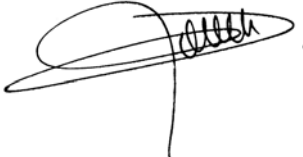



Herschel – SPIRE

Acceptance Data Package

Spectrometer MECHANISM Subsystem CQM (SMEC FM)

Fichier: LAM.SSP.SPI.ADP.060630_01_11_AD P SMEC FM.doc

Prepared By :	Signature
<p>Gérard ROUSSET PA/QA Date : 24/07/2006</p>	
Approved by:	Signature
<p>Dominique Pouliquen Date : 24/07/2006</p>	

Distribution List

Institut	Name	Issue/Revision									
		D-	1/0	1/1							
CNES	Blanc Y.										
CNES	Mercier K.			X							
RAL	Griffin M.J.										
RAL	King K.J.										
RAL	Sawyer E.		X	X							
RAL	Swinyard B.M.										
CEA	Auguères J.L.										
CEA	Cara C.										
CEA	Tourrette T.										
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LAM	Dargent P.										
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LAM	Malina R.										
LAM	Moreaux Gabriel										
LAM	Origné A.										
LAM	Pouliquen D.		X	X							
LAM	Rousset G.		X	X							
LAM	Travers B.										

List of Acronyms

	Signification
AD	Applicable Document
ADC	Analog to Digital Converter
BSM	Beam Steering
CCAP	Cahier des Clauses Administratives Particulières
CCTP	Cahier des Clauses Techniques Particulières
CEA-Sap	Commissariat à l'Energie Atomique – Service d'Astrophysique
CNES	Centre National d'Etudes Spatiales
CNRS	Centre National de la Recherche Scientifique
DAC	Digital to Analog Converter
DIL	Dual In Line
DPU	Data Process Unit
DSP	Digital Signal Processor
EPROM	Erasable Programmable Read-Only Memory
ESA	European Space Agency
FDP	Carte Fond De Panier
FM	Flight Model
FPGA	Field Programmable Gate Array
FS	Flight Spare Model
IFSI	Inst. Di Fiscia dello Spazia Interplanetario
IID	Instrument Interface Document
INSUE	Institut National des Sciences de l'Univers et de l'Environnement
LAM	Laboratoire d'Astrophysique de Marseille
LVDT	Linear Voltage Differential Transducer
MAC	Multi Axis Controller
MCU	Mechanisms Control Unit
PROM	Programmable Read-Only Memory
QM	Qualification Model
SMEC	Spectrometer MEChanism subsystem
SMECm	Spectrometer MEChanism – mechanism
SPIRE	Spectral and Photometric Imaging Receiver
STBE	Spécification Technique de Besoin d'Essai
SVM	SerVice Module
TBC	To Be Confirmed
TBD	To Be Defined
VHDL	Very high speed integrated circuit Hardware Description Language

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1. Shipping Documents, deliverable list

The delivered part is the Flight Model (FM) of the Spectrometer MeChanism Subsystem (SMEC) dedicated to the spectrometer channel of the SPIRE instrument

1.1 Pro-format invoice

See following page

1.2 Deliverable list

The deliverable items are the following:

⇒ **White container**

- ✓ One external wooden container, dimensions: 750 x 750 x 500 mm
- ✓ One internal aluminium container dimensions: 450 x 350x 300 mm
- ✓ One dedicated SMEC FM mechanical support frame (Integrated inside the internal container)
- ✓ SMEC FM and its attachment screws dedicated to the transport only
- ✓ One SMEC FM Acceptance Data Package reference : LAM.SSP.SPI.ADP.060630_01

2. Transportation, Handling and Installation Procedures

The mechanism is delivered on an aluminium transportation frame which is integrated and attached on the baseplate of the internal container. This aluminium frame has a flatness compatible with the SMEC requirements.

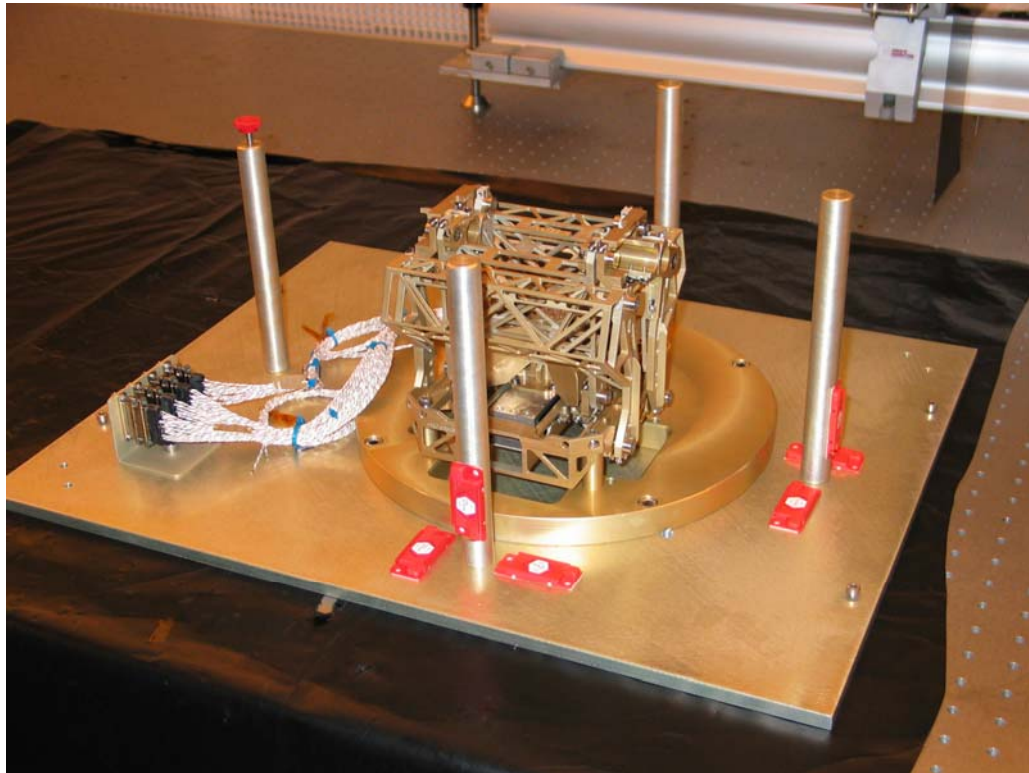


Figure 1 : For example, the SMEC CQM integrated on its transportation frame

List of provided procedures:

