90586976 **SPIRE_SEND_DRCU_COMMAND** • **param 1 = 0x905Axxxx** • **param 2 = 0** 0x905A9C40 **The 16 bit parameters xxxx will be provided by I-EGSE staff**	SMECENCSIG1OFF -/-/~ Commanded Value SMECENCSIG2OFF -/-/~ Commanded Value		[illegible] 20:59 20:59	

V 0x91C1 0001 → 20:46
V 0x9055 FFFF
V 0x9055 0000
V 0x9055 6000
V 0x91C1 0000 → Fp325
→ V flush FIFO 0x7000 (21:00)

SCD06505

PVS 1

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
6	**Note that it may be necessary to repeat this test to fine tune the Feed Forward Offset.** **The I-EGSE staff will need to analyse the test data before continuing the test sequence.**	—	—	—	V
Test Result (Pass/Fail): pass					

17/07/08 21:01

V SCD06 505 0x50490004 21:05

RSL (4)

5.3.8 Procedure SPIRE-IST-COLD-FUNC-SMEC-LVDT-R

Version	1.1
Date	10th July 2008
Purpose	SMEC (REDUNDANT) Backup LVDT Close Loop Check
Initial configuration	SPIRE DPU and DRCU REDUNDANT are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU REDUNDANT is booted. SMEC Encoder and LVDT are ON. SMEC is in closed loop.
Final configuration	Unchanged
Preconditions	• SPIRE DRCU REDUNDANT is switched ON • SPIRE MCU REDUNDANT is booted. • SPIRE MIB REDUNDANT is imported in the CCS database. • CCS is up and running • FUNCTIONAL TEST PARAMETERS display is selected on the CCS • **The Herschel Cryostat should be tilted horizontal**
Duration	90 minutes
Pass/Fail criteria	SMEC remains in closed loop on LVDT

Procedure Steps:

18/07/08 11:33.

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	**Manual commanding will be necessary during this test. Details to be specified.**	—	—	—	
2	**Wait for the I-EGSE staff to confirm the success or failure of this test.** **The I-EGSE staff will need to analyse the test data before continuing the test sequence.**	—	—	—	
Test Result (Pass/Fail):					

	Test Change	Curr. No.: 1.④cont. Date 17-18/07/2008 Page 1 of	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed	Reason for Change		

④ Commands sent, for. LVDT Closed Loop.

SCD06505, 91C10001. 11:33

SCD06505, 905E1F5E

SCD06505, 905F2386

SCD06505, 90451F5E

SCD06505, 90440000

SCD06505, 90440004 Open Loop 11:49.
Close loop on LVDT.

V SCD06505, 90451388 12:02

V SCD06505, 90461388

V SCD06505, 90490000

V SCD06505, 90452710

V SCD06505, 90480004.

V SCD06505, 90490002

V SCD06505, 9048000A

V SCD06505 9 1C10000 12:08

V flush_Fifo x7000

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

	Test Change	Curr. No.: 2 Date 17-18/07/2008 Page 1 of 1	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed After Step 4 of Section 7.2.5	Reason for Change Perform Gyro Calibration		

1) Because of delay in power ON (NCR-4344) it is agreed to perform Gyro calibration* in parallel with initial configuration of S/C for SMEC test.

* Test Procedure: HP-2-ASED-TP-0227

2) Step 7 of Section 7.2.5
Select monitoring mode 2 instead of 1.
Reset SCC parameters:
resetsccparams K*

Prepared by: S. HAMER	Resp. Test Leader	Project Engineer
PA/QA D. Lamonby	Prime	Customer

	Test Change	Curr. No.: 3 Date 17-18/07/2008 Page 1 of 1	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed Section 7.2.6.12 Step 1	Reason for Change Removal of Step because of tuning settings		

1) Commands I have already been included in SPIRE IEGSE procedure therefore no need to perform step:
   a) disconnect HASPIREEGSE
   b) Reconfigure IEGSE
   c) connect HASPIREEGSE

2) SPR-599. 7.2.6.12 Step 2
   Incorrect Update of SPIRE IEGSE database
   Disconnect for IEGSE again
   Reconfigure database
   Reconnect for IEGSE again
   Repeat step 2. - OK

3) Change encoder settings (Step 1 cancelled above):
   SCD06505, 0x9058A7F8
   SCD06505, 0x905A8EF8
   SCD06505, 0x90490004,
   Repeat Step 2. of 7.2.6.12

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

	Test Change	Curr. No.: 4 Date 17-18/07/2008 Page 1 of	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed 7.2.6.12 Step 2	Reason for Change VC1 @ overflow NCR-4348		

Change downlink data rate to 1.5Mbps
send command.

