HERSCHEL/SPIRE

DRCU
Declared Processes List (DPL)

Reference: SAp-SPIRE-NC-0061-02
Issue: 3.0
Date: 10/05/06

	Function	Name	Date	Visa
Prepared by	Mechanical Quality Engineer	I. LE MER	31/07/06	[signature]
Verified by	Mechanical architect	T. TOURRETTE	31/07/06	[signature]
Verified by	Electro technical Quality	L. DUMAYE		
Verified by	Manufacturing Responsible of electronic boards	C. CLOUE		
Approved by	PA Manager	J. FONTIGNIE	01/08/06	[signature]
Authorized by	Project Manager	J-L. AUGUERES	01/07/06	[signature]

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Document Status and Change Record

Date	Issue	Affected pages
15/11/01	0.0	Draft
13/10/03	1.0	5 Purpose 8 Item 4-1 & 4-2 Specification filled out Other Various minor modifications in the formulation
21/03/05	2.0	Complete update of document Updated items: 1-1 / 4-1 / 5-1 / 5-2 / 5-3 / 6-1 / 7-1 / 8-1 / 8-2 / 9-1 / 9-2 / 11-1 / 15-1 / 17-1 Items N/A: 4-2 / 8-3 / 16-1 Added items : 1-2 / 1-3 / 5-4 / 8-4 / 17-2
10/05/06	3.0	Updated items: 1-3 / 4-1 / 5-1 / 5-3 / 5-4 / 7-1 / 8-1 / 8-2 / 8-4 / 9-2 / 17-2 Items N/A on FM : Added items: 8-5

List of acronyms

AD/RD	Applicable / Reference Document
ADP	Acceptance Data Package
BOLC	Bolometer & Cooler Control Unit
CDR	Critical Design Review
CEA	Commissariat à l'Energie Atomique
DCU	Detector Control Unit
DML	Declared Material List
DMPL	Declared Mechanical Part List
DPL	Declared Processes List
DRCU	Detector Readout and Control Unit
EIDP	End Item Data Package
FCU	FPU Control Unit
FIRST	Far InfraRed and Sub millimeter Telescope
FM	Flight Model
FMECA	Failures Modes Effects & Criticality Analysis
FPU	Focal Plane Unit
FS	Flight Spare
GSE	Ground Support Equipment
HIFI	Heterodyne Instrument for FIrst
ICD	Interface Control Document
LAM	Laboratoire d'Astrophysique de Marseille
MAIV	Manufacturing, Assembly, Integration & Verification
MCU	Mechanisms Control Unit
MGSE	Mechanical Ground Support Equipment
N/A	Not Applicable
PA/QA	Product/Quality Assurance
PACS	Photoconductor Array Camera & Spectrometer
PCB	Printed Circuit Board
PDR	Preliminary Design Review
PhFPU	Photometer Focal Plane Unit
PSU	Power Supply Unit
QM	Qualification Model
RFA	Request For Approval
RT	Room Temperature
S/C	SpaceCraft
SAp	Service d'Astrophysique
SCU	Subsystems Control Unit
SPIRE	Spectral & Photometric Imaging Receiver
TBC	To Be Confirmed
TBD	To Be Defined

Table Of Contents

1 Purpose ... 6
2 Documentation ... 7
2.1 Applicable documents ... 7
2.2 Reference documents ... 7
3 Declared Processes List ... 8

1 Purpose

This document lists the processes to be used in the SPIRE/DCRU QM2, FM, FS.

The DRCU is composed of:

- FCU
  - MCU (under LAM responsibility)
  - SCU
  - PSU (under Astrium responsibility)
  - Harness between PSU &SCU (under Astrium responsibility)
- DCU

This document does not take into account the following elements which are described in dedicated lists:

- PSU (under Astrium responsibility) : HSPIR.PSU.LI.00002.V.ASTR
- Harness between PSU &SCU (under Astrium responsibility): DML-636/03/CAM/ST
- MCU (under LAM responsibility): SE-SPIRE-MCU-Q-LIPRO

This issue does not take into account the warm harnesses interconnect, which are not yet manufactured.

