



## HERSCHEL/SPIRE

### HS\_DRCU (HS\_DCU & HS\_FCU) FM Configuration Item Data List / As Built Configuration List

**Reference:** Sap-SPIRE-QA-0417-06  
**Issue:** 1.0  
**Date:** 31/07/06

	Function	Name	Date	Visa
<b>Prepared by</b>	AP Manager	FONTIGNIE Jean	02/08/06	
<b>Approved by</b>	System	CARA Christophe		
<b>Authorized by</b>	Project manager	AUGUERES Jean-Louis	2/8/06	

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	<b>Herschel /SPIRE</b> HS_DRCU (HS_DCU & HS_FCU)FM CIDL / ABCL	 <b>DSM-DAPNIA SAp</b> SAp-SPIRE-QA-0417-06 Issue: 1.0 Date : 31/07/06 Page : 3/10
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## 2 Document status and change record

Date	Issue	Affected pages
11/07/06	1.0	Creation

## 3 Scope of the document

The **CIDL** “Configuration Items Data List” identifies the applicable issue/revision of requirement documents, specifications, drawings and engineering lists that represent the “**as designed**” configuration of HS\_DCU and HS\_FCU.

Thus the two equipments are constituted of separate boxes, they can not be operated separately , so a single CIDL / ABCL has been elaborated.

The **ABCL** “As Built Configuration List” identifies for each unit, the applied issues and revisions of the above documents plus any major NCR and major RFW.

## 4 CIDL status

### 4.1 Documents

#### 4.1.1 Upper level Specifications

<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
Herschel/Planck Instrument Interface document partA	SCI-PT-IIDA-04624	3.3
Herschel/Planck Instrument Interface document partB	SCI-T-IIDB / SPIRE	4.0
BDA-SSD	SPIRE-JPL-PRJ-000456	3.1
Changes to DCU specs in BDA-SSD	HR-SP-RAL-ECR-067	22 March 2004

#### 4.1.2 CEA's Specification documents

<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
DRCU subsystem specification document	SApSPIRE-CCa-25-00	1.2

#### 4.1.3 CEA's Interface Control Drawings & Documents

<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
DRCU/DPU interface control document	SAp-SPIRE-CCa-0076-02	1.3
DRCU interface control document	SAp-SPIRE-CCa-0075-02	1.1
HS_DCU MICD	SPIR-MX-5100 000	I
HS_FCU MICD	SPIR-MX-5200 000	L

	<b>Herschel /SPIRE</b> HS_DRCU (HS_DCU & HS_FCU)FM CIDL / ABCL	 <b>DSM-DAPNIA SAp</b> SAp-SPIRE-QA-0417-06 Issue: 1.0 Date : 31/07/06 Page : 4/10
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#### 4.1.4 PMP lists

<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
HS_DRCU DML	SAp-SPIRE-NC-0060-02	3.0
HS_DRCU DPL	SAp-SPIRE-NC-0061-02	3.0
HS_DRCU DMPL	SAp-SPIRE-ILM-0382-06	1.0
HS_DRCU DCL	SAp-SPIRE-VM-164-04	Issue 17

#### 4.1.5 Subsystems PMP lists (refer to subsystem eidps)

HSPSU DML	HSPIR.PSU.LI.003.V.ASTR	Issue 00 rev 03
HSPSU DPL	HSPIR.PSU.LI.002.V.ASTR	Issue 03 rev 00
HSPSU DCL	HSPIR.PSU.LI.00201.V.ASTR	Issue 00 Rev 00
HSFCU internal harness DML	DML-635/03/CAM/ST	Issue 03
HSFCU internal harness DPL	DPL-636/03/CAM/ST	Issue 02
HSFCU internal harness DCL	HSPIR.PSU-DCL_DA0018637-V-ASTR	Issue 00 rev 00
MCU DML & DMPL	SE-SPIRE-MCU-Q-LIMAT	Issue 1a
MCU DPL	SE-SPIRE-MCU-Q-LIPRO	Issue 1a
MCU DCL	LAM.ELEC.SPI.LIS 050211_01	Issue 1 Rev 1

#### 4.1.6 Others applicable documents for HS\_DRCU FM:

<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
HS_DRCU packing/unpacking/handling procedure	SAp-SPIRE-HT-416-06	1.0
User's manual	SAp-SPIRE-CCa-411-06	1.0
HS_PSU safety operations, failure detection and recovery	HSPIR.PSU.MA.00110.V.ASTR	Issue 00 Rev 00

#### 4.1.7 CEA's documents: procedures of manufacturing and assembly of "as designed" DRCU

##### Assembly procedure & general manufacturing specifications

<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
Procédure de montage HS_DCU	SAp-SPIRE-TT-263-05	3.0
Procédure de montage HS_FCU	SAp-SPIRE-TT-229-05	3.0
Spécification de mise en œuvre des vernis	SAp-FIRST-TT-0434-04	1/0
Spécification de mise en œuvre des colles	SAp-FIRST-TT-435-04	1/0
Spécification de cambrage des composants « flat pack »	SAp-FIRST-JF-438-04	1.1
Note technique test des régulateurs	SAp-FIRST-CCa-558-04	1
Spécification d'assemblage des cartes filles	SAp-FISRT-TT-437-04	2

	<b>Herschel /SPIRE</b> HS_DRCU (HS_DCU & HS_FCU)FM CIDL / ABCL	 <b>DSM-DAPNIA SAp</b> SAp-SPIRE-QA-0417-06 Issue: 1.0 Date : 31/07/06 Page : 5/10
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**Electronic board sub-assemblies / DCU:**

<i>Subsystem</i>	<i>Reference of CIDL</i>	<i>Issue</i>
DAQ+IF Board	FR-SPIRE-FM 1500--0	0
BIAS Board	FR SPIRE-FM 1400--0	0
LIAP Board	FR-SPIRE-FM 1310--0	0
LIATC Board	FR-SPIRE-FM 1310--0	0
LIAS Board	FR-SPIRE-FM 1320--0	0
DCU-BP board	FR-SPIRE-FM 1200--0	0
DCU Electronic box	Sap-SPIRE-ILM-413-06	1.0

**Electronic board sub-assemblies / FCU:**

<i>Subsystem</i>	<i>Reference of CIDL</i>	<i>Issue</i>
CCHK Board	FR-SPIRE-FM 3400--0	0
TEMP Board	FR-SPIRE-FM 3300--0	0
SCU-BP Board	FR-SPIRE-FM 2200--0	0
FCU Electronic box	Sap-SPIRE-ILM-414-06	1.0

**Subsystems CIDLs**

HS\_PSU

<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
HSPSU CIDL	HSPIR.-PSU-DI-DA0017834-V- ASTR	Issue 04 rev 00

HS\_FCU internal harness

<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
PSU SPIRE FM HARNESS CIDL	CIDL-686/04/CAM/ST	Issue 00

MCU subassembly

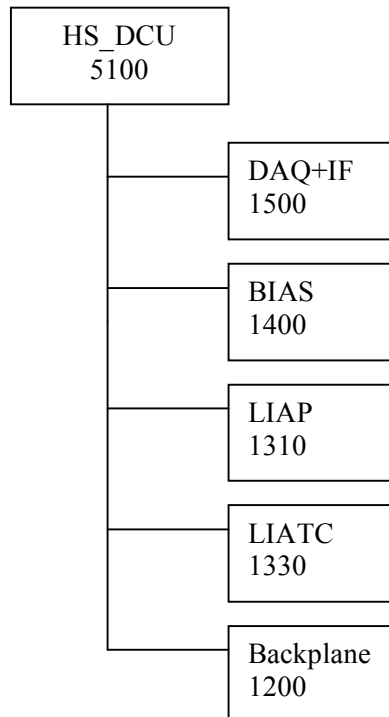
<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
??	TBD (LAM)	

**4.1.8 CEA's documents: procedures for test & acceptance**

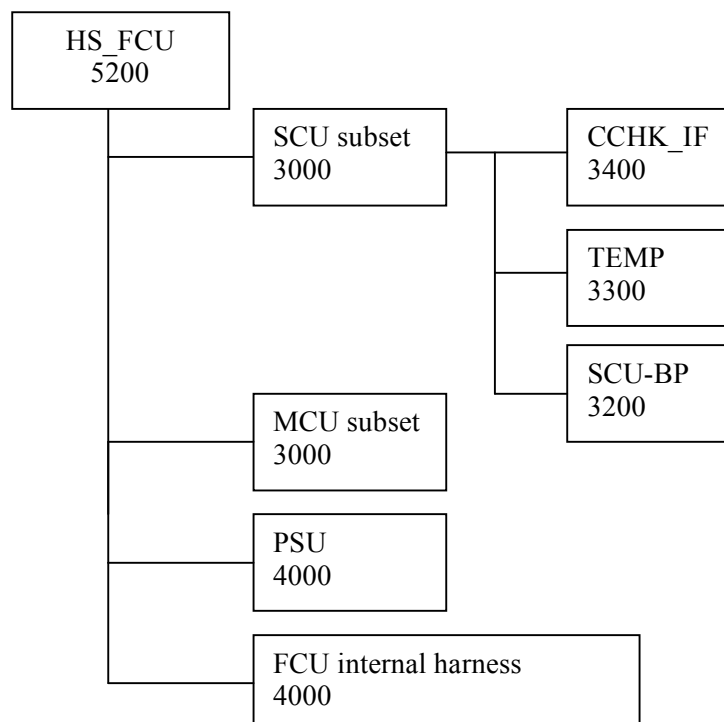
<i>Document name</i>	<i>Reference</i>	<i>Issue</i>
Procédure de test fonctionnel HS_DCU	SAP-SPIRE-HT-387-06	Issue 1.0
Procédure de test fonctionnel HS_FCU	SAP-SPIRE-HT-388-06	Issue 1.0
Procédure vibrations HSDCU FM	SAP-SPIRE-TT-400-06	Issue 1.0
Procédure vibrations HSFCU FM	SAP-SPIRE-TT-401-06	Issue 1.0
Procédure VTC HS_DCU	SAP-SPIRE-HT-389-06	Issue 1.0
Procédure VTC HS_FCU	SAP-SPIRE-HT-390-06	Issue 1.0
Procédure pour les essais de continuité	SAP-FIRST-JF- 689-06	Issue 1.1



## 4.2 Drawing family tree

### 4.2.1 HS\_DCU family tree



### 4.2.2 HS\_FCU family tree



	<b>Herschel /SPIRE</b> HS_DRCU (HS_DCU & HS_FCU)FM CIDL / ABCL	 SAp-SPIRE-QA-0417-06 Issue: 1.0 Date : 12/07/06 Page : 7/10
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## 5 ABCL

HS\_DCU and HS\_FCU FM has been built in accordance with the assembly procedures (cf. paragraph 4.1.6).