DC27F170

Prepared by: S. HAMER	Resp. Test Leader	Project Engineer
PA/QA D. Lamonby	Prime	Customer

	Test Change	Curr. No.: 5 Date 17-18/07/2008 Page 1 of 1	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed 7.2.6.13 before step 1	Reason for Change Set up for closed loop test		

1) Before running close loop test configure

SCD06505, 0x90490004	~~Reset~~ Reinit Encoders
SCD06505, 0x90541A60	FF Gain
SCD06505, 0x91C10001	Start MCU Science
~~RUNCU~~	
SCD06505, 0x90450000	Set Posn. SMEC.
SCD06505, 0x90490001	Move ~~EN~~ SMEC
SCD06505, 0x90490004	Reinit Encode
SCD06505, 0x90490001	Move SMEC
SCD06505, 0x91C10000	Stop MCU Science
SCD01505, 0x7000	Flush FIFO

2)

Prepared by: S. HAMER	Resp. Test Leader	Project Engineer
PA/QA (PA) J. Hall. 17/7/2008.	Prime	Customer

	Test Change	Curr. No.: 6 Date 17-18/07/2008 Page 1 of

Test designation	Test Procedure	Issue	Rev.
SPIRE SMEC Test	HP-2-ASED-TP-0217	1	3

Test step changed	Reason for Change
7.2.6.13	request for additional data

before Step 3)

SCD05505 Disable Selection 0x10

SCD06505 0x91C00000 → Stop Sampling SMEC Science frames

SCD06505 0x91C4000A → Set Sampling rate 0x4 = 4 ms

Prepared by:	Resp. Test Leader	Project Engineer
S. Ilsen	S. Ilsen	
PA/QA	Prime	Customer
(PA) J. Hall 17/7/08.		

	Test Change	Curr. No.: 7 Date 17-18/07/2008 Page 1 of 1	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed 7.2.6.13 afkr Step 3	Reason for Change ~~Recovery from Re-acquisition of WC 4348~~ setup for closed loop test		

Send DACU command

✓	SCO 0650F	0x90557850	Set SMEC to 0x7850 13:21:02
✓	"	0x90450000	set end to 0mm
✓	"	0x90490001	set scan mode parameter to 1
✓	"	0x90490004	set scan mode parameter to 4
✓	"	0x90490001	set scan mode parameter to 1
✓	"	0x90440001	SMEC loop parameter no 6 to 1

+ repeat SPIRE-IST-CAL-FUNC-SMEC-07-P.tcl

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

	Test Change	Curr. No.: 8 Date 17-18/07/2008 Page 1 of	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed ch 7.2.6.14 HP-2-ASED-SD0381 Step 23/24 → 29	Reason for Change change order of execution		

→ Send Manual command
SCD06505 → 91C10001 (start science)

→ skip Step 23

→ continue with Step 24 → 29

→ perform Step 23

→ Continue from step 30

before 26:
Manual Tc
SCD06505 or 91C1 0000
SCD01505 or 700

after step 26:
execute chapter 7.2.6.17

after step 26
Hop test → 15:30:01 / 15:30:20

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

	Test Change	Curr. No.: 9 Date 17-18/07/2008 Page 1 of	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed prior 7.2.6.38	Reason for Change might break		

execute:

SPIRE-IST-COLD-SMEC-OFF-R.tcl 21:11 UTC

(switch off SMEC)

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

	Test Change	Curr. No.: 10 Date 17-18/07/2008 Page 1 of	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed .	Reason for Change Switch on SMEC & Configure after N. Bill		

i) Switch ON SMEC; execute script:
SPIRE-IST-COLD-FUNC-SMEC-01-R.