Procedure title	Reference
Instructions for SMEC bench geometry control tool	LAM.MEC.SPI.NOT.040330_01_11
Process for mounting and dismounting the SMEC in a dedicated container	LAM.MEC.SPI.PRC.040714_01_12
Process for SMEC mechanism mounting on a test or a transport bench	LAM.MEC.SPI.PRC.040902_01_10
Process for SMEC mech. mounting procedure on the SOB	LAM.MEC.SPI.PRC.040901_01_10
Procedure for grinding the four SMEC pads on the SOB	LAM.SSP.SPI.PRC.060704_01_10
SMEC Electrical handling procedure	LAM.SSP.SPI.PRC.060724_01_10

Table 1 : List of provided integration procedure

3. Certificate of Conformance / Delivery review board MoM / AI list

Item : SPIRE Mirrors	CONFORMANCE	Doc. No :
Model : FM		

CERTIFICATE OF CONFORMANCE

Herewith is certified that the delivered SMEC which will be used for the STM model of the SPIRE instrument, complies with the following documents :

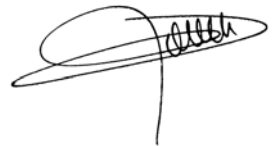
- Spectrometer mechanism Specification Ref: **LAM.PJT.SPI.SPT.040909_01 Iss1 Rev 0**
- SMEC ICD Ref: **LAM.SSP.SPI.DCI.040611_01 Iss 1 rev 1**

With the exception of the agreed NCR listed in the Section 16 of this ADP



SPIRE Project Manager at LAM

_____²
D. Pouliquen



SPIRE Product Assurance manager at LAM

G. Rousset

Date:

4. Qualification status list / Test matrix

The tests implemented for the qualification of the mechanism are listed in the table here after.

The mechanism has been qualified in vibration with the development model (DM). The thermal qualification was obtained with the FM.

Test/verification	Performed	Report reference	Status	Comments
QUALIFICATION				
Low level sine @ 300K	YES	LAM.PJT.SPI.NOT.050630_01 Iss1 rev 0	Delivered	(DM)
Sine @ 300K	YES	LAM.PJT.SPI.NOT.050630_01 Iss1 rev 0	Delivered	Qualification Level (DM)
Random vibrations @ 300K	YES	LAM.PJT.SPI.NOT.050630_01 Iss1 rev 0	Delivered	Qualification Level (DM)
Functional test @ 300K	YES	LAM.PJT.SPI.PR.V.060726_01 Iss1 rev 0	Delivered	Qualification (FM) (1)
Life test	NO			To be performed on the DM
ACCEPTANCE				
Low level sine @ 300K FM	YES	LAM.PJT.SPI.PR.V.060627_01 iss1 rev 0	Delivered	Acceptance Level (FM)
Sine @ 300K	YES	LAM.PJT.SPI.PR.V.060627_01 iss1 rev 0	Delivered	Acceptance Level (FM)
Random vibrations @ 300K	YES	LAM.PJT.SPI.PR.V.060627_01 iss1 rev 0	Delivered	Acceptance Level (FM)
Low level sine at 20K	YES	LAM.PJT.SPI.PR.V.060627_01 iss1 rev 0	Delivered	Acceptance Level (FM)
Sine @ 20K	YES	LAM.PJT.SPI.PR.V.060627_01 iss1 rev 0	Delivered	Acceptance Level (FM)
Random vibrations @ 20K	YES	LAM.PJT.SPI.PR.V.060627_01 iss1 rev 0	Delivered	Acceptance Level (FM)
Functional test @ 300K	YES	LAM.PJT.SPI.PR.V.060726 Iss1 rev 0	Delivered	Thermal Qualification (1)
Functional test @ 20K	YES	LAM.PJT.SPI.PR.V.060726 Iss1 rev 0	Delivered	(FM) (1)

Table 2: FM test and verification matrix

(1) Report is given in "Performance test report" LAM.PJT.SPI.PR.V.060726 Iss1 rev 0 see section 25

5. Top level Drawings

The drawing list, corresponding to the SMEC FM configuration, is given here after.

Reference	Ind	Sheet	Title	Number of parts
SPI-MEC-00-D0-01	A	1/1	Smec assy	
SPI-MEC-00-D0-02	A	1/1	Static sub-assy	
SPI-MEC-00-D0-03	A	1/1	Carriage sub-assy	
SPI-MEC-00-D0-04	A	1/1	Guidance sub-assy	
SPI-MEC-10-DD-01	H	1/3	Structure de base	1
SPI-MEC-10-DD-01	H	2/3	Structure de base	
SPI-MEC-10-DD-01	H	3/3	Structure de base	
SPI-MEC-10-DD-03	C	1/1	Butee de plaque mobile	1
SPI-MEC-10-DS-01	B	1/2	Structure de base - traitement de surface	
SPI-MEC-10-DS-01	B	2/2	Structure de base - traitement de surface	
SPI-MEC-10-DS-02	A	1/1	Structure de base - usinage des pinces	
SPI-MEC-10-DS-04	A	1/1	Montage goupille verticale/butee de plaque mobile	
SPI-MEC-21-DD-01	C	1/1	Cadre interne	2
SPI-MEC-21-DD-02	B	1/3	Cadre externe	2
SPI-MEC-21-DD-02	B	2/3	Cadre externe	
SPI-MEC-21-DD-02	B	3/3	Cadre externe	
SPI-MEC-22-DD-01	B	1/1	Structure supérieure	2
SPI-MEC-24-DD-01	D	1/1	Poulie interne droite	1
SPI-MEC-24-DD-02	D	1/1	Poulie interne gauche	1
SPI-MEC-24-DD-03	C	1/1	Poulie externe droite	1
SPI-MEC-24-DD-04	C	1/1	Poulie externe gauche	1
SPI-MEC-24-DD-05	C	1/1	Courroie	4
SPI-MEC-24-DD-06	A	1/1	Bride de courroie	2
SPI-MEC-24-DD-07	B	1/1	Bride de courroie rainuree	2
SPI-MEC-24-DD-08	A	1/1	Bride de courroie chanfreinee	4
SPI-MEC-30-DD-01	G	1/5	Plaque mobile	1
SPI-MEC-30-DD-01	G	2/5	Plaque mobile	
SPI-MEC-30-DD-01	G	3/5	Plaque mobile	
SPI-MEC-30-DD-01	G	4/5	Plaque mobile	
SPI-MEC-30-DD-01	G	5/5	Plaque mobile	
SPI-MEC-30-DD-03	B	1/1	Goupille verrouillage vertical	1
SPI-MEC-30-DD-06	C	1/1	Cadre verrou latéral av	1
SPI-MEC-30-DD-07	E	1/1	Verrou latéral ar	1
SPI-MEC-30-DD-09	A	1/1	Butée verticale av	2
SPI-MEC-30-DS-05	A	1/1	Montage collage bague mobile latch	
SPI-MEC-40-DD-01	D	1/1	Roof top	1
SPI-MEC-50-DD-01	C	1/1	Cale moteur lineaire	4