### 5.1 As Built Hardware Tree for DCU electronics

Slot description /	Board s/n	As built drawing list	Changes As designed / As built
DAQ+IF Main	4001	FR SPIRE-FM 1500-B	CR414 : change on FPGA reset buffer <sup>1</sup> CR418 : TO257 case (voltage regulator) tied to 0V CR444 : added resistors to bring powerdrain on secondary lines of dc/dc converter closer to specs
DAQ+IF Red.	4002		
LIAP1	4001	FR SPIRE-FM- 1310--0	No change As designed = As Built
LIAP2	4010		
LIAP3	4003		
LIAP4	4004		
LIAP5	4005		
LIAP6	4006		
LIAP7	4007		
LIAP8	4008		
LIATC	4009		
BIASM	4001	FR SPIRE-FM 1400--A	CR416 : TO257 case (voltage regulator) tied to 0V
BIASR	4002		
LIAS1	4001	FR SPIRE-FM 1320--A	CR415 concerns ambiguous drawing, does not affect board manufacturing. As far as h/w is concerned, As designed=As built
LIAS2	4002		
LIAS3	4003		
Backplane	4001	FR-SPIRE-FM 1200-0	CR386 : DIP16 regulator height on pcb reduced
Box	QM2 <sup>2</sup>	--	As designed= As built

### 5.2 As Built Hardware Tree for FCU electronics (SCU subset)

Slot description /	Board s/n	As built drawing list	Changes As designed / As built
CCHK+IF Main	4001	FR-SPIRE-FM 3400--A	CR417 : TO257 case (voltage regulator) tied to 0V CR427 : subshield pin tied to 0V
CCHK+IF Red	4002		
TEMP Main	4001	FR-SPIRE-FM 3300--B	CR443 : change of resistors (adjustment of SCAL temp channel range as per HSO-CDF-ECR-114) CR428 : subshield pin tied to 0V
TEMP Red.	4003		
SCU-BP	4002	FR-SPIRE-FM 3200-0	No change As designed = As Built

Nota for FCU/MCU subset, for PSU and for FCU internal harnesses, refer to subsystem eidps.

FCU box : as designed= as built, refurbished QM2 box.

<sup>1</sup> (ref qualification NCR n° 396),

<sup>2</sup> FM box is refurbished QM2 box

## 6 RFD/RFW status list

<i>RFD/RFW ref.</i>	<i>Description</i>	<i>Status</i>
CEA's ref RFD_SPIRE_FCU_n9	Request for deviation FCU baseplate	Supposed approved (FCU MICD published in IID-B)
CEA's ref RFD_SPIRE_FCU_n10	Request for deviation fixation points	Supposed approved (FCU MICD published in IID-B)
CEA's ref RFW_FCU_FM_n12 RAL's ref HR-SP-CEA-RFW-003	HSPSU FM board : few solder joints not compliant with ECSS-Q-70-08	Issue 2 approved
CEA's ref RFW_FCU_n13 RAL's ref HR-SP-CEA-RFW-004	Conducted emissions on primary power lines	Pending
RFW_DCU_n15 RAL's ref TBD	Radiated susceptibility E Field	Pending
RFW_DCU_N16 RAL's ref TBD	Susceptibility to ESD	Pending
RFW_DRCU_N17 RAL's ref TBD	No radiated emission test performed	Pending

## 7 NCR status list

### 7.1 Major NCRs

#### 7.1.1 DCU major NCRs

<i>NCR n°</i>	<i>Description of problem</i>	<i>Corrective action</i>	<i>Status</i>
456	Susceptibility to E-Field	None	Waiver raised
453	Susceptibility to ESD	None	Waiver raised

#### 7.1.2 FCU major NCR's

<i>NCR n°</i>	<i>Description of problem</i>	<i>Corrective action</i>	<i>Status</i>
445	Excessive power drain (OP400 soldered rotated 180°) on CCHK+IF n°4002, TEMP 4003	OP400 replaced	To be closed
446			
439	Short-circuit between MCU secondary power lines and structure (root cause : pin pending of capacitors)	Stress analysis performed, potentially damaged components have been replaced	To be closed





### 7.2 Minor NCRs

#### 7.2.1 DCU minor NCR's

<b>NCR n°</b>	<b>Description of problem</b>	<b>Corrective action</b>	<b>Status</b>
<b>422</b>	Nheater channel not functional on BIAS n°4002 (test at board level) ->Defect on solder on a SMD resistor	Fixed : solder rectification	Closed
<b>426</b>	Channel 13 not functional on LIAP n°4006 (test at board level) ->Defect on solder on a SMD resistor	Fixed : solder rectification	Closed
<b>430</b>	Channel 10 not functional on LIAP n°4008 (test at board level) ->Defect on solder on a SMD resistor	Fixed : solder rectification	Closed
<b>447</b>	DCU mounting surface lightly scratched	Local application of alodine surface treatment	Closed
<b>451</b>	LIAS n°4001 pin 23 not tied to 0V ->Defect on solder on a SMD resistor (before acceptance tests)	Fixed : solder rectification	Closed

#### 7.2.2 FCU minor NCR's

<b>NCR n°</b>	<b>Description of problem</b>	<b>Corrective action</b>	<b>Status</b>
<b>455</b>	Excessive temperature reached during "OFF" plateau (about 80°C instead of 60°C)	None – FCU was not powered in such conditions, corresponds to storage conditions	Closed
<b>459</b>	Light instability of current drained on when powering on MCU redundant	None – current remains in specifications	Closed

	<p style="text-align: center;"><b>Herschel /SPIRE</b></p> <p style="text-align: center;">HS_DRCU (HS_DCU &amp; HS_FCU)FM CIDL / ABCL</p>	<p style="text-align: center;"> <b>DSM-DAPNIA SAp</b> SAp-SPIRE-QA-0417-06 Issue: 1.0 Date : 12/07/06 Page : 10/10</p>
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**8 Annexe : copies of major NCR's and RFW**

2)PROJECT : SPIRE	MODEL : FM	FILLED OUT BY : J.Fontignie	DATE : 12/05/2006
EQUIPMENT : HS_FCU N° :	SUB-ASSEMBLY : MCU N° :	BOARD(S) : N° :	N°OT : COMPAGNY :
<b>OCCURENCE PHASE</b> <input type="checkbox"/> CONTROL <input type="checkbox"/> MANUFACTURING <input type="checkbox"/> DESIGN/VALIDATION	<input type="checkbox"/> INTEGRATION <input type="checkbox"/> QUALIFICATION <input type="checkbox"/> OTHERS	<input type="checkbox"/> DESTOCKAGE <input type="checkbox"/> RECETTE	<b>ENVIRONMENTAL CONDITIONS</b> <input type="checkbox"/> AMBIANT <input type="checkbox"/> THERM. <input type="checkbox"/> VIBRATION <input type="checkbox"/> THERMAL VACCUM. <input type="checkbox"/> OTHER

**TITLE :** Short circuit on Redundant side of MCU, between +15V secondary line and chassis

**DESCRIPTION :**  
After integration of MCU boards in FCU box, first tests (facing powerbench and not PSU FM) have shown a disruption of the powerbench.

**REFERENCE DOCUMENT(S) :**

3) <b>TECHNICAL INVESTIGATION :</b> Investigations with ohm-meter have shown a short circuit between +15V motor and 0V (0V is same potential as chassis). Visual investigation after disintegration of MCU daughter boards have shown a capacitor pin in contact with chassis (C15, See photo left). See FA -MCU-024a in MCU subsystem EIDP for complete description of investigation.		<b>RESPONSIBLE(S) :</b>
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4) <b>CORRECTIVE ACTIONS (model concerned by NCR/CR) .</b> New method for pin bending of involved "through hole" capacitors, Involved capacitors replaced Stress analysis performed and potentially damaged components replaced CEA's procedure for integration enhanced (now includes impedance checking on secondary power inputs for MCU & SCU) See FA -MCU-024a in MCU subsystem EIDP for complete description of repair.	<b>RESPONSIBLE(S) :</b>	<b>FINALE DECISION(S)</b> <input type="checkbox"/> USE AS IS <input type="checkbox"/> WAIVER (FM) <input type="checkbox"/> DOCUMENTATION CHANGE <input checked="" type="checkbox"/> REPAIR <input type="checkbox"/> SCRAP <input type="checkbox"/> MODIFICATION <input type="checkbox"/> ACTION ON OTHER PRODUCT
<b>PREVENTIVE ACTIONS (further models) .</b> None	<b>RESPONSIBLE(S) :</b>	

CLASS	CLEARANCE FOR ACTIONS	TECHNICAL MANAGER	PRODUCT ASSURANCE MANAGER	PROJECT MANAGER
<input type="checkbox"/> MINOR	Unit responsible of involved product :		J. Fontignie 02/08/06	J.-L. AUGERET 28/06
<input checked="" type="checkbox"/> MAJOR	Upper level manager :			

5) <b>CLOSING DATE:</b>	<b>BY:</b>	<b>VISA:</b>
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<b>6) INVOLVED PARAMETERS</b> <input type="checkbox"/> INTERFACES <input checked="" type="checkbox"/> PERFORMANCES <input type="checkbox"/> RELIABILITY <input type="checkbox"/> SAFETY <input type="checkbox"/> OTHER:	<b>DIRECT CAUSES</b> <input type="checkbox"/> MATERIAL <input type="checkbox"/> STRUCT.THERM. <input type="checkbox"/> MECANISMS <input type="checkbox"/> EEE PART <input type="checkbox"/> DOCUMENTATION <input type="checkbox"/> OTHER	<input type="checkbox"/> HARNESS <input type="checkbox"/> ELECTRONICS <input type="checkbox"/> SOFTWARE <input type="checkbox"/> OPTICS <input type="checkbox"/> CLEANLINESS	<input type="checkbox"/> TEST MEANS <input type="checkbox"/> STORAGE/TRANSPORT <input type="checkbox"/> HANDLING/OPERATIONS <input type="checkbox"/> TESTS <input checked="" type="checkbox"/> UNKNOWN	<b>ROOT CAUSES</b> <input type="checkbox"/> DOCUMENTATION <input type="checkbox"/> MANUFACTURING <input type="checkbox"/> CONTROL <input type="checkbox"/> OPERATION <input type="checkbox"/> OTHER (schedule)	<input type="checkbox"/> PROCEDURE <input type="checkbox"/> CONFIG. <input type="checkbox"/> DESIGN <input checked="" type="checkbox"/> UNKNOWN
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SCHEDULE IMPACT :	< 1 week	< 1 month	> 1 month	COST IMPACT:	< 100KF	< 1MF	> 1MF
7) 1 <sup>st</sup> DISTRIBUTION	Date	to :					
2 <sup>nd</sup> DISTRIBUTION	Date	to :					



