

SPIRE

**SUBJECT: Cold vibration test procedure
CQM**

PREPARED BY: E Sawyer

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SPIRE

Project Document

Cold vibration test procedure

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Distribution

Change Record

ISSUE	DATE	
1	10/3/04	New issue
2	26/3/04	Modifications noted during TRR. Times added Torques added Accelerometer locations added Temperature sensor locations added
3	30/3/04	Intermediate level sine and random were optional, now mandatory

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Glossary

SPIRE Spectral and Photometric Imaging REceiver

References

Applicable Documents

No	Document	Ref
AD1	SPIRE cold vibration test plan	SPIRE-RAL-PRC-001955

Reference Documents

1. SCOPE

This document describes the detailed procedure to be followed during the cold vibration testing on the FPU to be carried out at CSL, Liege.

It should be used in conjunction with AD1

2. ACCELEROMETER ALLOCATION

Channel No	Location	Code	Axis
F66	Photometer detector (side)	PHS.XY	X and Y
F72	Photometer detector (side)	PHS.Z	Z
F58	Photometer detector (end)	PHE.XY	X and Y
F56	Cooler	COOL	X
F73	FPU top of optics bench over cone	FPUX	X
F71	FPU top	FPUY	Y
F63	FPU top	FPUZ	Z
F51	Spectrometer detector	SPECX	X
F52	Spectrometer detector	SPECZ	Z
F53	Spectrometer detector	SPECY	Y
F61	Optics bench near SMEC	OBY	Y
F54	SMEC moving carriage	SMECLX	X
11030	Cold tip	CTIPY	Y
11606	SMEC top	SMECUX	X

3. TEMPERATURE SENSOR LOCATIONS

Sensor number	Location	CODE	
1	RF filter	RF	
2	Spectrometer 2K	SPEC	
3	Photometer 2K	PHOT	
4	Optical sub bench	OPSB	
5	Input baffle	BAF	
6	BSM/SOB interface	BSM	

4. STEP BY STEP TEST SEQUENCE RECORD

No	Activity	Time	Date	Comments	Resp.
1	Test preparation				
1.1	Unpacking from container: As per AD1 Store container until the end of the test	3 hrs	29/3/04		
1.2	Visual inspection of the FPU Cover with cover provided while awaiting integration Accelerometers and temperature sensors will be fitted before delivery.	2 hrs		Record any anomalies	
2	Vibration Test in TBD axis				
2.1	Test preparation Assuming test adaptor is fitted to the shaker Fit FPU and JFETs to test adaptor in accordance with AD1	3 hrs			

	<p>Check torque of mounting feet</p> <p>8.1 Nm plus running torque for M6 8.25 plus running torque or M8 Kaylock nut. 2.1 Nm for the JFET bolts. 2.5 nm for the L3 straps to JFETS</p> <p>Remove MGSE</p> <p>Connect accelerometers carry out continuity check.</p> <p>Connect temperature sensors</p> <p>Note These sensors do not record accurate temperatures at room temperature. Accurate only below 40K.</p> <p>Individual calibration curves will be supplied by SPIRE</p> <p>Carry out very low level test in ambient 0.2g max.</p> <p>Note The Kevlar suspended detectors will not tolerate significant levels when warm. This test is to verify the instrumentation only.</p> <p>Shrouds installation, connection of pumps and fluid lines</p>	<p>½ hrs</p> <p>½ hrs</p> <p>½ hrs</p>			
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2.2	TRR	4 hrs	30/304		
2.2	<p>Evacuation</p> <p>Monitor pressure during evacuation and check for consistence with evacuation rate requirement in AD1</p> <p>Note pressure values or attach record</p>		01/4/04		
2.3	<p>Cool down</p> <p>Monitor temperature sensor during cool down and check for consistence with cool down requirements in AD1</p> <p>Note Temperature or attach temperature record of temperature sensors</p>		03/04/04		
2.4	Test readiness review				

	Check results				
2.9	Resonance search Carry out resonance search as before Compare with previous results				
2.10	Low level Random test test to AD1 at -12dB Check results				
2.11	Intermediate level Random test				

	test to AD1 at -6dB Check results				
2.12	Qualification level random test Carry out test to AD1 Check results				
2.13	Resonance search Cary out resonance search as before				

	Compare with previous results				
2.14	Post test analysis Check completeness of data Carry out initial assessment				

3.	Test in TBD axis			
3.2	Evacuation if required Monitor pressure during evacuation and check for consistence with evacuation rate requirement in AD1 Note pressure values or attach record			
3.3	Cool down if required Monitor temperature sensor during cool down and check for consistence with cool down requirements in AD1 Note Temperature or attach temperature record of temperature sensors			
3.4	Test readiness review			

3.9	Resonance search Cary out resonance search as before Compare with previous results			
3.10	Low level Random test test to AD1 at -12dB Check results			
3.11	Intermediate level Random test test to AD1 at -6dB Check results			

3.14	Post test analysis Check completeness of data Carry out initial assessment			
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4	TBD axis test			
4.2	Evacuation if required Monitor pressure during evacuation and check for consistence with evacuation rate requirement in AD1 Note pressure values or attach record			
4.3	Cool down if required Monitor temperature sensor during cool down and check for consistence with cool down requirements in AD1 Note Temperature or attach temperature record of temperature sensors			
4.4	Test readiness review			

4.9	Resonance search Carry out resonance search as before Compare with previous results			
4.10	Low level Random test test to AD1 at -12dB Check results			
4.11	Intermediate level Random test test to AD1 at -6dB Check results			

4.14	Post test analysis Check completeness of data Carry out initial assessment			
5	Post Test Activities • check completeness of test data • Warm up Monitor temperature sensor during warm up and check for consistence with cool down requirements in AD1 Note Temperature or attach temperature record of temperature sensors			

Venting

Monitor pressure during venting and check for consistence with evacuation rate requirement in AD1

Note pressure values or attach record

Open cryostat.

dismounting of shrouds

- Visual inspection of test specimen
- Removal of instrument (TBC) and cleanliness inspection with UV light

- Installation of the instrument inside its own container in accordance with AD1

6	Post Test Review			
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