06:17 2) Configure SMEC:

- SCD06505, 91C10001 Start MCU science
- SCD06505, 90557781 FF offset
- SCD06505, 90586978 Encoder Sig 1
- SCD06505, 905A9C40 Encoder Sig 2
- SCD06505, 91C10000 Stop MCU science
- SCD01505, 0x7000 Flush FIFO

3) Continue from step 52 of SD-0381, (section 7.2.6.38 of TP-0217)

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

	Test Change	Curr. No.: 11 Date 18/07/2008 Page 1 of 1

Test designation	Test Procedure	Issue	Rev.
SPIRE SMEC Test	TP-0217	1	3

Test step changed	Reason for Change
7.2.6.39	Tuning

1) Before start.

06:53 - SCD06505, 91C10001 Start MCU Science

- SCD06505, 9055 7A44 FF OFFSET,

- SCD06505, 90450000 Set Enc Pos

07:21

↘ SCD06505, 9049 0004 Init Encoder.

↘ SCD06505, 9054 1901. FF Gain

↘ SCD06505, 90490000 Stop Encoder

- SCD06505, 91C10000 Stop Science

- SCD01505, x7000 Flush FIFO

↘ Disconnect EEGSE

↘ Update ccs

↘ Reconnect EEGSE

2) 07:46 SCD05505, 0x10 Disable Selection

SCD06505, 91C0 0000 Stops TM10 samples ~~SMEC Sci Data~~

SCD06505, 91C4 000A Set TM14 samples to 42

3) 08:24 Repeat step 3 (due to ccs handler timeout on EEGSE)

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

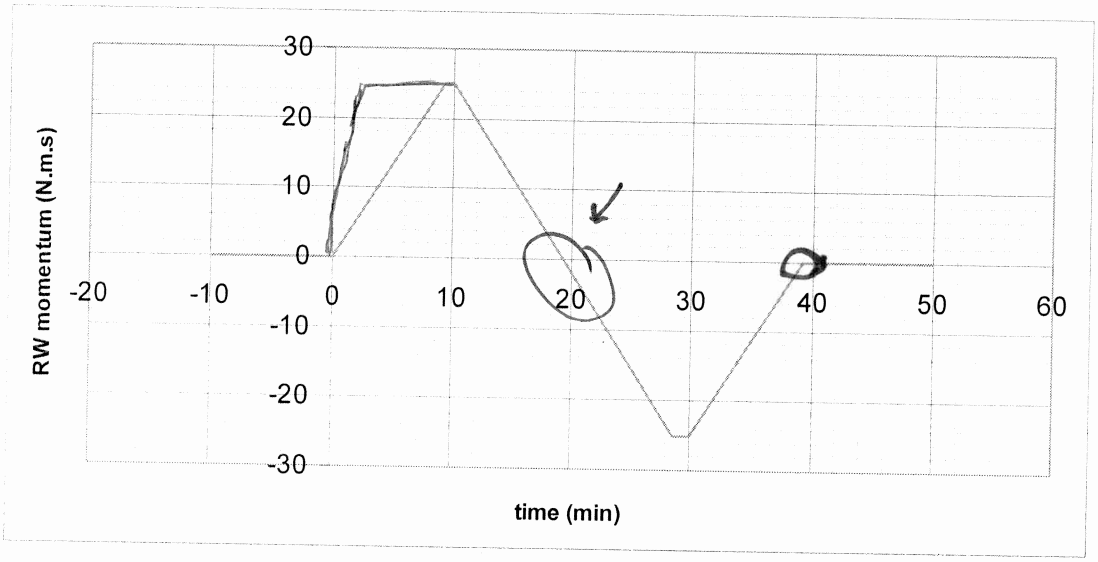

Figure A4-1: Reaction Wheel Profile Graphically

	Test Change	Curr. No.: 12 Date 17-18/07/2008 Page 10 of 13	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed End of. 7.2.6.42	Reason for Change Additional μVib Test on Redundant		

i) After tuning of the reactor wheel profile to reflect required slope (see Figure A4-1 of main procedure) repeat test without accelerometer measurement on redundant SMEC.

Perform attached sheets omitting ETS steps.