2)PROJECT : SPIRE	MODEL : FM	FILLED OUT BY : J.Fontignie	DATE : 12/05/2006
EQUIPMENT : HS_FCU N° :	SUB-ASSEMBLY : SCU N° :	BOARD(S) : TEMP N° :4003	N°OT : COMPAGNY :

<b>OCCURENCE PHASE</b> <input type="checkbox"/> CONTROL <input type="checkbox"/> MANUFACTURING <input type="checkbox"/> DESIGN/VALIDATION	<input type="checkbox"/> INTEGRATION <input type="checkbox"/> QUALIFICATION <input checked="" type="checkbox"/> OTHERS	<input type="checkbox"/> DESTOCKAGE <input type="checkbox"/> RECETTE	<b>INTEGRATION LEVEL</b> <input type="checkbox"/> PART <input type="checkbox"/> SUB-ASSEMBLY <input type="checkbox"/> EQUIPEMENT	<input checked="" type="checkbox"/> SUB SYSTEM <input type="checkbox"/> INSTRUMENT <input type="checkbox"/> OTHER	<b>ENVIRONMENTAL CONDITIONS</b> <input type="checkbox"/> AMBIANT <input type="checkbox"/> VIBRATION <input type="checkbox"/> THERMAL VACCUM	<input type="checkbox"/> THERM. <input checked="" type="checkbox"/> EMI/EMC <input type="checkbox"/> OTHER
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**TITLE :** TEMP Board s/n 4003 have shown excessive power-drain during test at board level

**DESCRIPTION :**  
Test at board level before board coating have shown an excessive power drain on +/-9V secondary power lines : 270mA instead of 100mA expected.

**REFERENCE DOCUMENT(S) :**

3) **TECHNICAL INVESTIGATION :** **RESPONSIBLE(S) :**  
Investigations performed with I/R camera have shown OP400 amplifier (refdes U42) as well as resistors R289/R290 and capacitors C181/C182 as suspicious (high temperature in this area) Further visual inspection have shown that OP400 U42 have been wrongly encapsulated in its package. The pin 1 reference point on the cover is inconsistent with the reference mark on the ceramic body of the component (See photo on next page). During board manufacturing, OP400 placement has be done according to the pin 1 reference of the cover, so the amplifier has been rotated 180°, this has the consequence of permuting +9V/-9V supplies, this implies a short circuit through clamping diodes. The only limitation is the series resistor on the OP400 +/-9V pins (2\*47.5Ω, for 18V, consistent with about 170mA of excessive power drain)

4) **CORRECTIVE ACTIONS (model concerned by NCR/CR) .** **RESPONSIBLE(S) :**

Stress analysis performed, only potentially damaged components are U42 (OP400) and R289/R290 + C181/C182. Components replaced with new components from attrition stock. Board tested OK after replacement.

**FINALE DECISION(S)**

USE AS IS  
 WAIVER (FM)  
 DOCUMENTATION CHANGE  
 REPAIR

**PREVENTIVE ACTIONS (further models) .** **RESPONSIBLE(S) :**

All OP400 amplifiers used for Herschel have now been encapsulated. CEA has the action to come back to the company who has encapsulated the OP400 and define preventive actions for next projects.

SCRAP  
 MODIFICATION  
 ACTION ON OTHER PRODUCT

CLASS	CLEARANCE FOR ACTIONS	TECHNICAL MANAGER	PRODUCT ASSURANCE MANAGER	PROJECT MANAGER
<input type="checkbox"/> MINOR	Unit responsible of involved product :		J. Fontignie	J.-L. Augereau
<input checked="" type="checkbox"/> MAJOR	Upper level manager :			2/8/06

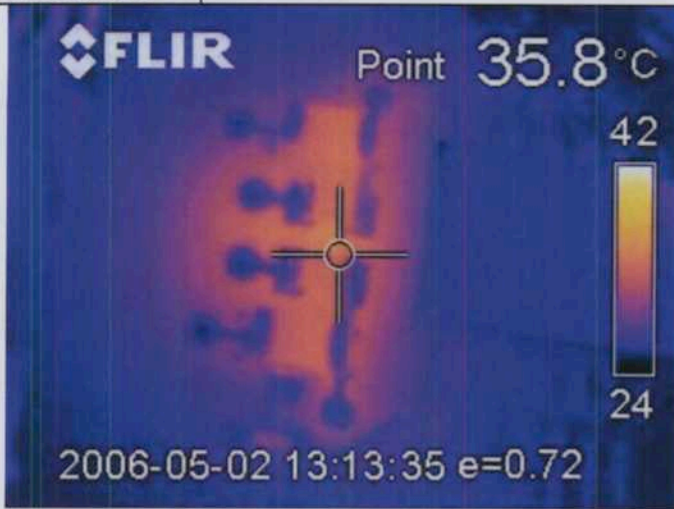
5) **CLOSING DATE:** **BY:** **VISA:**

<b>6) INVOLVED PARAMETERS</b> <input type="checkbox"/> INTERFACES <input checked="" type="checkbox"/> PERFORMANCES <input type="checkbox"/> RELIABILITY <input type="checkbox"/> SAFETY <input type="checkbox"/> OTHER:	<b>DIRECT CAUSES</b> <input type="checkbox"/> MATERIAL <input type="checkbox"/> STRUCT.THERM. <input type="checkbox"/> MECANISMS <input type="checkbox"/> EEE PART <input type="checkbox"/> DOCUMENTATION <input type="checkbox"/> OTHER	<input type="checkbox"/> HARNESS <input type="checkbox"/> ELECTRONICS <input type="checkbox"/> SOFTWARE <input type="checkbox"/> OPTICS <input type="checkbox"/> CLEANLINESS	<input type="checkbox"/> TEST MEANS <input type="checkbox"/> STORAGE/TRANSPORT <input type="checkbox"/> HANDLING/OPERATIONS <input type="checkbox"/> TESTS <input checked="" type="checkbox"/> UNKNOWN	<b>ROOT CAUSES</b> <input type="checkbox"/> DOCUMENTATION <input type="checkbox"/> MANUFACTURING <input type="checkbox"/> CONTROL <input type="checkbox"/> OPERATION <input type="checkbox"/> OTHER (schedule)	<input type="checkbox"/> PROCEDURE <input type="checkbox"/> CONFIG <input type="checkbox"/> DESIGN <input checked="" type="checkbox"/> UNKNOWN
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SCHEDULE IMPACT : < 1 week < 1 month > 1 month COST IMPACT: < 100KF < 1MF > 1MF

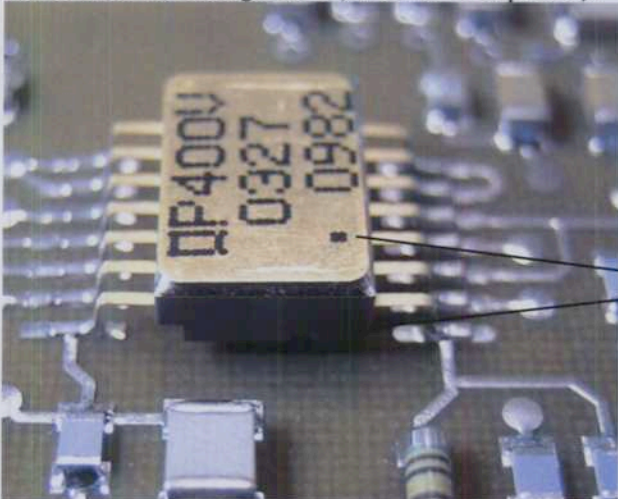
7) **1<sup>st</sup> DISTRIBUTION**  
Date to :  
**2<sup>nd</sup> DISTRIBUTION**  
Date to :





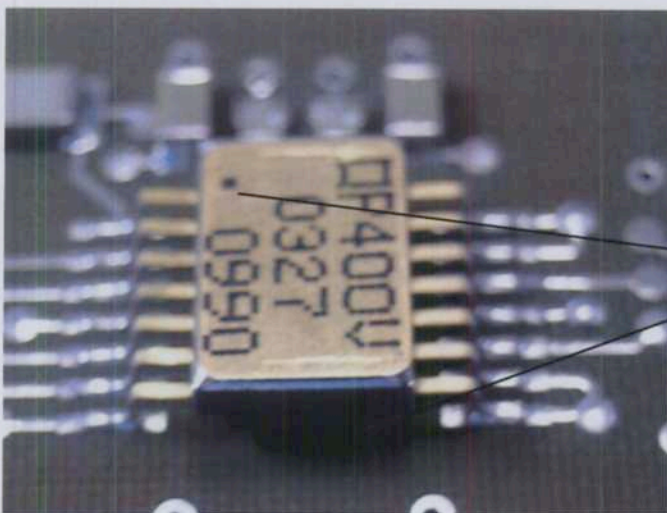
Hot spot on R289, R290 seen with I/R Camera

Standard OP400 configuration (all OP400 except U42) :



Consistency on marking

Unusual configuration of marking (U42) :



Inconsistency of marking

2)PROJECT : SPIRE	MODEL : FM	FILLED OUT BY : J.Fontignie	DATE : 12/05/2006
EQUIPMENT : HS_FCU N° :	SUB-ASSEMBLY : SCU N° :	BOARD(S) : CCHK N° : 4002	N°OT : COMPAGNY :

<b>OCCURENCE PHASE</b> <input type="checkbox"/> CONTROL <input type="checkbox"/> INTEGRATION <input type="checkbox"/> DESTOCKAGE <input type="checkbox"/> MANUFACTURING <input type="checkbox"/> QUALIFICATION <input type="checkbox"/> RECETTE <input type="checkbox"/> DESIGN/VALIDATION <input checked="" type="checkbox"/> OTHERS	<b>INTEGRATION LEVEL</b> <input type="checkbox"/> PART <input checked="" type="checkbox"/> SUB SYSTEM <input type="checkbox"/> SUB-ASSEMBLY <input type="checkbox"/> INSTRUMENT <input type="checkbox"/> EQUIPEMENT <input type="checkbox"/> OTHER	<b>ENVIRONMENTAL CONDITIONS</b> <input type="checkbox"/> AMBIANT <input type="checkbox"/> THERM <input type="checkbox"/> VIBRATION <input checked="" type="checkbox"/> EMI/EMC <input type="checkbox"/> THERMAL VACCUM <input type="checkbox"/> OTHER
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**TITLE :** CCHK Board s/n 4002 have shown excessive power-drain during test at board level

**DESCRIPTION :**  
 Test at board level before board coating have shown an excessive power drain on +/-9V secondary power lines : of about 170mA.

