

Subject / Title:	PFM Post Test Review "Cold Vibration"	Document No:	SPIRE-RAL-MoM-002580	Issue No:	1	Date	27 January 2006	Page 1 of 4
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Spacecraft / Project	HERSCHEL / SPIRE	Meeting Place	Telecon
Instrument / Model	SPIRE PFM	Subsystem	FPU

Participants		Agenda
<i>Print Name</i>	<i>Signature</i>	
RAL Eric Sawyer		Actions from the TRR RAL Overview of build standard. RAL Summary of activities RAL Y axis test results summary MSSL Z axis test results summary MSSL X axis test results summary MSSL Report on SMEC results CNES/LAM Anomalies (NCR 0136) Issue of test report MSSL/RAL Report on facility performance CSL Workmanship test after SMEC integration RAL/CSL/ESTEC AOB
RAL		
MSSL Berend Winter		
CSL Christophe Grodent		
LAM Dominique Pouliquen		
ESA		
ESA		
ESA Thijs van der Laan		
ESA Norbert Nikiolaizig		
CNES		
		Additional Distribution

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Action			
No	Responsibility	Due Date	
			<p>From the TRR All actions from test review closed. Test specification agreed see MOM of TRR Test procedure agreed see MOM of TRR Waivers HR-SP-RAL-RFW-006 and HR-SP-RAL-RFW-007 raised prior to the test See annex A.</p>
			<p>Build standard Full flight standard except the following: DM SMEC with 12 accelerometer channels No JFETS fitted (dummy plates to support harness) Accelerometers fitted to detector boxes and FPU Aperture cover fitted.</p>
			<p>Summary of activities Delivered to CSL 21st November See annex B for detailed planning Completed on 24th Jan</p>
			<p>Y axis test summary Resonance search, sine and random completed Not problems identified.</p>

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			<p>Z axis test summary Resonance search completed Intermediate and full level sine completed Reduction of frequency after full test ref NCR 0136 (annex C) Test stopped. Warm up and remove from cryostat. Supports changed to one stainless steel cone and two new CFRP A frames. Test repeated, sine and random</p>
			<p>X axis test summary Resonance search, sine and random completed Heavily notched to protect the SMEC during the sine test. Also notched in random.</p>
			<p>Report on SMEC results Telecon with LAM and CNES last week, they are happy with the test Next test can be run blind. SMEC unit level test levels are to be confirmed before the test Quite a lot of noise (hammering) on the mobile mass of the SMEC, no notching directly on the SMEC response. No degradation of the SMEC signatures and no indication of gap changes on the launch latch. Detailed inspection of the mechanism to be carried out by LAM.</p>
			<p>Issue of test report Estimate for completion of SPIRE test report 20/2/05 CSL test report will be issued next Week</p>
			<p>Report on facility performance No problems to report Cooldown rates and Delta Ts were observed.</p>

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			<p>SPIRE would like to thank CSL for there professional and helpful approach to this test campaign. ESA expressed a similar sentiment.</p>
			<p>Workmanship test after SMEC integration Planning may be difficult May could be a preferred slot for SPIRE. Bellows would probably not be changed for a single axis test.</p>
			<p>Conclusions. A successful test campaign has been completed. All data has been received from CSL and is of good quality. If any further data is required Berend will contact CSL</p> <p>Thanks to all involved in the test campaign.</p>

RFW/RFD Number: **HR-SP-RAL-RFW-006.1**

Spacecraft / Project	HERSCHEL	Originator's Name	Eric Sawyer	
System / Experiment / Model	SPIRE / PFM	Signature / Date	18/11/05 issue .1 23/11/05	
Sub-System	FPU cryo-vibration test	Request Type (Highlight applicable request)	Waiver (RFW)	Deviation (RFD)
Assembly		Organisation		
Sub-Assembly		Ref. Doc. / Drwg No.		
Item		References		
Serial No.				

RFW/RFD Title	Cryo-vibration test, to reduce levels after 1000 cycles
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End Items(s) Affected (Hardware, Software)				
Name	CI-Number	Model(s)		
FPU		PFM		
Requirement / Interface Documents Affected				
Specification/Drawing Title	Number	Issue	Date	App. Paragraph
IID-A	SCI-PT-IIDA-04624	3.3	30/6/04	9.5.3.3.2
Description of Deviation / Discrepancy / Non-Conformance				
<p>To avoid fatigue induced effects in the FPU mounting feet, it is requested to limit the number of cycles during the high level sine test. It is proposed to limit the levels once 1000 cycles have been reached in each axis. For X axis at 66 Hz reduce from 14.4 g to 6.4 g to For Y and Z axis at 66 Hz reduce from 6.4 g to 4.8 g</p>				
Other Items or Requirements (Potentially) Affected				
Need for RFW/RFD and Rationale for Acceptance				
<p>The FPU is supported on CFRP legs as are the internal detector boxes. These items could be susceptible to fatigue induced failure. The reduction in the number of cycles will minimise this risk.</p>				

	Name	Approved (Sign & Date)	Rejected (Sign & Date)
Engineering:	Eric Sawyer		
Product Assurance:	Eric Clark		
CCB-Chairman:			
Principle Investigator			
Product Assurance:			
Co-Investigator			
Prime Contractor			
ESA Project Office			

RFW/RFD Number: HR-SP-RAL-RFW-007.1

Spacecraft / Project	HERSCHEL	Originator's Name	Eric Sawyer	
System / Experiment / Model	SPIRE /	Signature / Date	18/11/05 Issue .1 23/11/05	
Sub-System	FPU Cryo-vibration test	Request Type (Highlight applicable request)	Waiver (RFW)	Deviation (RFD)
Assembly		Organisation		
Sub-Assembly		Ref. Doc. / Drwg No.		
Item		References		
Serial No.				