Terminate ACMS CRS BACKGROUND script to avoid interference with test

2) Due to loss of EEGSE connection terminate SPIRE_IST-SMEC-RAMP-MICROVIBRATION and reconnect SPIRE EEGSE.

09:51) Repeat step 1 of 7.2.6.15 of AVSR, p 8.

3 Terminate SPIRE-IST-SMEC-RAMP

10:48 SCD06505, 843E0000 Stop DCU
SCD06505, 91C10000 Stop MCU
SCD01505, 0x7000 Flush FIFO
SCD06505, 90490000 Reset SCD06505,90480000
SCD06505, 90450E8 Mech to 1mm
SCD06505, 90490001 Move to 1mm.
SCD01500, 80000000 Set BBD PTO

Prepared by: S HAMER	Resp. Test Leader	Project Engineer
PA/QA (PA) 18/7/08	Prime	Customer

Enter Start Date|Time:	18/07/08.	05:46	

7.2.6.16 SMEC Microvibration Pre-Test Configuration

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	ACMS Switch ON						
1	From Test Conductor Console, execute script: 'A102109SPVT003_ACMS_CONFIG25'	OK		OK		✓	
2	At the following main menu: HERSCHEL/PLANCK - MAIN MENU 1.0 - INIT PHASE ========== **1. Select/Load ACMS_CONFIG Input File** 2. Perform LAUNCH CONFIGURATION 3. On Board SW Updates 4. ACMS Power ON (in Pre-Sep configuration) 5. Modify ACC SGM/RM CONTENT (Enter sub-menu 1.1) 6. ACMS SCOE Configuration 77. JUMP to another Entry Point 88. Continue ACMS_CONFIG to menu 2.0 STBY/PRE-SEP 99. Terminate ACMS_CONFIG	Select option 1 and click OK then Continue		1, OK Continue		✓	

Enter Date/Time:	18/07/08	08:46	Sign Off:	

PVS12 p1

Enter Start Date|Time:	18/07/08	08:48	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	select the point number 1 and press the relevant button:"CONTINUE".					✓	
3	Sequence pops-up asking for the input file. Write SPIRE_UV and press OK	Write "SPIRE_UV" and press OK		SPIRE_UV OK		✓	
4	At sequence completion, the same main menu appears. *Select point number 6* **to switch on the ACMS SCOE then click OK, Continue**	Select Option 6 and click OK, Continue		6, OK Continue	ACMS SCOE is switched-on in 'executing' mode. Note: Until ACC is not fully powered-on, some WARNING ALARMS might come down in the On-Board Event History.	✓	
5	On AND YA001939 'AMCS SCOE - AS_PSEUDO 1 of 1' check that parameters: YMACT939 (ACMS SCOE state) YMASE939 (Simulator stata) YMAMS939 (MILFE state) YMAUS939 (UIFE state) Turned to: 'executing'	Parameters set to 'executing'		executing		✓	

Enter Date/Time:	18/07/08	09:09	Sign Off:	

RVS12.02

Enter Start Date|Time:	18/07/08	09:09	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
6	At sequence completion, the same main menu appears. *Select point number 4* **to switch on the ACC then click OK, Continue**	Select Option 4 and click OK, Continue		4, OK Continue	Expected Out of Limit of AEYYY109 (synchronisation). ACC may become INVALID for a short time. SPR 245: Out of Limit of HKA_ANTHx_Data	✓	
7	From a Packet History tool, select filter 'APID 512' and check that ACMS HK and ETM is correctly flowing down.	OK		OK		✓	
8	From On-Board Event History Display check that no 'NO-GO' are present.	OK		OK		✓	
9	From ACMS MASTER (ACMS_CONFIG25) sequence, move to Menu 3 (if not already there) with option 88. Click OK and then Confirm	OK		88, OK Continue		✓	
10	From ACMS_CONFIG25, Menu 3, select option 1: 'Override Separation Flag' then Click button OK and then Confirm	Select 1, then OK and Continue		1, OK Continue	ACC goes in SAM Mode	✓	

RSS 12.03

Enter Date/Time:	18/07/08	09:21	Sign Off:	