**REFERENCE DOCUMENT(S) :**

<b>3)TECHNICAL INVESTIGATION :</b> Visual inspection have shown that OP400 refdes "OP3070" have been wrongly encapsulated in its package. The pin 1 reference point on the cover is inconsistent with the reference mark on the ceramic body of the component (See NCR445 for another example). During board manufacturing, OP400 placement has be done according to the pin 1 reference of the cover, so the amplifier has been rotated 180°, this has the consequence of permuting +9V/-9V supplies, this implies a short circuit through clamping diodes. The only limitation is the series resistor on the OP400 +/-9V pins (2*47.5Ω, for 18V, consistent with about 170mA of excessive power drain)	<b>RESPONSIBLE(S) :</b>
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<b>4) CORRECTIVE ACTIONS (model concerned by NCR/CR) .</b> Stress analysis performed, only potentially damaged components are OP3070 (OP400) and R30P9V/R30N9V + C30P9VC30N9V. Components replaced with new components from attrition stock.Board tested OK after replacement.	<b>RESPONSIBLE(S) :</b>	<b>FINALE DECISION(S)</b> <input type="checkbox"/> USE AS IS <input type="checkbox"/> WAIVER (FM) <input type="checkbox"/> DOCUMENTATION CHANGE <input checked="" type="checkbox"/> REPAIR <input type="checkbox"/> SCRAP <input type="checkbox"/> MODIFICATION <input type="checkbox"/> ACTION ON OTHER PRODUCT
<b>PREVENTIVE ACTIONS (further models) .</b> All OP400 amplifiers used for Herschel have now been encapsulated. CEA has the action to come back to the company who has encapsulated the OP400 and define preventive actions for next projects.	<b>RESPONSIBLE(S) :</b>	

CLASS	CLEARANCE FOR ACTIONS	TECHNICAL MANAGER	PRODUCT ASSURANCE MANAGER	PROJECT MANAGER
<input type="checkbox"/> MINOR	Unit responsible of involved product :		J. Fontignie 02/08/06	J.L. ... 28/06
<input checked="" type="checkbox"/> MAJOR	Upper level manager :			

5)CLOSING DATE:	BY:	VISA:
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<b>6)INVOLVED PARAMETERS</b> <input type="checkbox"/> INTERFACES <input checked="" type="checkbox"/> PERFORMANCES <input type="checkbox"/> RELIABILITY <input type="checkbox"/> SAFETY <input type="checkbox"/> OTHER:	<b>DIRECT CAUSES</b> <input type="checkbox"/> MATERIAL <input type="checkbox"/> HARNESS <input type="checkbox"/> TEST MEANS <input type="checkbox"/> STRUCT.THERM. <input type="checkbox"/> ELECTRONICS <input type="checkbox"/> STORAGE/TRANSPORT <input type="checkbox"/> MECANISMS <input type="checkbox"/> SOFTWARE <input type="checkbox"/> HANDLING/OPERATIONS <input type="checkbox"/> EEE PART <input type="checkbox"/> OPTICS <input type="checkbox"/> TESTS <input type="checkbox"/> DOCUMENTATION <input type="checkbox"/> CLEANLINESS <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/> OTHER	<b>ROOT CAUSES</b> <input type="checkbox"/> DOCUMENTATION <input type="checkbox"/> PROCEDURE <input type="checkbox"/> MANUFACTURING <input type="checkbox"/> CONFIG. <input type="checkbox"/> CONTROL <input type="checkbox"/> DESIGN <input type="checkbox"/> OPERATION <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/> OTHER (schedule)
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SCHEDULE IMPACT :    < 1 week    < 1 month    > 1 month	COST IMPACT:    < 100KF    < 1MF    > 1MF
7)1 <sup>st</sup> DISTRIBUTION	
Date	to :
2 <sup>nd</sup> DISTRIBUTION	
Date	to :



2) <b>PROJECT : SPIRE</b>	MODEL : QM2	FILLED OUT BY : J.Fontignie	DATE : 13/06/2006
EQUIPMENT : HS_DCU N° :	SUB-ASSEMBLY : N° :	BOARD(S) : N° :	N°OT : COMPAGNY :
<b>OCCURENCE PHASE</b> <input type="checkbox"/> CONTROL <input type="checkbox"/> INTEGRATION <input type="checkbox"/> DESTOCKAGE <input type="checkbox"/> MANUFACTURING <input checked="" type="checkbox"/> QUALIFICATION <input type="checkbox"/> RECETTE <input type="checkbox"/> DESIGN/VALIDATION <input type="checkbox"/> OTHERS		<b>INTEGRATION LEVEL</b> <input type="checkbox"/> PART <input checked="" type="checkbox"/> SUB SYSTEM <input type="checkbox"/> SUB-ASSEMBLY <input type="checkbox"/> INSTRUMENT <input type="checkbox"/> EQUIPEMENT <input type="checkbox"/> OTHER	<b>ENVIRONMENTAL CONDITIONS</b> <input type="checkbox"/> AMBIANT <input type="checkbox"/> THERM. <input type="checkbox"/> VIBRATION <input checked="" type="checkbox"/> EMI/EMC <input type="checkbox"/> THERMAL VACCUUM <input type="checkbox"/> OTHER

**TITLE : HS\_DCU, corrupted bias level under ESD conductive test**

**DESCRIPTION :**

ESD susceptility tests performed on DCU QM2 shows susceptibility under ESD conductive tests (refer to [RD1] § 6.4). Such tests will not be reconducted on FM, so FM is supposed to have the same behaviour.

Affected requirements :

[AD1], § 5.14.3.13 "no malfunction, degradation of performance or deviation beyond the tolerance indicated in its individual specification shall occur when the subsystem equipment and its interface lines are exposed to a repetitive electrostatic arc discharge.

[AD2], requirement n° DRCU-REQ 34 (BDA bias) have been found to be affected during tests, but we can not guarantee that DRCU-REQ 35 (jfet Vss/Vdd bias) , DRCU-REQ-37 (jfet heater bias) are not affected.

**REFERENCE DOCUMENT(S) :**

[AD1] : Ref SCI-PT-IIDA-04624 Issue 3.3

[AD2] : DRCU subsystem specification Ref Sap-SPIRE-CCa-25-00

[RD1] : EMC Test report on DCU QM2 Ref Sap-SPIRE-DS-010-06

**3) TECHNICAL INVESTIGATION :**

**RESPONSIBLE(S) :**

Such discharges are expected to be very infrequent during flight since the DCU unit is mounted on the inner side of a Service Module panel. Effect is a step in the bolometer bias amplitude as shown in [RD1]. Bias remains within its specified range since the discharge affect the content of DAC registers

**4) CORRECTIVE ACTIONS (model concerned by NCR/CR) .**

**RESPONSIBLE(S) :**

**FINALE DECISION(S)**

No corrective action foreseen at DCU subsystem level.

- USE AS IS
- WAIVER (FM)
- DOCUMENTATION CHANGE
- REPAIR
- SCRAP
- MODIFICATION
- ACTION ON OTHER PRODUCT

**PREVENTIVE ACTIONS (further models) .**

**RESPONSIBLE(S) :**

To be discussed in NRB, CEA suggests to raise a waiver on HS\_DCU FM model

CLASS	CLEARANCE FOR ACTIONS	TECHNICAL MANAGER	PRODUCT ASSURANCE MANAGER	PROJECT MANAGER
<input type="checkbox"/> MINOR	Unit responsible of involved product :	C. CARA <i>[Signature]</i> 16/06/06	J. FONTIGNIE <i>[Signature]</i> 16/06/2006	J. LAQUERES <i>[Signature]</i> 16/06/06
<input checked="" type="checkbox"/> MAJOR	Upper level manager :			

**5) CLOSING DATE:**

**BY:**

**VISA:**

<b>6) INVOLVED PARAMETERS</b> <input type="checkbox"/> INTERFACES <input checked="" type="checkbox"/> PERFORMANCES <input type="checkbox"/> RELIABILITY <input type="checkbox"/> SAFETY <input type="checkbox"/> OTHER:	<b>DIRECT CAUSES</b> <input type="checkbox"/> MATERIAL <input type="checkbox"/> STRUCT.THERM. <input type="checkbox"/> MECANISMS <input type="checkbox"/> EEE PART <input type="checkbox"/> DOCUMENTATION <input type="checkbox"/> OTHER	<input type="checkbox"/> HARNESS <input type="checkbox"/> ELECTRONICS <input type="checkbox"/> SOFTWARE <input type="checkbox"/> OPTICS <input type="checkbox"/> CLEANLINESS	<input type="checkbox"/> TEST MEANS <input type="checkbox"/> STORAGE/TRANSPORT <input type="checkbox"/> HANDLING/OPERATIONS <input type="checkbox"/> TESTS <input checked="" type="checkbox"/> UNKNOWN	<b>ROOT CAUSES</b> <input type="checkbox"/> DOCUMENTATION <input type="checkbox"/> MANUFACTURING <input type="checkbox"/> CONTROL <input type="checkbox"/> OPERATION <input type="checkbox"/> OTHER (schedule)	<input type="checkbox"/> PROCEDURE <input type="checkbox"/> CONFIG. <input type="checkbox"/> DESIGN <input checked="" type="checkbox"/> UNKNOWN
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SCHEDULE IMPACT : < 1 week    < 1 month    > 1 month                      COST IMPACT: < 100KF    < 1MF    > 1MF

**7) 1<sup>st</sup> DISTRIBUTION**

Date to :