Reference	Ind	Sheet	Title	Number of parts
SPI-MEC-51-DO-01	C	1/1	Actuateur lineaire assemble	
SPI-MEC-51-DD-01	F	1/1	Actuateur lineaire – bout	2
SPI-MEC-51-DD-02	G	1/1	Actuateur lineaire – flasque	2
SPI-MEC-51-DD-03	D	1/1	Actuateur lineaire – noyau	1
SPI-MEC-51-DD-04	A	1/1	Actuateur lineaire – aimant bls	2
SPI-MEC-51-DD-05	B	1/1	Vis centreuse	2
SPI-MEC-51-DD-06	A	1/1	Goupille verrouillage lateral ar	1
SPI-MEC-51-DD-07	A	1/1	Goupille verrouillage lateral av	1
SPI-MEC-51-DD-08	D	1/1	Mat de verrouillage lateral av	1
SPI-MEC-51-DD-09	C	1/1	Bride de verrouillage lateral ar	1
SPI-MEC-51-DS-01	B	1/1	Montage goupille verrouillage lateral av	
SPI-MEC-51-DS-02	B	1/1	Montage goupille verrouillage lateral ar	
SPI-MEC-51-DS-03	A	1/1	Traitement peinture - bout	
SPI-MEC-51-DS-04	A	1/1	Traitement peinture - flasque sup	
SPI-MEC-51-DS-05	A	1/1	Traitement peinture - flasque inf	
SPI-MEC-51-DS-06	A	1/1	Flasque - contrôle	
SPI-MEC-51-DS-07	A	1/1	Bout - contrôle	
SPI-MEC-51-DS-08	A	1/1	Noyau - contrôle	
SPI-MEC-52-DD-01	D	1/1	Bobine actuateur -flasque ext	2
SPI-MEC-52-DD-02	C	1/1	Bobine actuateur -plaque	2
SPI-MEC-52-DD-03	A	1/1	Bobine actuateur assemblee	
SPI-MEC-52-DD-04	D	1/1	Bobinage actuateur	
SPI-MEC-60-DD-01	B	1/1	Cavalier lateral regle optique	2
SPI-MEC-60-DD-02	A	1/1	Bouchon de tete optique	1
SPI-MEC-60-DD-04	A	1/1	Plot invar colle sur regle	1
SPI-MEC-60-DD-05	A	1/1	Chapeau alu (collage regle)	1
SPI-MEC-60-DD-06	A	1/2	Cale rehausse tete optique	1
SPI-MEC-60-DS-01	A	1/1	Regle optique – depolissage	1
SPI-MEC-60-DS-02	C	1/1	Reprise d'usinage tete capteur optique	1
SPI-MEC-60-DS-03	A	1/1	Reprise d'usinage capot capteur optique	1
SPI-MEC-60-DS-04	A	1/1	Cavalier heidenhain de regle optique	1
SPI-MEC-70-DD-01	G	1/1	Berceau lvdt	1
SPI-MEC-70-DD-03	B	1/1	Rallonge noyau lvdt	2
SPI-MEC-70-DD-04	C	1/1	Guide noyau lvdt	2
SPI-MEC-70-DD-06	A	1/1	Noyau lvdt	2
SPI-MEC-70-DS-01	C	1/1	Usinage rallonge-noyau-guide lvdt	
SPI-MEC-70-DS-02	A	1/1	Reprise alesage bobine hrm 100	2
SPI-MEC-80-DD-04	D	1/1	Bague mobile latch	1
SPI-MEC-80-DD-05	B	1/1	Axe de verrouillage latch	1
SPI-MEC-80-DS-05	B	1/1	Montage axe de verrouillage latch	
SPI-MEC-81-DO-01	D	1/1.	Ensemble latch	

Reference	Ind	Sheet	Title	Number of parts
SPI-MEC-81-DD-01	E	1/1	Latch – support de bobinage principal	1
SPI-MEC-81-DD-03	E	1/1	Latch – reprise noyau mobile	1
SPI-MEC-81-DD-04	A	1/1	Latch – ressort insert	1
SPI-MEC-81-DD-05	A	1/1	Latch – bls magnet	2
SPI-MEC-81-DD-06	A	1/1	Latch – corps	1
SPI-MEC-81-DD-09	B	1/1	Latch – support aimant	1
SPI-MEC-81-DD-11	D	1/1	Latch – vis alu	1
SPI-MEC-81-DD-12	E	1/1	Latch – ecrou de compression ressort	1
SPI-MEC-81-DD-13	B	1/1	Latch – palier de guidage	1
SPI-MEC-81-DD-14	E	1/1	Latch – capot	1
SPI-MEC-81-DD-15	B	1/1	Equerre support latch	1
SPI-MEC-81-DD-16	A	1/1	Bague fixe equerre latch	1
SPI-MEC-81-DD-17	A	1/1	Rondelle de compensation cuvette	1
SPI-MEC-81-DD-18	B	1/1	Reprise noyau fixe	1
SPI-MEC-81-DD-19	A	1/1	Serre fils bobine latch	1
SPI-MEC-81-DD-20	A	1/1	Rondelle de compensation fixation inf latch	2
			Sur structure de base	
SPI-MEC-81-DD-21	A	1/1	Pastille capteur magneto resistif	1
SPI-MEC-81-DS-02	A	1/1	Traitement surface vis alu	
SPI-MEC-90-DD-01	E	1/2.	Support de carte c.i.	1
SPI-MEC-90-DD-01	E	2/2	Support de carte c.i.	
SPI-MEC-90-DD-02	A	1/1	Entretoise serre-cables	1
SPI-MEC-90-DD-03	A	1/1	Serre-cables	1
SPI-MEC-90-DD-04	A	1/1	Cavalier 2 – cables bobine	1
SPI-MEC-90-DD-05	A	1/1	Cavalier 1 – cables bobine	1
SPI-MEC-90-DD-06	A	1/1	Cavalier cables entree structure base	1
SPI-MEC-90-DD-07	A	1/1	Cavalier cables lvdt	2
SPI-MEC-90-DD-08	A	1/1	Bride pour cables dans goulotte	2
SPI-MEC-90-DD-09	A	1/1	Cavalier sonde temperature	2
SPI-MEC-90-DD-10	A	1/1	Bride fils sortie bobine	1
SPI-MEC-90-DD-11	A	1/1	Entretoise cavalier sonde temperature	1
SPI-MEC-90-DD-12	A	1/1	Bride serre cables ar	1