Enter Start Date|Time:	18/07/08		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
11	Sequence A102109SPVT034_ACMS_SAM_MON shall pop-up following the opening of separation straps, at prompt: 'Do you want to continue to monitor Sam Sun Pointing mode ? Enter your choice: no Then click OK	no		no	ACMS SAM Point Coarse is reached	✓	
12	From ACMS_CONFIG25 Master Sequence, Menu 4.0, select option 6 'Transition to OCM' **Click OK and then Confirm**	Select 6, then OK and Continue		6, OK Continue		✓	
13	Sequence 'A102109SPVT036_ACMS_STR_ON' shall pop-up. At prompt: 'Do You want to change current Str in Use' check if STR already selected is the correct one and answer **'no'**	no		no	STR-1 is switched ON and put in ATFAD mode	✓	
14	When scripts are completed, From ACMS synoptic check that ACC Mode is turned to: 'OCM pnt fine'	OK		OK		✓	
	~~Synchronise CCS Time~~ With ETS for Accelerometer Measurement Timing						

Enter Date/Time:	18/07/08	09:41	Sign Off:	

PVS 12+04

Enter Start Date|Time:	18/07/08		

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
15	For correlation of test results, record time of ETS Accelerometer Test Equipment and at the same time record the CCS time:						
	ETS Time (Accelerometer Measurement T.E. Clock):						
	CCS Time:						
16	If not already active request ETS to start accelerometer acquisitions as per Appendix 2						

PVS 12 p 5

Enter Date/Time:	18/07/08		Sign Off:	

Enter Start Date|Time:	18/07/08	09:41	

7.2.6.17 Reaction Wheel Operation for Variable Frequency Microvibration

This section should be performed in parallel with section 7.2.6.18 step 32. It takes approximately 40 mins to run.

Step	Reaction Wheel Activation	Nominal Value	Tolerance	Actual Value	Remark	P	N
1	From Test Conductor Console, execute script: 'A102109SPVT213_ACMS_RWL_SPIRE_uVIB'	OK		OK		✓	
2	Setup the 'TM Plotting Tool' to follow RWL spinning for the followiing monitoring parameters: AEWR1002 AEWR2002 AEWR3002 AEWR4002	OK		OK		✓	
3	At the following prompt: 'Positive Spin. Click OK' Check from ACMS Synoptic that RWL 1-2-3-4 are ON. Then Click OK to start positive spinning	Click OK		09:55 OK		✓	
	On the 'TM Plotting Tool' follow RWL positive spinning						
4	At the following prompt: 'Negative Spin. Click OK' Click OK to start negative spinning	Click OK		10:05		✓	

Enter Date/Time:	18/07/08	10:05	Sign Off:	

PUS 12 pc

Enter Start Date|Time:	18/07/08	10:25	

Step	Reaction Wheel Activation	Nominal Value	Tolerance	Actual Value	Remark	P	N
	On the 'TM Plotting Tool' follow RWL negative spinning						
6	At the following prompt: 'Click OK to spin-down RWL to 0 [Nms]' Click OK to bring RWLs to 0 [Nms]	Click OK		10:25: OK		✓	

RVS 12 pt 7

Enter Date/Time:	18/07/08	10:31.	Sign Off:	

Enter Start Date|Time:	18/07/08	09:47	

7.2.6.18 SMEC Variable Frequency Microvibration Test

The previous section (7.2.6.17) must be performed in parallel with this section step 23, which is assumed to take around 40 mins to run. Make sure that for this micro-vibration test the accelerometer acquisition has been activated before continuing.

PVS12-2

Step	Description	Parameters	Expected Values	Actual Values	Success/ Failure
1	Execute stand alone script SPIRE-IST-SMEC-RAMP-MICROVIBRATION.tcl Generate high rate MCU engineering data – we are looking for fluctuations in SMEC velocity Set SMEC continuously scanning at 0.5 mm/s (TBC) over full range Number of scans set to make this a 1 hour test **An ABORT TEST pop up should visibe on the operator screen – only press if advised by I-EGSE staff.**	N/A	N/A	N/A	✓
	When given the go-ahead from SPIRE I-EGSE Operator, perform the following step				
2	Perform Section 7.2.6.17 to start reaction wheel operation i.a.w. agreed profile (see Appendix 2)	N/A	N/A	N/A	
Test Result (Pass/Fail):					

PVS12-3

PVS12-4

Enter Date/Time:	18/07/08	10:57	Sign Off:	

Enter Start Date|Time:			

7.2.6.19 Reaction Wheel Operation for Spot Frequency Microvibration

This section should be performed in parallel with section 7.2.6.20 step 3. It takes approximately 40 mins to run.