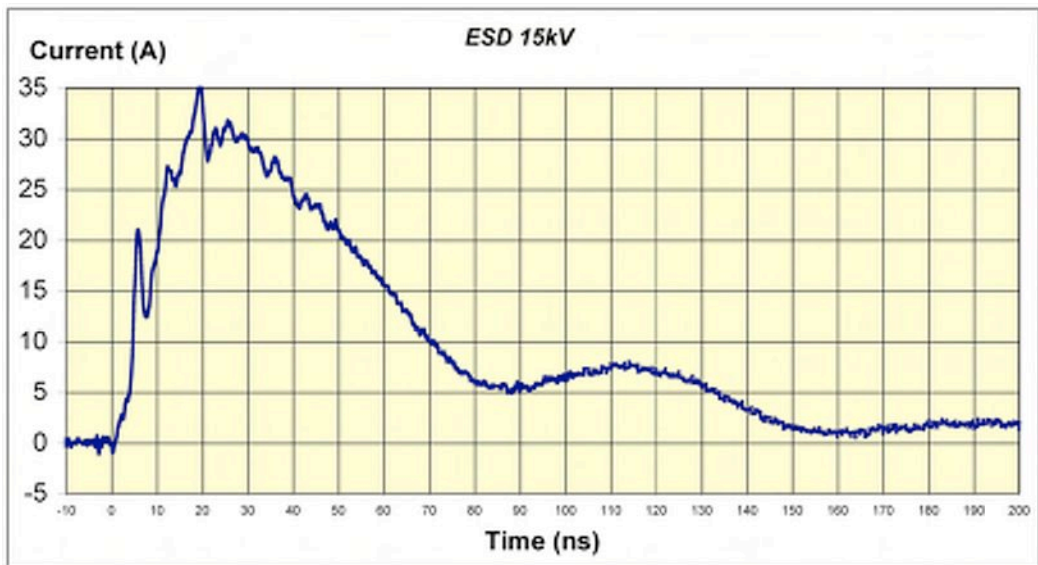
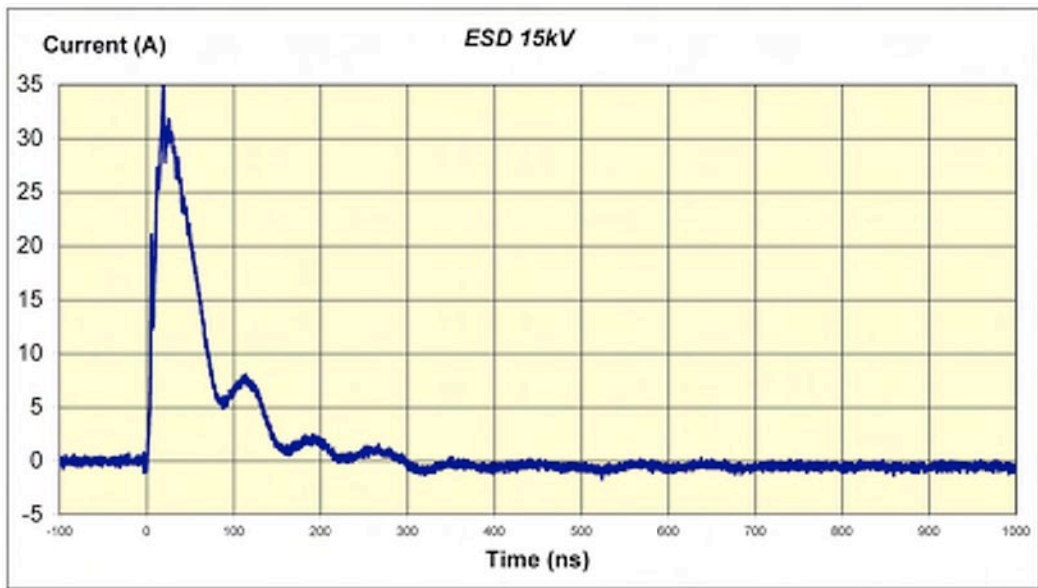
**2<sup>nd</sup> DISTRIBUTION**

Date to :

**6.4 Electro-Static Discharges**

**6.4.1 Test Equipment and measured typical current shape**

SCHLODER GUN SESD 2000	22/02/2005
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Measured on ESD strap grounding contact using FCC-F16 current probe

**6.4.2 Conducted ESD, DCU photometer redundant mode**

Test Scheduled on: 23/12/2005 12:29:26



	<b>EMC Test report on DCU QM2</b>	<b>Ref</b> :SAp-SPIRE-DS-010-06 <b>Issue</b> : 1 <b>Rev.</b> : 0 <b>Date</b> :20/02/06 <b>Page</b> :86/96
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#### 6.4.2.1 Test specification and settings

##### Requirement:

The device under test must recover nominal performances when exposed to a minimum of 10 direct contact discharges of 15mJ/15kV with a rise time lower than 10ns.

##### Effective settings and method:

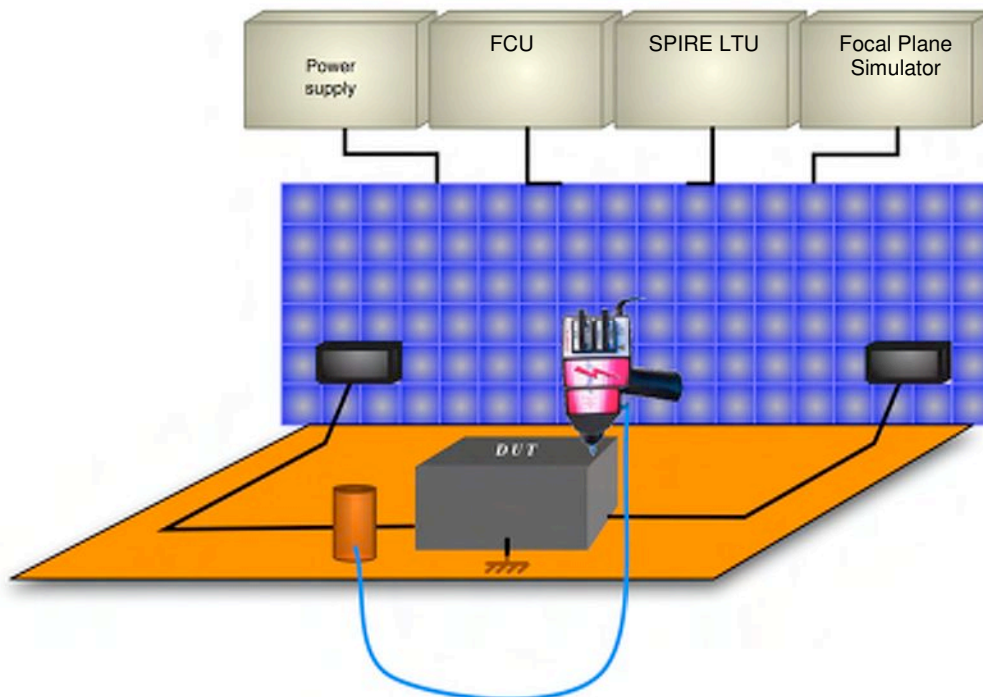
Arc discharge distance from DUT boundaries	direct contact
Discharge rate/Voltage setting	20 discharges at 2Hz/15kV

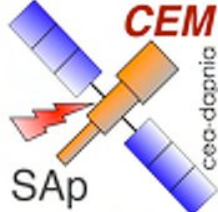
The DUT is in ON condition.

The ESD strap grounding point is moved all around the DUT in order to insure that the current circulation is mainly into the DUT structure.

#### 6.4.2.2 Test set-up description

##### Experimental Set-up Concept:



	<b>EMC Test report on DCU QM2</b>	<b>Ref</b> :SAp-SPIRE-DS-010-06 <b>Issue</b> : 1 <b>Rev.</b> : 0 <b>Date</b> :20/02/06 <b>Page</b> :87/96
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### Views of the Experimental Set-up and Discharge locations:



#### *Additional positions:*

1. Table-top both directions
2. Upper edges and corners
3. Harness bundles
4. Connector backshells

#### **6.4.2.3 Results**

#### **Analysis :**

1. NO SUSCEPTIBILITY
2. NO SUSCEPTIBILITY
3. NO SUSCEPTIBILITY
4. Susceptibilities found on BIAS-P and DAQ-IF connector backshells. All bias levels are affected as shown on figures below.

Nominal bias levels are recovered using relevant setting commands. No material damage.

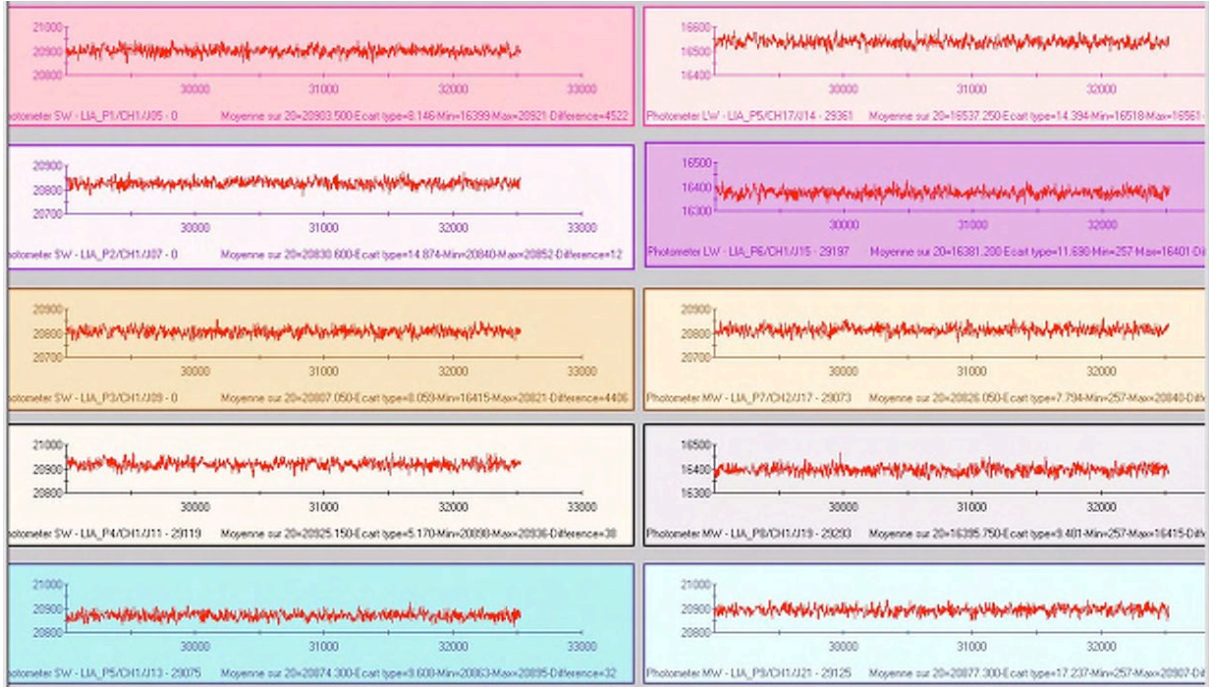
#### **Compliance:**

Failure detection and manual operator actions are required to recover nominal performances. This situation does not fully cope with the basic requirement, the DUT is then considered as not compliant.