2 Documentation

2.1 Applicable documents

	Title	*Reference*	*Iss*	*Rev*	*Date*
AD01	PA Requirements for FIRST Scientific Instruments	PT-RQ-04410	2	0	01/08/00
AD02	Standard Product Assurance Plan	SAp-GERES-FLo-436-00	1	0	07/11/00

2.2 Reference documents

	Title	*Reference*	*Iss*	*Rev*	*Date*
RD01	Data for Selection of Space Materials	ECSS –Q-70-71A	A	1	18/06/04
RD02	Materials, Mechanical Parts & Processes	ECSS-Q-70B			14/12/04
RD03	The technical reporting and approval procedure for materials and processes	PSS-01-700	2	2	
RD04	Materials selection for controlling stress-corrosion cracking	ECSS-Q-70-36-A			
RD05	CNES Guide for science projects				
RD06	DCRU DML	SAp-SPIRE-NC-0060-02	3	0	10/05/06
RD07	DRCU DMPL	SAp-SPIRE-NC-0382-06	1	0	10/05/06
RD08	DML - HSPSU	HSPIR/PSU.LI.00003.V. ASTR			
RD09	DPL - HSPSU	HSPIR/PSU.LI.00002.V. ASTR			
RD10	DML - Câblage PSU harnais SPIRE	DPL-635/03/CAM/ST			
RD11	DPL - Câblage PSU harnais SPIRE	DPL-636/03/CAM/ST			
RD12	DML - MCU	SE-SPIRE-MCU-Q-LIMAT			
RD13	DPL - MCU	SE-SPIRE-MCU-Q-LIPRO			

3 Declared Processes List

Group Type	*Used*
1. Adhesive Bonding	✓
2. Composite Manufacturing	N/A
3. Encapsulation / Molding	N/A
4. Painting / Coating	✓
5. Cleaning	✓
6. Welding / Brazing	✓
7. Crimping / Stripping / Wire Wrapping	✓
8. Soldering	✓
9. Surface Treatment	✓
10. Plating	N/A
11. Machining	✓
12. Forming	N/A
13. Heat Treatment	N/A
14. Special Fabrication	N/A
15. Marking	✓
16. Miscellaneous Processes	N/A
17. Inspection Procedure	✓

Group 1 – Adhesive Bonding

1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
1-1	Use of EC 2216	SAp- FIRST-TT-0435-04	Put a drop of EC 2216 on each fastener	Identification of fastener tightened with defined torque Gluing of identification labels Gluing of Copper Berylium finger strips	SAp	6-2, 10-2 1-3 2-1	N	used on SOHO, GOLF, XMM, EPIC, INTEGRAL Common practice @ SAp for space applications		
		RESA procedure : NF/A/05	Put a drop of EC 2216 on each fastener	Identification of fastener tightened with defined torque	RESA		N			
1-2	Use of STYCAST 2850/FT9	RESA procedure : NF/A/05	Mixture resin/catalyst: 100/3 Polymerisation: 24h at ambient	Gluing of thermal parts Immobilization of composants	RESA	10-1, EEE parts	N			
1-3	Use of NUSIL with Al2O3 load	RESA procedure : FAB C 038	Manual deposit with dispenser	Gluing of heavy components on printed wiring assembly	RESA		N			

Group 4 – Painting / Coating

1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
4-1	NUSIL conformal coating	RESA procedure: FAB C 038	Application of a thin/thick layer of NUSIL CV-1152	Protection of electronic boards	RESA	10-3, 15-1	N	Common practice @ SAp for space applications used on INTEGRAL		
~~4-2~~	~~SOLITHANE 113 conformal coating~~	~~SAp-GERES-FM-0239-96, rev 1~~	~~Application of a thin/thick layer of SOLITHANE 113~~	~~Protection of electronic boards~~	~~RESA~~	~~10-4, 15-1~~	~~N~~	~~Common practice @ SAp for space applications~~		