Step	Reaction Wheel Activation	Nominal Value	Tolerance	Actual Value	Remark	P	N
1	From Test Conductor Console, execute script: 'A102109SPVT213_ACMS_RWL_SPIRE_uVIB'	OK					
2	Setup the 'TM Plotting Tool' to follow RWL spinning for the following monitoring parameters: AEWR1002 AEWR2002 AEWR3002 AEWR4002	OK					
3	At the following prompt: 'Positive Spin. Click OK' Check from ACMS Synoptic that RWL 1-2-3-4 are ON. Then Click OK to start positive spinning	Click OK					
	On the 'TM Plotting Tool' follow RWL positive spinning						
4	At the following prompt: 'Negative Spin. Click OK' Click OK to start negative spinning	Click OK					

Enter Date/Time:			Sign Off:	

PVS 12 p9

Enter Start Date|Time:			

Step	Reaction Wheel Activation	Nominal Value	Tolerance	Actual Value	Remark	P	N
	On the 'TM Plotting Tool' follow RWL negative spinning						
6	At the following prompt: 'Click OK to spin-down RWL to 0 [Nms]' Click OK to bring RWLs to 0 [Nms]	Click OK					

PVS12_p10

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:			

7.2.6.20 SMEC Spot Frequency Microvibration Test

The previous section (7.2.6.17) must be performed in parallel with this section step 3, which is assumed to take around 40 mins to run. Make sure that for this micro-vibration test the accelerometer acquisition has been activated before continuing.

Step	Description	Parameters	Expected Values	Actual Values	Success/ Failure
1	On HPCCS execute test script SPIRE-IST-SMEC-SPOT-MICROVIBRATION Generate high rate data – we are looking for fluctuations in SMEC velocity Scan SMEC at 0.1 mm/s over full range for four scans	N/A	N/A	N/A	
	The following 2 steps shall be run in parallel				
2	Perform Section 7.2.6.17 to start reaction wheel operation i.a.w. agreed profile (see Appendix 2)	N/A	N/A	N/A	
3	On HPCCS execute test script SPIRE-IST-SMEC-SPOT-MICROVIBRATION Generate high rate data – we are looking for fluctuations in SMEC velocity Scan SMEC at 0.1 mm/s over full range for four scans	N/A	N/A	N/A	
Test Result (Pass/Fail):					

RUS12-P11

Enter Date/Time:			Sign Off:	

Enter Start Date|Time:	17/07/08	12:28	

7.2.6.21 Microvibration Post-Test Configuration

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
	ACMS Switch OFF						
7.5.5.12.1	Ensure RWLs have spun down before switching OFF					✓	
7.5.5.12.2	From ACMS_CONFIG25 main menu: • **Select the point number 99** and confirm the selection pressing the relevant button "CONTINUE".	Continue	Continue	✓		✓	
7.5.5.12.3	The following menu will appear: HERSCHEL/PLANCK - MAIN MENU 9.0 - ACMS OFF PHASE ========== ***select the point number 1*** 'Switch Off ACMS' and confirm the selection pressing the relevant button "CONTINUE".	Continue	1 ✓ Continue ✓			✓	
7.5.5.12.4	Check the "ACMS_OFF" Test Sequence has been successfully ended.	OK	OK				

PVS12 p12

Enter Date/Time:	17/07/08	12:40	Sign Off:	

Enter Start Date|Time:	17/07/08	12:40	

Step-No.	Test-Step-Description	Nominal Value	Tolerance	Actual Value	Remarks	P	N
7.5.5.12.5	By the same above menu, ***select the point number 99*** to end the ACMS_CONFIG25 Master Sequence". Click OK to Confirm	OK	ok			✓	
	Re-Synchronise Time With ETS for Accelerometer Measurement Timing						
7.5.5.12.6	For correlation of test results re-record time of ETS Accelerometer Test Equipment and at the same time record the CCS time:						
	ETS Time (Accelerometer Measurement T.E. Clock):						
	CCS Time:						
7.5.5.12.7	Notify ETS that accelerometer acquisitions can be stopped						