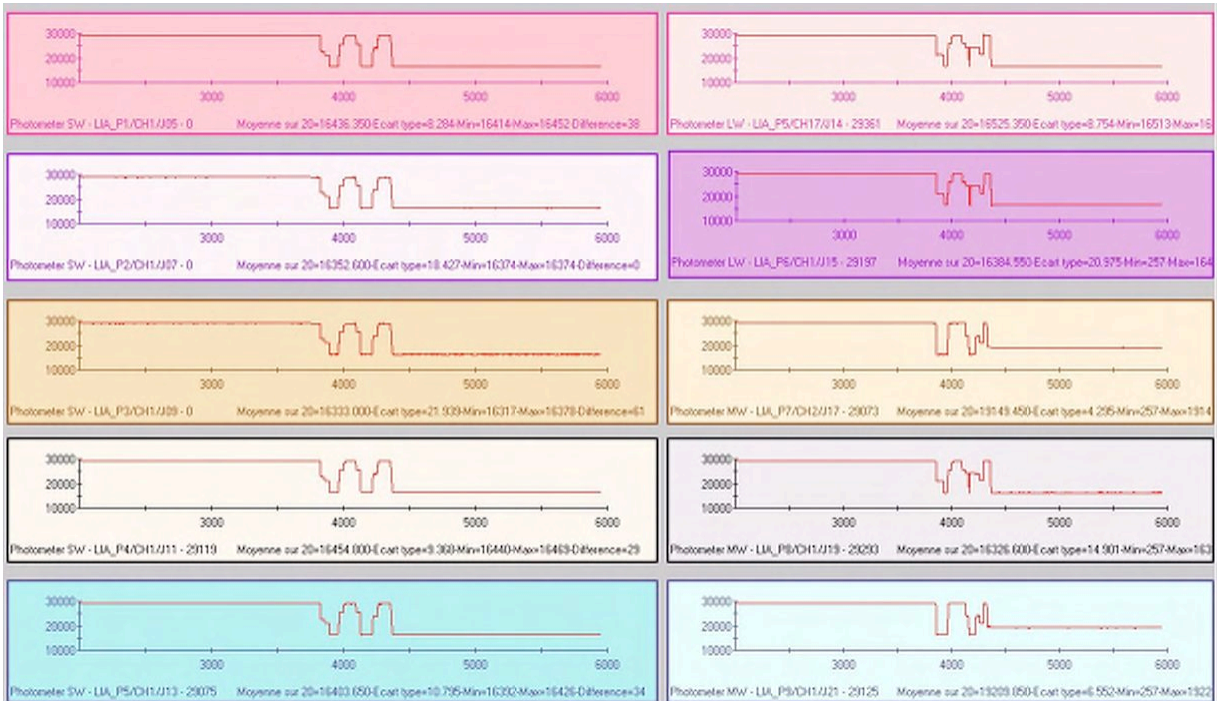


# EMC Test report on DCU QM2

**Ref** : SAp-SPIRE-DS-010-06  
**Issue** : 1    **Rev.** : 0  
**Date** : 20/02/06  
**Page** : 88/96

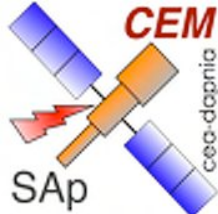


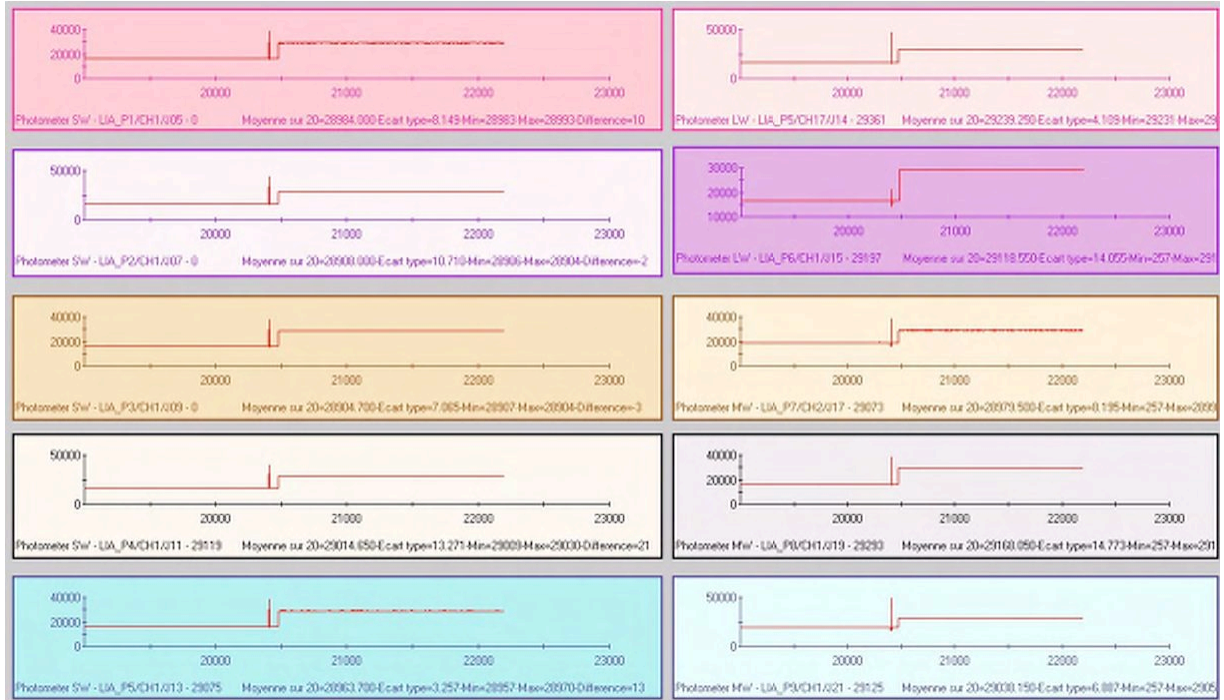
Nominal Performances




Bias level changes on every channel, example 1



	<h2>EMC Test report on DCU QM2</h2>	<p><b>Ref</b> :SAp-SPIRE-DS-010-06  <b>Issue</b> : 1    <b>Rev.</b> : 0  <b>Date</b> :20/02/06  <b>Page</b> :89/96</p>
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Bias level changes on every channel, example 2

	<b>EMC Test report on DCU QM2</b>	<b>Ref</b> :SAp-SPIRE-DS-010-06 <b>Issue</b> : 1 <b>Rev.</b> : 0 <b>Date</b> :20/02/06 <b>Page</b> :90/96
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### 6.4.3 Conducted ESD, DCU spectrometer redundant mode

Test Scheduled on: 23/12/2005 12:29:26

#### 6.4.3.1 Test specification and settings

##### Requirement:

The device under test must recover nominal performances when exposed to a minimum of 10 direct contact discharges of 15mJ/15kV with a rise time lower than 10ns.

##### Effective settings and method:

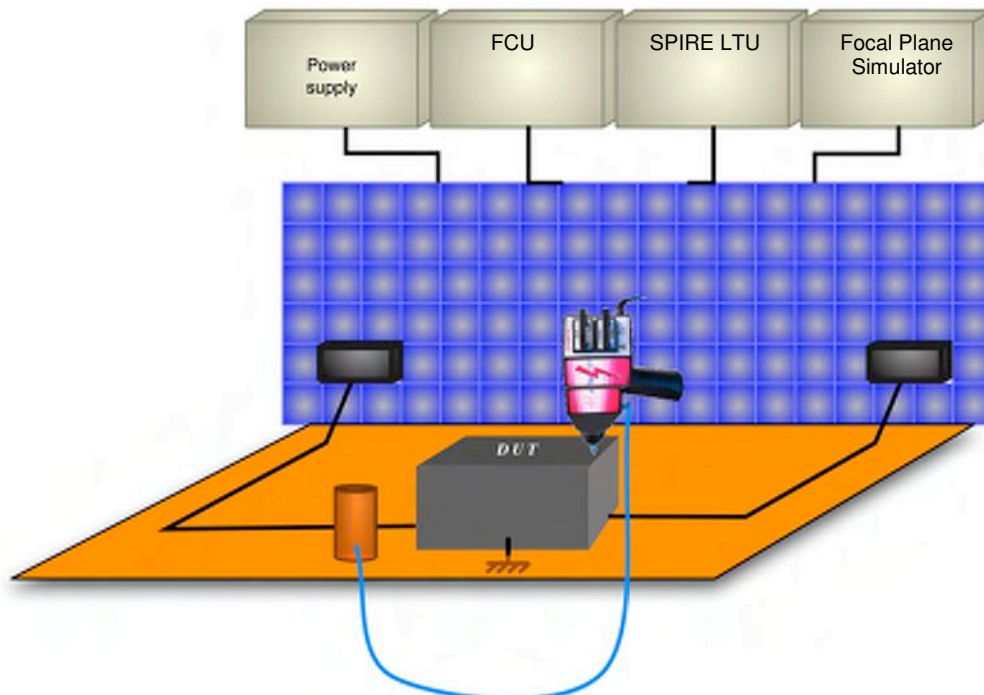
Arc discharge distance from DUT boundaries	direct contact
Discharge rate/Voltage setting	20 discharges at 2Hz/15kV

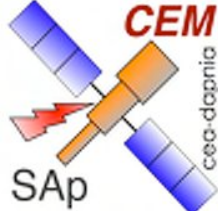
The DUT is in ON condition.

The ESD strap grounding point is moved all around the DUT in order to insure that the current circulation is mainly into the DUT structure.

#### 6.4.3.2 Test set-up description

##### Experimental Set-up Concept:



	<b>EMC Test report on DCU QM2</b>	<b>Ref</b> :SAp-SPIRE-DS-010-06 <b>Issue</b> : 1 <b>Rev.</b> : 0 <b>Date</b> :20/02/06 <b>Page</b> :91/96
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### Views of the Experimental Set-up and Discharge locations:

*Similar to previous set-up*

*Additional positions:*

1. Table-top both directions
2. Upper edges and corners
3. Harness bundles
4. Connector backshells

#### **6.4.3.3 Results**

#### **Analysis :**

1. NO SUSCEPTIBILITY
2. Susceptibility found on left rear corner box close to the BIAS connectors. Most of the bias levels are affected as shown on figure below.
3. NO SUSCEPTIBILITY
4. Susceptibilities found on BIAS-R connector backshell. All bias levels are affected as shown on figures below.