Group 5 – Cleaning										
1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
5-1	Cleaning of electronic parts	RESA procedure : IND C 051 ECSS-Q-70-08-A	Cleaning board : For SMC : pre-cleaning with Alpha 564 For WaveSoldering : pre-cleaning with FD Cleaning : Isopropyl alcohol	Cleaning of electronic parts before assembly	RESA	EEE parts	N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		
5-2	Cleaning of mechanical parts	SAp-GERES-PROC-402	Wiping with isopropyl alcohol or ethanol Rinsing with pure water Drying under clean flux	Cleaning of mechanical parts before assembly	SAp RESA	1-1, 1-2, 1-3, 2-1, 6-1, 6-2	N			
5-3	PCB dry out	RESA procedure : FAB C 039 ECSS-Q-70-08-A	Bake out of bare PCB	Dry out of each PCB	RESA	15-1	N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		
5-4	Final cleaning	RESA procedure : IND C 051 ECSS-Q-70-08-A	Final cleaning of wired PCB with Isopropyl alcohol	Wired PCB with Isopropyl	RESA	EEE parts, 15-1	N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		

Group 6 – Welding / Brazing										
1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
6-1	Salt bath brazing	CF-009-1 MIL-B-7883B ANSI/AWSC3.7-93	Brazing of electronic boxes with solder alloy	Electronic boxes	AML	1-2, 7-1	N	Used on SOHO, GOLF, XMM, INTEGRAL		

Group 7 – Crimping / Stripping / Wire Wrapping

1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
7-1	Crimping of connector pins	ESA ECSS-Q-70-26 RESA procedure: FAB A 025	Crimping of the pins of the connectors	DMA connector	RESA		N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		

Group 8 – Soldering / Brazing

1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
8-1	SMC Soldering	ESA PSS-01-738 RESA procedure : DP 5087 JF/PRO	Soldering of surface mount components on PCB		RESA	7-4	N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		
8-2	Electronic parts soldering	ESA ECSS-Q-70-08-A RESA procedure : FAB A 028	Manual soldering of electronic parts on PCB		RESA	7-3	N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		
~~8-3~~	~~Electronic parts soldering~~	~~ESA ECSS-Q-70-26-A~~	~~Manual soldering of electronic parts on PCB~~		~~RESA~~	~~7-2~~	~~N~~	~~CNES accreditation of Subco:~~ ~~ASF ST 15 /ASF ST 16~~		
8-4	Wave soldering	RESA procedure : IND C 095	Wave soldering process for BackPlane		RESA		N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		
8-5	Repair and modifications	RESA procedure : FAB A 028	Manual soldering of electronic parts on PCB		RESA	7-3	N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		

Group 9 – Surface conversion treatments

1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
9-1	Application of Alodine 1200		Aluminum conversion using CrO3 acid + HF acid bath	Anti-corrosive protection on all aluminum mechanical parts	AML	1-1, 1-2, 7-1	N	Common practice for space applications		
9-2	Black anodizing	ESA PSS-703	Black anodizing with inorganic dyes		AML	1-1, 1-2, 1-3	N	ESA PSS-703 requirements applied by a subcontractor with significant space application experience This treatment (Black anodizing) has been used on Golf, Cassini-cirs, XMM EPIC, INTEGRAL (ISGRI-SPI) with the same alloy.		

Group 11 – Machining										
1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
11-1	Standard machining		Machining of mechanical parts	Mechanical parts	AML	1-1, 1-2, 1-3 2-1 6-1, 6-2	N			

Group 15 – Marking										
1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
15-1	Mechanical marking		Milling marking on removable mechanical parts	Identification of electronic boxes	SERTIP	1-3	N			

Group 17 – Inspection procedures										
1	2	3	4	5	6	7	8	9		10
Item #	Process Identification	Specification	Process Description	Use & Location	Manufacturer Name	Associated DML Item Number	Criticality of Process	Approval Status		ESA validation
								Justification for Approval	Prime validation	
17-1	Incoming inspection on all parts (mechanical, electronic) delivered to SAp	PA Plan		To verify the conformity of delivered items (loose & manufactured items, sub-assemblies, etc.)	SAp		N			
17-2	Soldering inspection	RNC-ECSS-Q-70-08A RNC-CNES-Q-70-510	Inspection control of electronic board		RESA		N	CNES accreditation of Subco: ASF ST 16 /ASF ST 18		