RFW/RFD Title	Cryo-vibration test, to increase the high frequency roll off slope during random test
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End Items(s) Affected (Hardware, Software)				
Name	CI-Number	Model(s)		
FPU		PFM		
Requirement / Interface Documents Affected				
Specification/Drawing Title	Number	Issue	Date	App. Paragraph
IID-A	SCI-PT-IIDA-04624	3.3	30/6/04	9.5.3.4
Description of Deviation / Discrepancy / Non-Conformance				
To avoid potential damage to some subsystems during the random cryo-vibration test it is requested that the high frequency roll off is changed from -7dB/oct to -12dB/oct				
Other Items or Requirements (Potentially) Affected				
Need for RFW/RFD and Rationale for Acceptance				
Some subsystems have been shown to be sensitive to high frequency random vibration, so this reduction is designed to minimise the danger during instrument level tests. The system level analysis indicated that there are very low levels seen by SPIRE at high frequency.				

	Name	Approved (Sign & Date)	Rejected (Sign & Date)
Engineering:	Eric Sawyer		
Product Assurance:	Eric Clark		
CCB-Chairman:			
Principle Investigator			
Product Assurance:			
Co-Investigator			
Prime Contractor			
ESA Project Office			

CSL manning plan PFM	Issue 9	27/01/2006
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Date	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov	01-Dec	02-Dec
Activity	Arrive at CS	integration	TRR	Shrouds	cooldown	cooldown	cooldown	cool	vibration	axis chang	vibrate am	warm up
	Unpack	low level	Shrouds	pump						vibrate pm		
Support	Alan Pearce	Alan Pearce	Alan	None	Berend Wint	Chris BB	CBB	CBB	Berend Wint	Berend	Berend	Locke Sper
	Eric Sawyer	Eric Sawyer	Eric						Eric	Eric	Eric	arrives am

Date	03-Dec	04-Dec	05-Dec	06-Dec	07-Dec	08-Dec	09-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec
Activity	warm up	warm up	warm up	NRB	integration w	close cryo			Pump	cool	cool	Cool
			dismount									
Support	Locke	Locke	Dave Smith	Dave	Dave	Dave	None	None		John Coke	John	Berend
		leaves pm	arrives late ar	Alan	Alan	Alan						

Date	15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec	21-Dec	22-Dec	23-Dec	24-Dec	25-Dec	26-Dec
Activity	vibration	warm	warm	warm	store in cryostat to after Christmas holiday							
Support	Berend	Eric Clark	Eric Clark	Eric Clark								

Date	27-Dec	28-Dec	29-Dec	30-Dec	31-Dec	01-Jan	02-Jan	03-Jan	04-Jan	05-Jan	06-Jan	07-Jan
Activity	store in cryostat to after Christmas holiday									Open cryos	CSL activit	CSL activiti
										remove SPIRE		
Support										Alan	none	none
										Olly		

Date	08-Jan	09-Jan	10-Jan	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan
Activity	CSL activities	CSL activities	CSL activities		close chamber	cool	cool	cool	X axis vibrate	X axis Vibrate	warm	warm
Support	none	none	none	refit SPIRE Alan	start cooling Eric	Eric	Eric	Eric	Berend	Berend	Tim Froud	Tim
				TBD								

Date	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan	31-Jan
Activity	warm			Remove shrouds	remove SPIRE Packing	Transport						
Support	none			None	Alan	MSSL						

NCR Number: HR-SP-RAL-NCR-136

Spacecraft / Project	Herschel / SPIRE	Originator's Name	Eric Sawyer	
Experiment / Model	SPIRE / PFM	Signature		
Sub-System	FPU	Date	5 th December 2005	
Assembly		Level (Highlight if applicable)	Major	Minor
Sub-Assembly				
Item		NRB Reference		
Serial Number				

NCR Occurred During (Highlight if applicable)	Manufacture	Inspection	Test	Integration	Other
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NCR Title	Cryo-vibration test Z axis
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NCR Description	
After the high level sine test in the Z axis, the post test resonance search indicated a 20% drop in the frequency of the first mode.	
Cause of NCR	
Detailed inspection of the FPU is required before the cause can be confirmed. It is likely to be damage to the CFRP mounting cone for the following reasons. Y axis test results appear to be ok with not indication of damage. Z axis excitation applied more load to the cone then testing in Y axis.	
Disposition / Corrective Action	
Inspection first then decide on course of action, options are: <ul style="list-style-type: none"> Stop test and return SPIRE to RAL for further assessment/possible redesign of mounts. Replace CFRP cone with stainless steel cone which has already been qualified, and continue test – repeat Z axis test then do X axis. 	
Document or Drawing Affected (Title, Number & Issue)	Estimated COST OF NCR (cost of : correction, Materials, Resource, and delay to Project etc.)

NCR CLOSED	Name	Sign & Date	
		Approved	Rejected
Project Manager	Eric Sawyer		
Product Assurance:	Eric Clark		
CCB-Chairman:			
Principle Investigator			
Product Assurance:			
Co-Investigator			
Prime Contractor			
ESA Project Office			