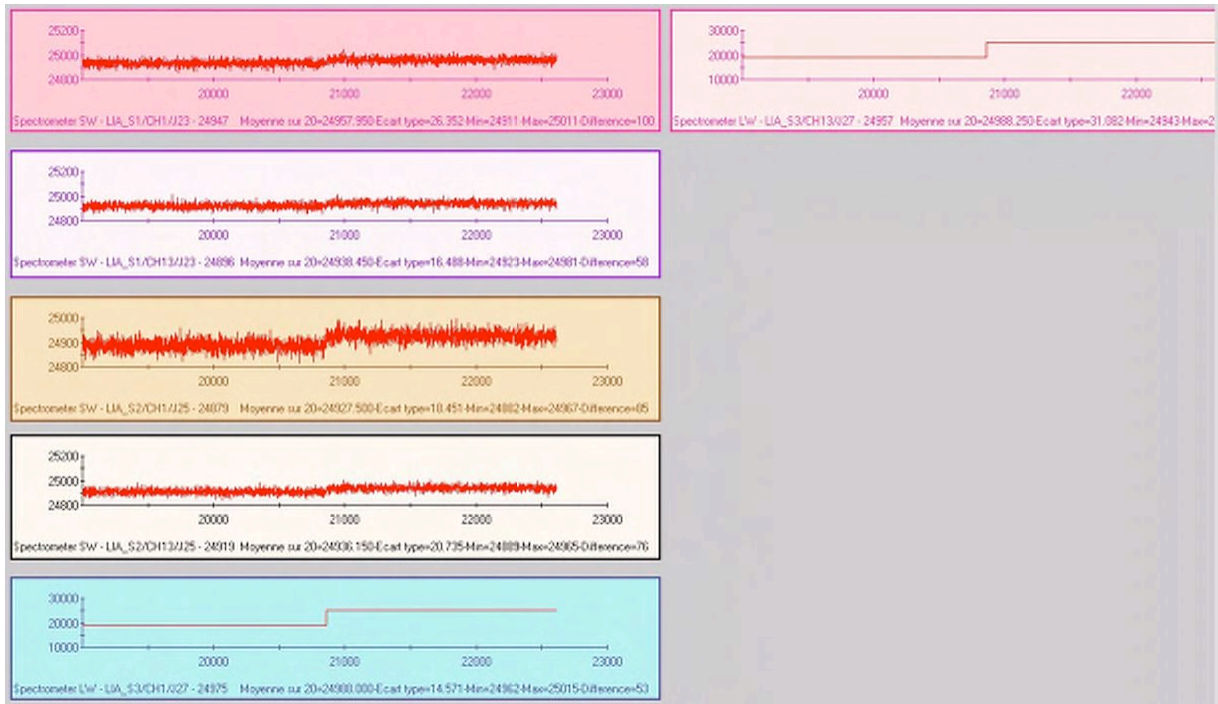
Nominal bias levels are recovered using relevant setting commands. No material damage.

#### **Compliance:**

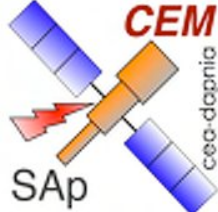
Failure detection and manual operator actions are required to recover nominal performances. This situation does not fully cope with the basic requirement, the DUT is then considered as not compliant.

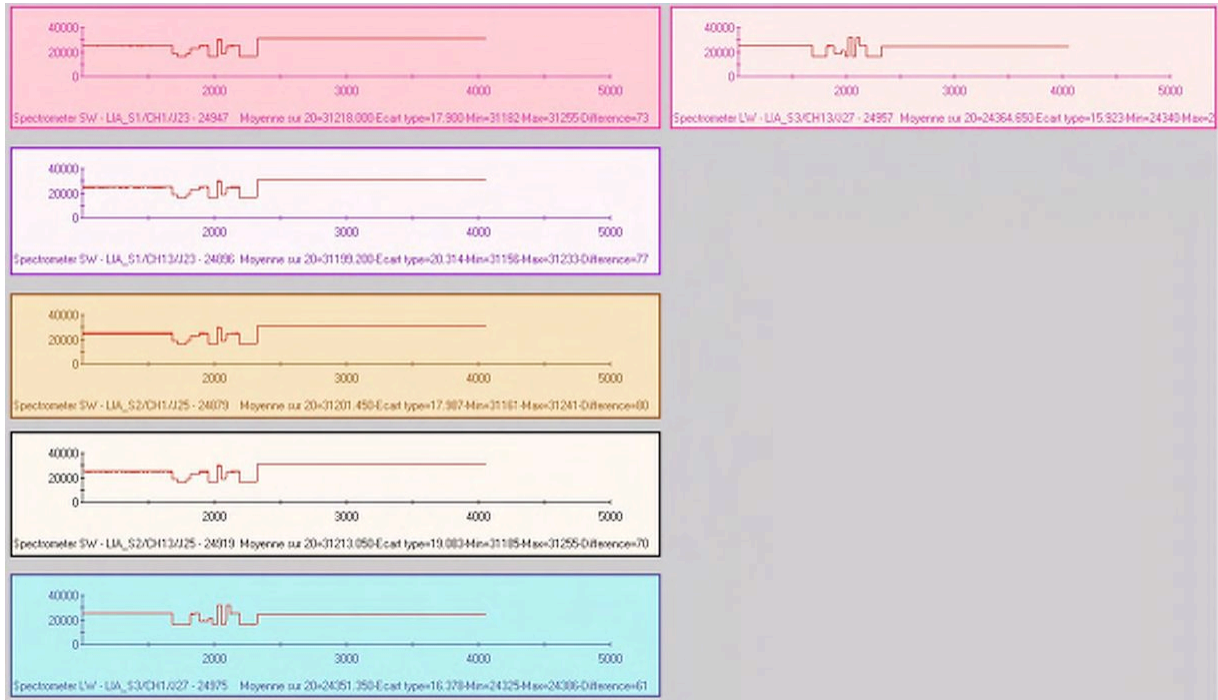


Nominal Performances



Bias level changes, discharges on the left rear corner box

	<h2>EMC Test report on DCU QM2</h2>	<p><b>Ref</b> :SAp-SPIRE-DS-010-06  <b>Issue</b> : 1    <b>Rev.</b> : 0  <b>Date</b> :20/02/06  <b>Page</b> :93/96</p>
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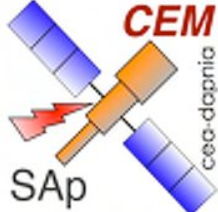


Bias level changes on every channel, discharges on BIAS-R front connector backshell



Bias level changes on every channel, discharges on BIAS-R rear connector backshell



	<b>EMC Test report on DCU QM2</b>	<b>Ref</b> :SAP-SPIRE-DS-010-06 <b>Issue</b> : 1 <b>Rev.</b> : 0 <b>Date</b> :20/02/06 <b>Page</b> :94/96
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#### 6.4.4 Radiated ESD, DCU photometer redundant mode

Test Scheduled on: 23/12/2005 12:29:26

##### 6.4.4.1 Test specification and settings

###### Requirement:

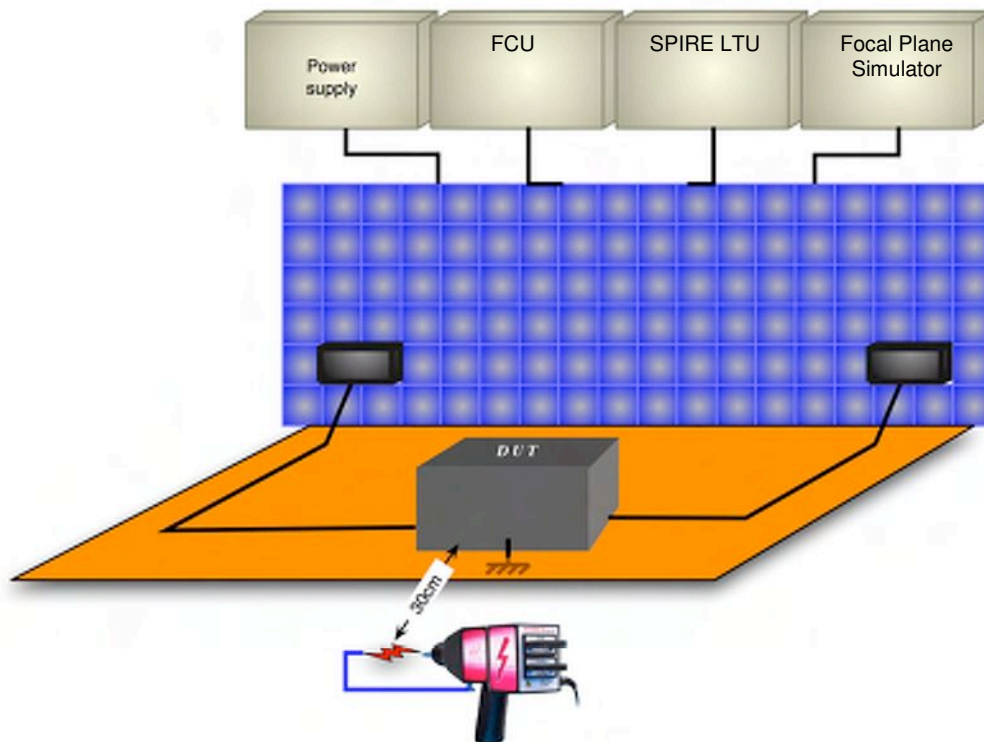
The device under test must recover nominal performances when exposed to a minimum of 10 discharges of 15 mJ/15kV at 30cm distance from the device under test boundaries.