Table 3 : List of drawings

6. Interface drawing

6.1 Mechanical Interface control drawings

Title	Reference
MICD SMEC ASS'Y (- 8mm location)	SPI-MEC-00-DI-02-F F1
MICD SMEC ASS'Y (+ 32 mm location)	SPI-MEC-00-DI-02-F F2

Table 4 : List of Interface drawings

See the drawings at the following sheet

6.2 Electrical Interface drawings

6.2.1 SMEC Harness definition

The SMEC harness definition is given here after

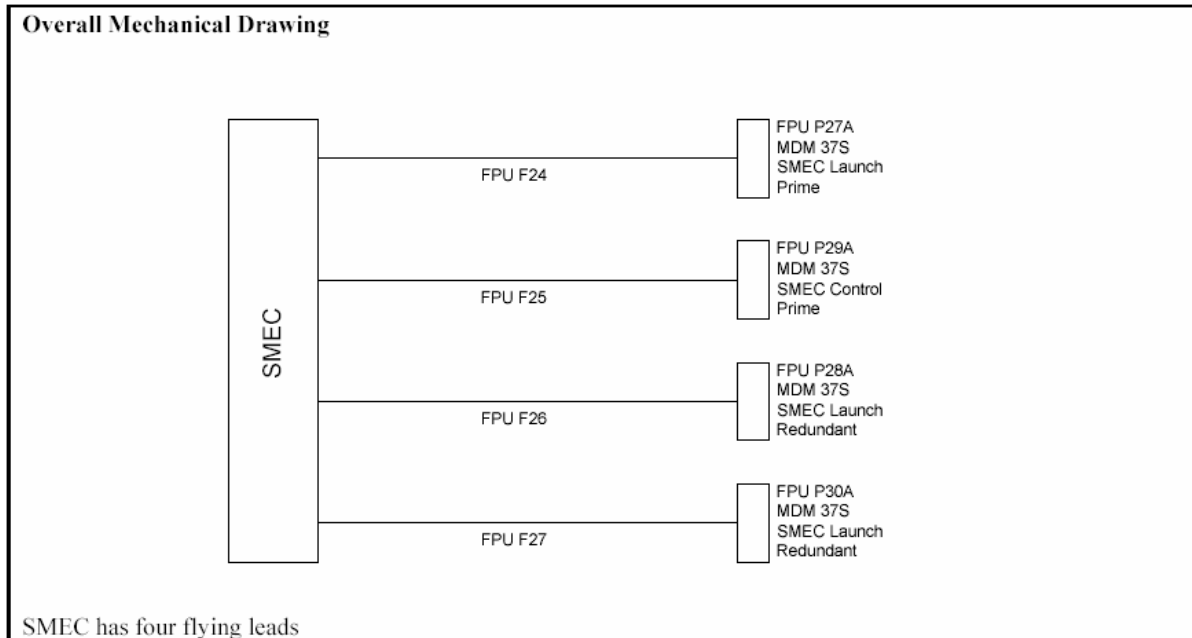


Figure 2: SMEC Harness definition

6.2.2 Pin allocation

6.2.2.1 Prime

6.2.2.1.1 Connector HSFPJ_J29

Prime connector # 1 (I/F with RF filter box / J29A)

Identification : HSFPJ_J29, located on the cable of SMECm

Type : MDM 37S

Functions : motor (3 STP), encoder (8 STP), 11 screens

37 way FPU_J29	Signal function	Signal name	Max. current	Wire type
1	SMEC drive coil I+	S_Mot_Coil_P	100 mA	Insulated STP
2	SMEC drive coil I-	S_Mot_Coil_N	100 mA	
20	SMEC drive coil shield	S_Mot_Coil_Shd	N/A	
4	SMEC drive coil supply sense	S_Mot_Bemf_P	10 µA	Insulated STP
5	SMEC drive coil return sense	S_Mot_Bemf_N	10 µA	
23	SMEC drive coil supply sense shield	S_Mot_Bemf_Shd	N/A	
7	SMEC position sensor Led power supply	LEDA	1 mA	Insulated STP
8	SMEC position sensor Led power return	LEDC	1 mA	
26	Shield	LED_Shd	N/A	
10	SMEC position sensor photodiode #1 I+	IPD1A	20 µA	Insulated STP
11	SMEC position sensor photodiode #1 I-	IPD1C	20 µA	
29	Shield	IPD1_SHD	N/A	
13	SMEC position sensor photodiode #2 I+	IPD2A	20 µA	Insulated STP
14	SMEC position sensor photodiode #2 I-	IPD2C	20 µA	
32	Shield	IPD2_Shd	N/A	
16	SMEC position sensor photodiode #3 I+	IPD3A	20 µA	Insulated STP
17	SMEC position sensor photodiode #3 I-	IPD3C	20 µA	
35	Shield	IPD3_Shd	N/A	
21	SMEC drive coil I+ (rob)	S_Mot_Coil_P	100 mA	Insulated STP
22	SMEC drive coil I- (rob)	S_Mot_Coil_N	100 mA	
3	SMEC drive coil shield rob)	S_Mot_Coil_Shd	N/A	
27	SMEC position sensor power supply	-3V	1 mA	Insulated STP
28	SMEC position sensor power return	-3V	1 mA	
9	Shield	POS_POWER_Shd	N/A	
30	SMEC pos. sensor photodiode #1 feedback +	CRPD1A	10 µA	Insulated STP
31	SMEC pos. sensor photodiode #1 feedback -	CRPD1C	10 µA	
12	Shield	CRPD1_SHD	N/A	
33	SMEC pos. sensor photodiode #2 feedback +	CRPD2A	10 µA	Insulated STP
34	SMEC pos. sensor photodiode #2 feedback -	CRPD2C	10 µA	
15	Shield	CRPD2_Shd	N/A	
36	SMEC pos. sensor photodiode #3 feedback +	CRPD3A	10 µA	Insulated STP
37	SMEC pos. sensor photodiode #3 feedback -	CRPD3C	10 µA	
18	Shield	CRPD3_Shd	N/A	
6	NC			
19	NC			
24	NC			
25	NC			