PUS 12 913

Enter Date/Time:	17/07/08	12:41	Sign Off:	

	Test Change	Curr. No.: 13 Date 17-18/07/2008 Page 1 of 3	
Test designation SPIRE SMEC Test	Test Procedure HP-2-ASED-TP-0217	Issue 1	Rev. 3
Test step changed End of 7.2.6.42 after PVS12.	Reason for Change Missing steps from procedure		

Performing missing steps that should have been done at the end of section 7.2.6.41. (Error in SPIRE-RAL-PRC-2398 change log).

See attached sheets.

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

PVS13 p2

10:59 18/07/08.

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
5	**Set up the first set of SMEC PID parameters by executing standalone TCL script SPIRE-IST-COLD-SMEC-PID1.tcl** **Kd = 2000 (0x7D0)** **Kp = 2000 (0x7D0)** **Ki = 2000 (0x7D0)**	SMECLOOPMODE SMECKD SMECKP SMECKI	-/-/1 -/-/0x7D0 -/-/0x7D0 -/-/0x7D0	1 7D0 7D0 7D0	OK
6	**Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-07-R.tcl**	—	—	—	OK.
7	**Set up the second set of SMEC PID parameters by executing standalone TCL script SPIRE-IST-COLD-SMEC-PID2.tcl** **Kd = 1000 (0x3E8)** **Kp = 2000 (0x7D0)** **Ki = 2000 (0x7D0)**	SMECLOOPMODE SMECKD	-/-/1 0x7D0/-/0x3E8	1 3E8	OK
8	**Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-07-R.tcl**	—	—	—	OK.
9	**Set up the third set of SMEC PID parameters by executing standalone TCL script SPIRE-IST-COLD-SMEC-PID3.tcl** **Kd = 2000 (0x7D0)** **Kp = 2000 (0x7D0)** **Ki = 1000 (0x3E8)**	SMECLOOPMODE SMECKD SMECKI	-/-/1 0x3E8/-/0x7D0 0x7D0/-/0x3E8	7D0 3E8	OK.
10	**Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-07-R.tcl**	—	—	—	OK.
11	**Set up the fourth set of SMEC PID parameters by executing standalone TCL script SPIRE-IST-COLD-SMEC-PID4.tcl** **Kd = 2000 (0x7D0)** **Kp = 1000 (0x3E8)** **Ki = 2000 (0x7D0)**	SMECLOOPMODE SMECKP SMECKI	-/-/1 0x7D0/-/0x3E8 0x3E8/-/0x7D0	1 3E8 7D0	

RUS13 p3

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
12	**Execute TCL script SPIRE-IST-COLD-FUNC-SMEC-07-R.tcl**	—	—	—	OK.
13	**Reset the SMEC PID parameters to their nominal values by executing standalone TCL script SPIRE-IST-COLD-SMEC-PID-Nominal.tcl** **Kd = 700 (0x2BC)** **Kp = 2000 (0x7D0)** **Ki = 1000 (0x3E8)**	SMECKD SMECKP SMECKI	0x7D0/-/0x2BC 0x3E8/-/0x7D0 0x7D0/-/0x3E8	2BC 7D0 3E8	OK
Test Result (Pass/Fail):					

18/07/08 11:29.

END OF DOCUMENT

	Name	Dep./Comp.
	Alberti von Mathias Dr.	ASG22
	Baldock Richard	FAE12
	Barlage Bernhard	AED13
	Bayer Thomas	ASA42
	Brune Holger	ASA45
	Edelhoff Dirk	AED2
	Fehringer Alexander	ASG13
X	Fricke Wolfgang Dr.	AED 65
	Geiger Hermann	ASA42
	Grasl Andreas	OTN/ASA44
	Grasshoff Brigitte	AET12
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	Koelle Markus	ASA43
X	Koppe Axel	AED312
X	Kroeker Jürgen	AED65
X	La Gioia Valentina	Terma
	Lang Jürgen	ASE252
	Langenstein Rolf	AED15
	Langfermann Michael	ASA41
X	Maukisch Jan	ASA43
X	Much Christoph	ASA43
	Müller Jörg	ASA42
X	Müller Martin	ASA43
	Peltz Heinz-Willi	ASG13
	Pietroboni Karin	AED65
	Platzer Wilhelm	AED2
	Reichle Konrad	ASA42
	Runge Axel	OTN/ASA44
	Schink Dietmar	AED32
	Schlosser Christian	OTN/ASA44
	Schmidt Rudolf	FAE12
	Schmidt Thomas	ASA42
	Schuler Günter	ASA42