Table 5 : Connector HSFPJ_J29 pin allocation

6.2.2.1.2 Connector HSFPJ_J27

Prime connector # 2 (I/F with RF filter box / J27A)

Identification : HSFPJ_J27, located on the SMECm cable

Type : MDM 37S

Functions : LVDT (3 STP), launch latch (6 STP), t° probes (4 STP), 13 screens

37 way FPU_J27	Signal function	Signal name	Max. current	Wire type
22	SMEC launch latch #1 power supply A	S_LL#1_Coil_P	300 mA / 50 ms	Insulated STP
23	SMEC launch latch #1 power return A	S_LL#1_Coil_N	300 mA / 50 ms	
4	Shield	S_LL#1_Coil_Shd	N/A	
5	SMEC launch latch #1 power supply B	S_LL#1_Coil_P	300 mA / 50 ms	Insulated STP
6	SMEC launch latch #1 power return B	S_LL#1_Coil_N	300 mA / 50 ms	
24	Shield	S_LL#1_Coil_Shd	N/A	
28	SMEC temperature I+		1 µA	Insulated STP
11	SMEC temperature I-		1 µA	
10	SMEC temperature V+		N/A	
29	SMEC temperature V-		N/A	
30	Shield		N/A	
31	SMEC/SOB I/F temperature I+		1 µA	Insulated STP
14	SMEC/SOB I/F temperature I-		1 µA	
13	SMEC/SOB I/F temperature V+		N/A	
32	SMEC/SOB I/F temperature V-		N/A	
12	Shield		N/A	
2	SMEC launch latch # 2 confirmation + (TBC)	S_LL#2_Stat_P	1 mA	Insulated STP
21	SMEC launch latch # 2 confirmation - (TBC)	S_LL#2_Stat_N	1 mA	
3	Shield	S_LL#2_Stat_Shd	N/A	
33	SMEC LVDT primary coil power supply (P)	LVDT_PRIM_P	5 mA	Insulated STP
34	SMEC LVDT primary coil power supply (N)	LVDT_PRIM_N	5 mA	
15	Shield	LVDT_PRIM_Shd	N/A	
35	SMEC LVDT secondary coil # 1 signal (P)	LVDT_SECA_P	50 µA	Insulated STP
36	SMEC LVDT secondary coil # 1 signal (N)	LVDT_SECA_N	50 µA	
17	Shield	LVDT_SECA_Shd	N/A	
18	SMEC LVDT secondary coil # 2 signal (P)	LVDT_SECB_P	50 µA	Insulated STP
19	SMEC LVDT secondary coil # 2 signal (N)	LVDT_SECB_N	50 µA	
37	Shield	LVDT_SECB_Shd	N/A	
25	SMEC launch latch #2 power supply A	S_LL#2_Coil_P	300 mA / 50 ms	Insulated STP
26	SMEC launch latch #2 power return A	S_LL#2_Coil_N	300 mA / 50 ms	
7	Shield	S_LL#2_Coil_Shd	N/A	
8	SMEC launch latch #2 power supply B	S_LL#2_Coil_P	300 mA / 50 ms	Insulated STP
9	SMEC launch latch #2 power return B	S_LL#2_Coil_N	300 mA / 50 ms	
27	Shield	S_LL#2_Coil_Shd	N/A	
1	SMEC launch latch # 1 confirmation +	S_LL#1_Stat_P	1 mA	Insulated STP
20	SMEC launch latch # 1 confirmation -	S_LL#1_Stat_N	1 mA	
3	Shield	S_LL#1_Stat_Shd	N/A	
16	NC			

Table 6: Connector J 27 A pin allocation

6.2.2.2 Redundant

6.2.2.2.1 Connector HSFPU_J30

Redundant connector # 1 (I/F with RF filter box / J30A)

Identification :HSFPU_J30, located on the cable of SMECm

Type : MDM 37S

Functions : motor (3 STP), encoder (8 STP), 11 screens
Connected to RF filter box / J30A [RD2]

Pinout : Same as HSFPU_J29

6.2.2.2.2 Connector HSFPU_J28

Redundant connector # 2 (I/F with RF filter box / J28A)

Identification :HSFPU_J28, located on the cable of SMECm

Type : MDM 37S

Functions : LVDT (3 STP), launch latch (4 STP), t° probes (4 STP), 11 screens
Connected to RF filter box / J28A [RD2]

Pinout : Same as HSFPU_J27

7. Functional diagrams

Not Applicable

8. Electrical circuit diagrams

The list of the given electronics drawing is given in the table here after:

DRW reference	Rev	Sheet	DRW title	Date
LAM.ELE.HER.040302		1/2	Plan de câblage du mécanisme SMEC	08/10/2004
LAM.ELE.HER.040302		2/2	Plan de câblage du mécanisme SMEC	08/10/2004
LAM.ELE.SPI.DRW.040402_01	A		Connection SMEC	02/04/2004
LAM.ELE.FTS.ENC.03-16	1.1		Incremental encoder preamplifier	September 2002

Table 7: Electrical circuit drawing list

Drawings at the following pages

9. As built configuration status list

The as built configuration list is given here after:

Document	Doc reference
Spectrometer mechanism Specifications	LAM.PJT.SPI.SPT.040909_01_10
SMEC DCI	LAM.SSP.SPI.DCI.040611_01_11
SPIRE Harness Definition Document	SPIRE-RAL-PRJ-000608_11
SPIRE Mirrors specifications	LAM.PJT.SPI.SPT.200007 iss 09

Drawings	
Drawing tittle	Drawing ref:
MICD SMEC ASS'Y (- 8mm location)	SPI-MEC-00-DI-02-F F1
MICD SMEC ASS'Y (+ 32 mm location)	SPI-MEC-00-DI-02-F F2
See the drawing list given in section 5	

Table 8 : As built configuration list

10. Serialised components list

The serialised components are the following:

LVDT : (SCHAEVITZ MHR 100)

Type 3079 0100 S/N J3235
Type 3079 0100 S/N J3243

Temperature Sensors : (CERNOX 1030 SD/ HT)

The serial number are the following :

SMEC :

Main : S/N X30980
Redundant : S/N X31071

SOB :

Main : S/N X31032
Redundant : S/N X31047

HEDENHAIN Ruler

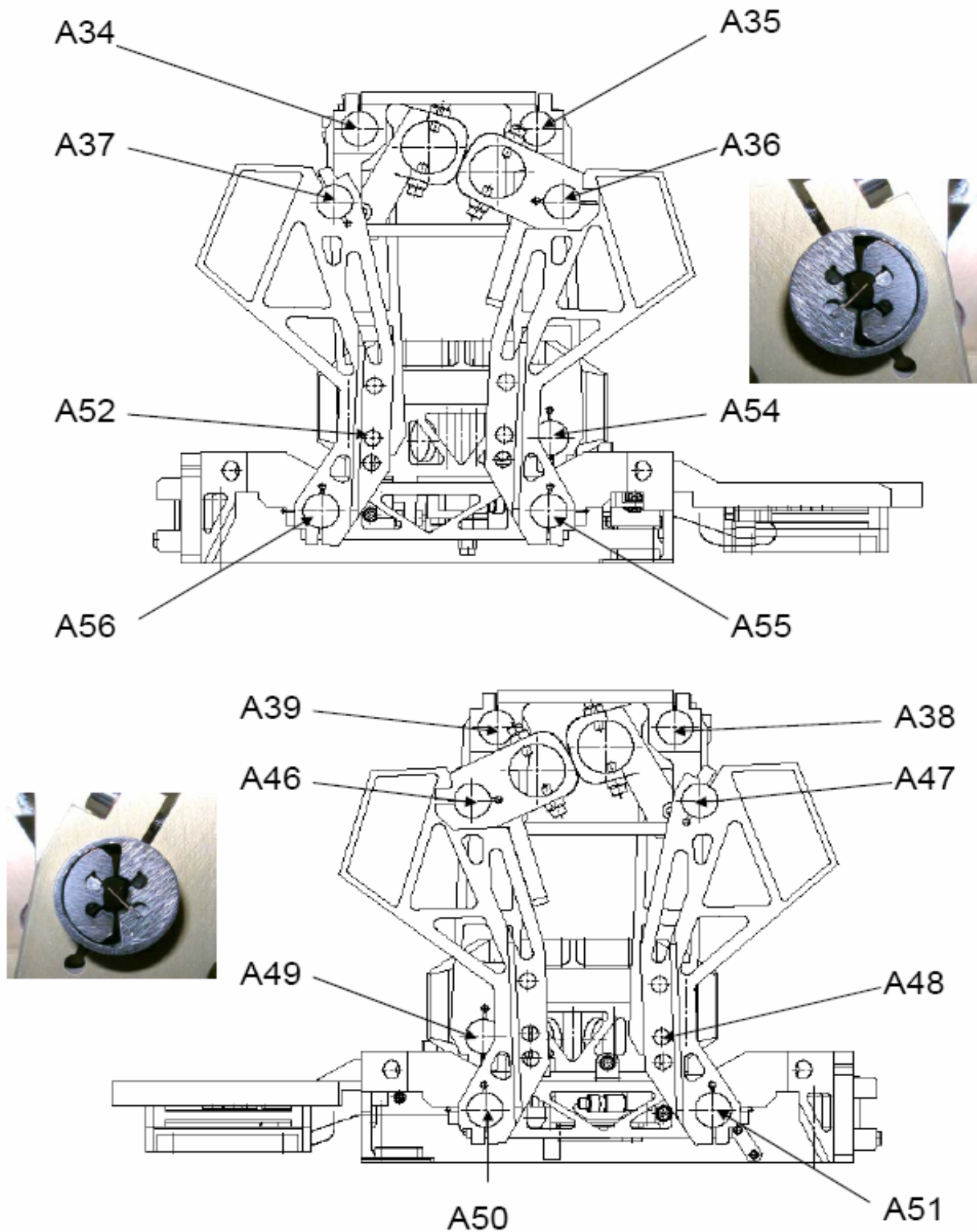
Type 401 R S/N 12339781

Preamplifier PCB

PCB v3.2 N° 2

Pivot

See at the following sheet



List of the mechanical parts integrated in the SMECm

Partie	Part designation	Drawing number	Ind	Nb	Part S/N	
10 - Bâti	Structure de base	SPI-MEC-10-DD-01	H	1	10	
	Butée de plaque mobile	SPI-MEC-10-DD-03	C	1	01	
20- Guidage	Cadre interne	SPI-MEC-21-DD-01	C	2	14&15	
	Cadre externe	SPI-MEC-21-DD-02	B	2	10&11	
	Structure supérieure	SPI-MEC-22-DD-01	B	2	14&15	
	Pivot	PIV-LAM-F01-527-1		16	See list	
	Poulie interne droite	SPI-MEC-24-DD-01	D	1	01	
	Poulie interne gauche	SPI-MEC-24-DD-02	D	1	01	
	Poulie externe droite	SPI-MEC-24-DD-03	C	1	01	
	Poulie externe gauche	SPI-MEC-24-DD-04	C	1	01	
	Courroie	SPI-MEC-24-DD-05	C	4	4 du lot	
	Bride de courroie	SPI-MEC-24-DD-06	A	2	2 du lot	
	Bride de courroie rainurée	SPI-MEC-24-DD-07	B	2	2 du lot	
	Bride de courroie chanfreinée	SPI-MEC-24-DD-08	A	4	4 du lot	
	30 - Chariot	Plaque mobile	SPI-MEC-30-DD-01	F	1	D1
		Goupille verrouillage vertical	SPI-MEC-30-DD-03	B	1	1 du lot
Cadre verrou latéral AV		SPI-MEC-30-DD-06	C	1	21	
Verrou latéral AR		SPI-MEC-30-DD-07	E	1	01	
Butée verticale AV		SPI-MEC-30-DD-09	A	2	01 & 02	
40 - Miroir	Roof top	SPI-MEC-40-DD-01	D	1	12	
50 - Moteur	Moteur assemblé	SPI-MEC-51-DO-01	C	1	●	
	Cale moteur linéaire	SPI-MEC-50-DD-01	C	4	9 à12	
	Actuateur linéaire Bout	SPI-MEC-51-DD-01	F	2	2 du lot	
	Actuateur linéaire Flasque	SPI-MEC-51-DD-02	G	2	2 du lot	
	Actuateur linéaire Noyau	SPI-MEC-51-DD-03	D	1	●●●	
	Actuateur linéaire Aimant BLS	SPI-MEC-51-DD-04	A	2	2 du lot	
	Vis centreuse	SPI-MEC-51-DD-05	B	2	2 du lot	
	Goupille verrouillage latéral AR	SPI-MEC-51-DD-06	A	1	1 du lot	
	Goupille verrouillage latéral AV	SPI-MEC-51-DD-07	A	1	1 du lot	
	Mât de verrouillage latéral AV	SPI-MEC-51-DD-08	C	1	14	
	Bride de verrouillage latéral AR	SPI-MEC-51-DD-09	A	1	22	
	Bobine actuateur assemblée	SPI-MEC-52-DD-03	A	1	52-03-12	
	60 - Cap. Op	Règle optique	SPI-MEC-60-DS-01	A	1	1614086 5
		Tête capteur optique	SPI-MEC-60-DS-02	A	1	324
Capot tête optique		SPI-MEC-60-DS-03	A	1	324	
Cavalier HEIDENHAIN de règle optique		SPI-MEC-60-DS-04	A	2	Heidenh ain	
Cavalier latéral règle optique		SPI-MEC-60-DD-01	B	1	2 du lot	
Bouchon de tête optique		SPI-MEC-60-DD-02	A	1	1 du lot	
Plot invar collé sur règle optique		SPI-MEC-60-DD-04	A		1 du lot	
Chapeau Alu		SPI-MEC-60-DD-05	A	1	3	
Cale rehausse tête optique		SPI-MEC-60-DD-06	A	1	1	
Flex		???		1	AD	
70 - LVDT		Berceau LVDT	SPI-MEC-70-DD-01	G	1	13
	Rallonge noyau LVDT	SPI-MEC-70-DD-03	B		J3243	
	Guide noyau LVDT plongeur	SPI-MEC-70-DD-04	C	2	J3235	
	Noyau LVDT	SPI-MEC-70-DD-06	A			

Partie	Part designation	Drawing number	Ind	Nb	Part S/N
	Bobine MHR 100	SPI-MEC-70-DS-02	A	2	J3235/J 3243
80 - Verrou	Bague mobile LATCH	SPI-MEC-80-DD-04	C	1	1 du lot
	Axe de verrouillage LATCH	SPI-MEC-80-DD-05	B	1	1 du lot
	Mécanisme LATCH :	SPI-MEC-81-DO-01	B	1	FM
	Equerre support LATCH	SPI-MEC-81-DD-15	A	1	02
	Bague fixe équerre LATCH	SPI-MEC-81-DD-16	A	1	1 du lot
	Rdlle compensation cuvette vis FS M1,6-6	SPI-MEC-81-DD-17	A	1	1 du lot
	(Serre fils Bobine Latch	SPI-MEC-81-DD-19	A	1	1 du lot
	Rdlle compensation fix inf latch structure base	SPI-MEC-81-DD-20	A	1	1 du lot
90 - Harnais	Support carte C.I.	SPI-MEC-90-DD-01	E	1	12
	Entretoise serre câbles	SPI-MEC-90-DD-02	A	1	1 du lot
	Serre câbles	SPI-MEC-90-DD-03	A	1	1 du lot
	Cavalier 2 câble bobine	SPI-MEC-90-DD-04	A	1	1 du lot
	Cavalier 1 câble bobine	SPI-MEC-90-DD-05	A	1	1 du lot
	Cavalier câble Ent Struc Base	SPI-MEC-90-DD-06	A	1	1 du lot
	Cavalier câble LVDT	SPI-MEC-90-DD-07	A	2	2 du lot
	Bride pour câbles dans goulotte	SPI-MEC-90-DD-08	A	2	2 du lot
	Cavalier câble sondes Temp	SPI-MEC-90-DD-09	A	2	2 du lot
	Bride fils sortie bobine	SPI-MEC-90-DD-10	A	1	1 du lot
	Entretoise Cav sonde Temp	SPI-MEC-90-DD-11	A	1	1 du lot
	Bride serre câble AR	SPI-MEC-90-DD-12	A	1	01
	Sonde T°	X30980 Main X31071 Redundant			
	Carte CI				

11. List of Waivers

N°	NCR reference	Description	RFW reference	Date	Status
1	LAM.SSP.SPI.NCR.060310_01	Scratch on the Roof top mirror	LAM.SSP.SPI.RFW.060717_01	13/07/2006	Open
2	LAM.SSP.SPI.NCR.060718_01	J29 and J30 cable length	LAM.SSP.SPI.RFW.060721_01	21/07/2006	Open

12. Copies of waivers

See the waivers at the following sheets

13. User manual

13.1 Restriction of use

The SMEC mechanism is delivered on a transportation frame, located inside the transport container, whose flatness is compatible with the SMEC flatness requirements. This transportation frame can be removed from the container in order to be carried in the clean room.

All the functional tests performed before mechanical integration must be performed with the mechanism integrated on the frame and with the attachment screws tightened at the nominal torque.

The mechanism will never be operated if not fully integrated, with its attachment screws, either on its transportation frame or on the SOB.