	Name	Dep./Comp.
	Schweickert Gunn	ASG22
X	Sonn Nico	ASG51
	Steininger Eric	AED32
X	Stritter Rene	AED11
	Suess Rudi	OTN/ASA44
	Wagner Klaus	ASG22
X	Wietbrock Walter	AET12
	Wöhler Hans	ASG22
	Wössner Ulrich	ASE252
X	Theunissen Martijn/Dutch Space	ASA43
X	Martin Olivier	ASA43
X	Alcatel Alenia Space Cannes	AAS-F
	Alcatel Alenia Space Torino	AAS-I
X	ESA/ESTEC	ESA
	Instruments:	
	MPE (PACS)	MPE
X	RAL (SPIRE)	RAL
	SRON (HIFI)	SRON
	Subcontractors:	
	Alcatel Alenia Space Antwerp	ABSP
	Austrian Aerospace	AAE
	Austrian Aerospace	AAEM
	BOC Edwards	BOCE
	Dutch Space Solar Arrays	DSSA
	EADS Astrium Sub-Subsyst. & Equipment	ASSE
	EADS CASA Espacio	CASA
	EADS CASA Espacio	ECAS
	European Test Services	ETS
	Patria New Technologies Oy	PANT
	SENER Ingenieria SA	SEN

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

	Name	Dep./Comp.		Name	Dep./Comp.
	Baldock Richard	FAE12		Schweickert Gunn	ASG23
	Barlage Bernhard	AED13	X	Sonn Nico	ASG51
	Bayer Thomas	ASA42		Steininger Eric	AED321
	Brune Holger	ASA45	X	Stritter Rene	AED11
	Chen Bing	HE Space		Suess Rudi	OTN/ASA44
	Davis William	Captec		Theunissen Martijn	DSSA
	Edelhoff Dirk	AED21		Vascotto Riccardo	HE Space
	Fehringer Alexander	ASG15		Wagner Klaus	ASG23
X	Fricke Wolfgang Dr.	AED 65	X	Wietbrock Walter	AET12
	Geiger Hermann	ASA42		Wöhler Hans	ASG23
	Grasl Andreas	OTN/ASA44		Wössner Ulrich	ASE252
	Grasshoff Brigitte	AET12		Zumstein Armin	AED15
X	Hamer Simon	Terma			
	Hanka, Erhard	FI522			
	Hendrikse Jeffrey	HE Space			
X	Hendry David	Terma			
	Hengstler Reinhold	ASA42			
	Hinger Jürgen	ASG23			
	Hohn Rüdiger	AED65			
	Hopfgarten Michael	AET32			
	Huber Johann	ASA42			
	Hund Walter	ASE252			
X	Idler Siegmund	AED312			
	Iványi von András	FAE12			
	Jahn Gerd Dr.	ASG23	X	ESA/ESTEC	ESA
	Jolk Matthias	AET1	X	Thales Alenia Space Cannes	TAS-F
	Klenke Uwe	ASG72		Thales Alenia Space Torino	TAS-I
	Kölle Markus	ASA43			
	König Werner	AET32			
X	Koppe Axel	AED312		**Instruments:**	
X	Kroeker Jürgen	AED65		MPE (PACS)	MPE
	La Gioia Valentina	Terma	X	RAL (SPIRE)	RAL
	Lang Jürgen	ASE252		SRON (HIFI)	SRON
	Langenstein Rolf	AED15			
	Langfermann Michael	ASA41			
	Leitermann Stefan	AET12		**Subcontractors:**	
	Liberatore Danilo	Rhea		Austrian Aerospace	AAE
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