For the transportation from the frame to the SOB, the mechanism will be in latched configuration. The last step of the functional test will be to check that the latch is "ON" (mechanism locked).

13.2 Latch EGSE procedure

The procedure for using the Latch EGSE is given at the following pages of this section

13.3 Software design

The MCU software design description is given at the following pages of this section

13.4 User Manual

The SMEC FM user Manual is given at the following pages of this section

14. Historical record

See table at the following page

15. Logbook / diary of events

See following sheets

16. Operating time / Cycle records

See following sheet

17. Connector mating record

See the mating-demating record at the following page

18. Age sensitive Item record

Not applicable

19. Pressure vessel history / test record

Not applicable

20. Calibration Data record

See in section 25 the document "SMEC FM Performance test report" ref : LAM.PJT.SPI.PRIV.060726_01_10

21. Temporary installation record

There is no red tagged item on the SMEC mechanism

Short circuits connectors, to prevent the ESD, and connector savers will have to be removed before final electrical integration.

During the integrations and test operations a certain number of components have been temporarily integrated on the SMEC. They are:

- ✓ The accelerometers which were glued on the SMEC mechanism in order to be used during the vibrations at 300K and during the cold vibration at CSL. All these accelerometers were removed before shipment
- ✓ The thermal sensor used during the thermal tests, which were removed immediately after the test
- ✓ The preamplifier PCB, was exchanged by a new one, following the loss of the signal (See NCR section LAM.SSP.SPI.NCR.060620_01)

22. Open Work / Deferred Work / Open tests

22.1 Open work

No open Work

22.2 Deferred Work

- Installation of the two SOB thermal sensors
- Functional tests after integration on the SOB

22.3 Open Test

No open test on the FM

A life test has to be carried out with the development model (DM)

23. List of Non Conformance reports

The list of non conformances is given in the table at the following sheet:

NCR ref	MIN/MAJ	Parts designation	Reference document	NCR Title	STATUS C/O
LAM.SSP.SPI.NCR.041103_02	MIN	Plaque mobile #1 et # 2	SPI.MEC.30.DD.01.B	Thickness of the stiffener is 2,05 instead of 2,5mm.	C
LAM.SSP.SPI.NCR.050622_01	MIN	Structure de base # 10	SPI-MEC-10-DD-01-G	Flatness default and one attachment hole damaged	C
LAM.SSP.SPI.NCR.050628_02	MIN	Structure de base # 10,11, 20, 21, 22	SPI-MEC-10-DD-01-G	Routing default at the level of the optical head	C
LAM.SSP.SPI.NCR.050629_03	MIN	Structure de base # 10	SPI-MEC-10-DD-01-G	Shift of the attachment hole location of the clamp used to hold the cables	C
LAM.SSP.SPI.NCR.050729_01	MIN	Moteur FM	SPI-MEC-51-DO-01-C	Geometric default and height out of spec by 0.3 mm	C
LAM.SSP.SPI.NCR.050829_01	MIN	Cavalier serre câble	SPI-MEC-90-DD-09-A	Diameter of the braid is too important. Mounting of the clamp not possible. The cable will be hold with a collar	C
LAM.SSP.SPI.NCR.060202_01	MIN	Bobine moteur 520312	SPI-MEC-52-DD-01-D	One hole has been shifted. The frame is mounted using 3 screws instead of 4.	C
LAM.SSP.SPI.NCR.060203_01	MIN	Bobine moteur 520312	SPI-MEC-52-DD-01-D	Coil thickness 12,42 instead of 12,2	C
LAM.SSP.SPI.NCR.060215_01	MIN	Bobine moteur 520312	SPI-MEC-52-DD-01-D	Tilt of the attachment holes on the baseplate	C
LAM.SSP.SPI.NCR.060215_02	MIN	Noyau moteur 1	SPI-MEC-51-DD-03-D	Shift of the core with respect to the symmetry plane of the motor	C
LAM.SSP.SPI.NCR.060310_01_11	MAJ	Roof top	SPI-MEC-40-DD-01-D1	Scratch on one of the four mirrors	O
LAM.SSP.SPI.NCR.060410_01	MIN	SMEC Flight unit		Water condensation on the SMEC FM	C
LAM.SSP.SPI.NCR.060620_01	MIN	SMEC Preamplifier PCB		Signal loss, leading to a replacement of the Preamp. PCB	C
LAM.SSP.SPI.NCR.060712_02	MIN	Latching operation		Discrepancy during the latching operations during the tests in cold conditions	C
LAM.SSP.SPI.NCR.060712_02	MAJ	Cable length (J29 and J30)	SPI-MEC-00-DI-02-F F1	Length of the Cable is 347mm instead of 350mm	O

Table 9 : List of the Non-Conformances

24. Copies of Non Conformance report

See the Non Conformance Report on the following sheets

25. Test reports

The test report list is given in the table here after:

Document title	Document reference	Status
SMEC FM Roof top mirrors Mechanical measurement report	LAM.SSP.SPI.PR.V.060425_01_10	Delivered
SMEC FM Visual inspection report	LAM.SSP.SPI.PR.V.060707_01_10	Delivered
SMEC FM Mass and CoG measurement report	LAM.MEC.SPI.NOT.060707_01_11	Delivered
SMEC FM Mechanical I/F measurement report	LAM.SSP.SPI.PR.V.060620_01_10	Delivered
SMEC FM Acceptance test report	LAM.PJT.SPI.PR.V.060627_01_10	Delivered
SMEC FM Performance test report	LAM.PJT.SPI.PR.V.060726_01_10	Delivered

Table 10 : List of test reports

26. Proof load certificates

Not applicable

27. Reference list of lower level ADP's

Not applicable

28. Mass records

The mass of the SMEC FM in the delivery configuration is **2,011 kg**
Including: harness and connectors

Without attachment screws and without savers

The mass of the DM (fully representative of the FM) without harness is **1,710 Kg**

29. Cleanliness statement

The delivered SMEC FM has been cleaned according to the procedure LAM.QUA.SPI.PRC.020047_10.

Prior to integration, each mechanical part has been baked out at 75° during 48h at a pressure of 10⁻⁵ Torr, according to the procedure LAM.QUA.SPI.PRC.030010_10.