###### Effective settings and method:

Arc discharge distance from DUT boundaries	30 cm
Discharge rate/Voltage setting	40 repetitive/15kV

##### 6.4.4.2 Test set-up description


###### Experimental Set-up Concept:



##### 6.4.4.3 Results

###### Analysis :

NO SUSCEPTIBILITY

	<b>EMC Test report on DCU QM2</b>	<b>Ref</b> :SAp-SPIRE-DS-010-06 <b>Issue</b> : 1 <b>Rev.</b> : 0 <b>Date</b> :20/02/06 <b>Page</b> :95/96
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#### 6.4.5 Radiated ESD, DCU spectrometer redundant mode

Test Scheduled on: 23/12/2005 12:29:26

##### 6.4.5.1 Test specification and settings

###### Requirement:

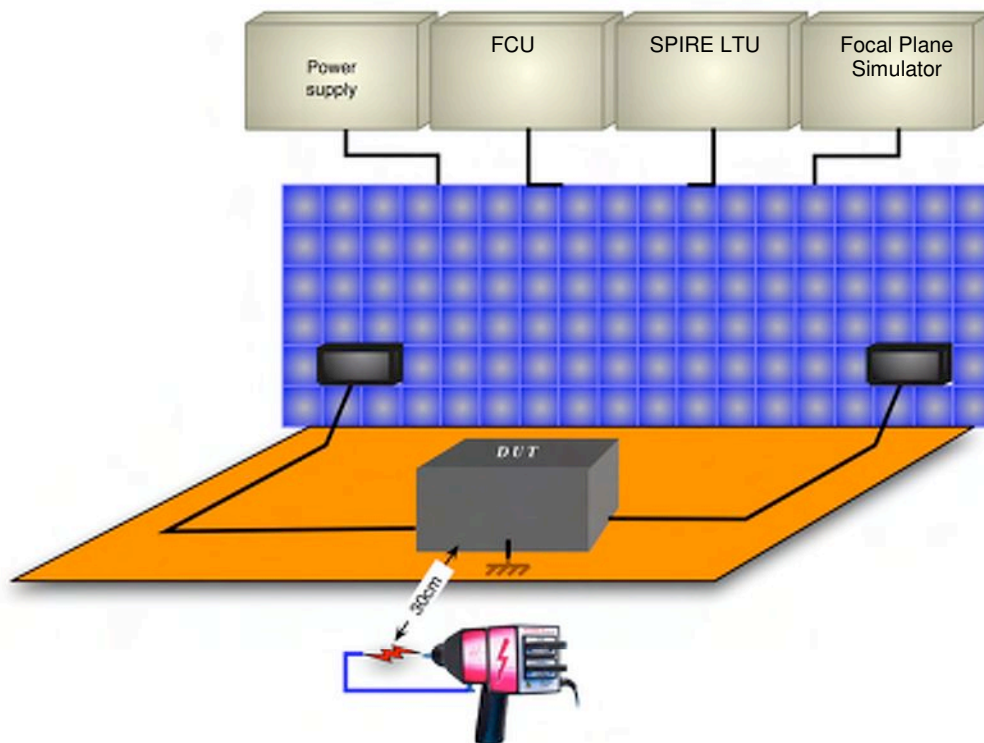
The device under test must recover nominal performances when exposed to a minimum of 10 discharges of 15 mJ/15kV at 30cm distance from the device under test boundaries.

###### Effective settings and method:

Arc discharge distance from DUT boundaries	30 cm
Discharge rate/Voltage setting	40 repetitive/15kV

##### 6.4.5.2 Test set-up description


###### Experimental Set-up Concept:



##### 6.4.5.3 Results

###### Analysis :

NO SUSCEPTIBILITY

 <p><b>CEM</b> cea-dspnra <b>SAp</b></p>	<p><b>EMC Test report on DCU QM2</b></p>	<p><b>Ref</b> :SAp-SPIRE-DS-010-06 <b>Issue</b> : 1 <b>Rev.</b> : 0 <b>Date</b> :20/02/06 <b>Page</b> :96/96</p>
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2)PROJECT : SPIRE	MODEL : QM2	FILLED OUT BY : J.Fontignie	DATE : 07/07/2006
EQUIPMENT : HS_DCU N° :	SUB-ASSEMBLY : N° :	BOARD(S) : N° :	N°OT : COMPAGNY :

<b>OCCURENCE PHASE</b>		<b>INTEGRATION LEVEL</b>		<b>ENVIRONMENTAL CONDITIONS</b>	
<input type="checkbox"/> CONTROL	<input type="checkbox"/> INTEGRATION	<input type="checkbox"/> DESTOCKAGE	<input type="checkbox"/> PART	<input type="checkbox"/> SUB SYSTEM	<input type="checkbox"/> AMBIANT
<input type="checkbox"/> MANUFACTURING	<input checked="" type="checkbox"/> QUALIFICATION	<input type="checkbox"/> RECETTE	<input type="checkbox"/> SUB-ASSEMBLY	<input type="checkbox"/> INSTRUMENT	<input type="checkbox"/> THERM.
<input type="checkbox"/> DESIGN/VALIDATION	<input type="checkbox"/> OTHERS		<input type="checkbox"/> EQUIPEMENT	<input type="checkbox"/> OTHER	<input type="checkbox"/> VIBRATION
					<input type="checkbox"/> THERMAL VACCUM.
					<input type="checkbox"/> OTHER

**TITLE : HS\_DCU, susceptibility to E Field at 215MHz and 185MHz (Horizontal polarization)**

**DESCRIPTION :**  
Emi-Emc tests performed on DCU QM2 have shown a susceptibility on DCU (ref RD1 § 6.3) at 215MHz (0dB margin) and 185MHz (5dB negative margin).

**Nota :** margins are established considering equal contributions of environmental noise and sensitivity (=0 dB)

**REFERENCE DOCUMENT(S) :**  
[AD1] : Ref SCI-PT-IIDA-04624 Issue 3.3  
[AD2] : DRCU subsystem specification Ref Sap-SPIRE-CCa-25-00  
[RD1] : EMC Test report on DCU QM2 Ref Sap-SPIRE-DS-010-06

3) <b>TECHNICAL INVESTIGATION :</b>	<b>RESPONSIBLE(S) :</b>
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4) <b>CORRECTIVE ACTIONS (model concerned by NCR/CR) .</b>	<b>RESPONSIBLE(S) :</b>	<b>FINALE DECISION(S)</b>
No corrective action foreseen at DCU subsystem level.		<input type="checkbox"/> USE AS IS <input checked="" type="checkbox"/> WAIVER (FM) <input type="checkbox"/> DOCUMENTATION CHANGE <input type="checkbox"/> REPAIR <input type="checkbox"/> SCRAP <input type="checkbox"/> MODIFICATION <input type="checkbox"/> ACTION ON OTHER PRODUCT
<b>PREVENTIVE ACTIONS (further models) .</b>	<b>RESPONSIBLE(S) :</b>	
To be discussed in NRB, such tests will not be performed on DCU FM, so FM is supposed to have the same behaviour. CEA proposes to raise a waiver.		

CLASS	CLEARANCE FOR ACTIONS	TECHNICAL MANAGER	PRODUCT ASSURANCE MANAGER	PROJECT MANAGER
<input type="checkbox"/> MINOR	Unit responsible of involved product :		J.FONTIGNIE	J. Auguier
<input checked="" type="checkbox"/> MAJOR	Upper level manager :			

5) <b>CLOSING DATE:</b>	<b>BY:</b>	<b>VISA:</b>
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<b>6) INVOLVED PARAMETERS</b>		<b>DIRECT CAUSES</b>		<b>ROOT CAUSES</b>	
<input type="checkbox"/> INTERFACES	<input checked="" type="checkbox"/> PERFORMANCES	<input type="checkbox"/> MATERIAL	<input type="checkbox"/> STRUCT.THERM.	<input type="checkbox"/> DOCUMENTATION	<input type="checkbox"/> PROCEDURE
<input type="checkbox"/> RELIABILITY	<input type="checkbox"/> SAFETY	<input type="checkbox"/> MECHANISMS	<input type="checkbox"/> EEE PART	<input type="checkbox"/> MANUFACTURING	<input type="checkbox"/> CONFIG.
<input type="checkbox"/> OTHER:		<input type="checkbox"/> HARNESS	<input type="checkbox"/> ELECTRONICS	<input type="checkbox"/> CONTROL	<input type="checkbox"/> DESIGN
		<input type="checkbox"/> TEST MEANS	<input type="checkbox"/> STORAGE/TRANSPORT	<input type="checkbox"/> OPERATION	<input checked="" type="checkbox"/> UNKNOWN
		<input type="checkbox"/> TESTS	<input type="checkbox"/> HANDLING/OPERATIONS	<input type="checkbox"/> OTHER (schedule)	
		<input type="checkbox"/> CLEANLINESS	<input checked="" type="checkbox"/> UNKNOWN		

SCHEDULE IMPACT : < 1 week < 1 month > 1 month COST IMPACT: < 100KF < 1MF > 1MF

7) <b>1<sup>st</sup> DISTRIBUTION</b>	Date	to :
<b>2<sup>nd</sup> DISTRIBUTION</b>	Date	to :

ORIGINAL



<b>PROJECT/INSTRUMENT : HERCSHEL / SPIRE</b>		<b>SEGMENT</b> GROUND ON BOARD	Date :01/09/2003
S-SYSTEME : FCU MODEL : FM	EQUIPMENT : MODEL :	SUB-ASSY : MODEL :	WBS n°
Drawing ref : FCU MICD ref. SPIR-MX-5200 000 F		Serial or lot ref : All	Company :
Affected Document ref: SCI-PT-IIDA-04624 3/0		Quantity 1	Destination : Spire system team

**TITLE : FCU flat base plate**  
**DESCRIPTION :**

SCI-PT-IIDA-04624 Issue 3/0 requires a flat base plate for warm units if dissipative flux exceeds 50W/m<sup>2</sup>. (IIDA § 5.7.3 "All units operating in the 270-350K range shall have a flat base-plate contact: these are all the dissipating units i.e. those where the skin dissipated power of faces not in contact with support structure is more than 50W/m<sup>2</sup>) .

The total dissipated power through the HSFCU is 48.12 W and the estimated radiative area is about 0.42m<sup>2</sup> : the dissipative flux is > 50 W/m<sup>2</sup>.

However, ASTRUM (PSU supplier) propose a design without flat base plate.

(Original RFW raised by ASTRUM, ref HSPIR.PSU.RFD.00014.V.ASTR)

Réf. NCR : None

Date close-out by CRM:

**REASON FOR CHANGE / JUSTIFICATION:**

A preliminary thermal analysis taking into account hypothesis coming from of AD1 (Trad=45°C, Tmean base plate = 45 °C), shows that the main requirement coming from AD3 ( $\Delta T < 6^\circ\text{C}$  between the bottom and the top of the bottom part of the unit : the HS\_PSU) is satisfied with the proposed design .

Furthermore, the implementation of a flat base plate would dramatically impact the mass budget.

Compared to the original design, ASTRUM propose to increase the contact area with the SVM plate by filling the gaps between the attachment feet as shown on the joined drawing. The added area value is 0,017m<sup>2</sup>, which makes a total contact area with NIDA of 0,050 m<sup>2</sup>.

ASTRUM provided a reduced thermal model of this configuration (RD1) to ALCATEL who checked the acceptability of this design (see e-mail sent from Bernard COLLAUDIN (ALCATEL-SPACE) to Mr TOURRETTE (CEA) the 25 July 2003)

Ref. of justification. documents :

AD1 = SCI-PT-IIDA-04624 3/0 Part A

AD3 = SAP-SPIRE-DS-012-02 SPIRE PSU cahier des charges techniques Version 1 Rev 1

RD1= HSPSU Modèle thermique réduit HSPIR.PSU.MN.019.V.ASTR Edition :01 Rév. : 01)

**AFFECTED CRITERIA**

Function  Interface  Interchangeability  Reliability  Safety  Other :

**USING LIMITATIONS OR COMMENTS :**

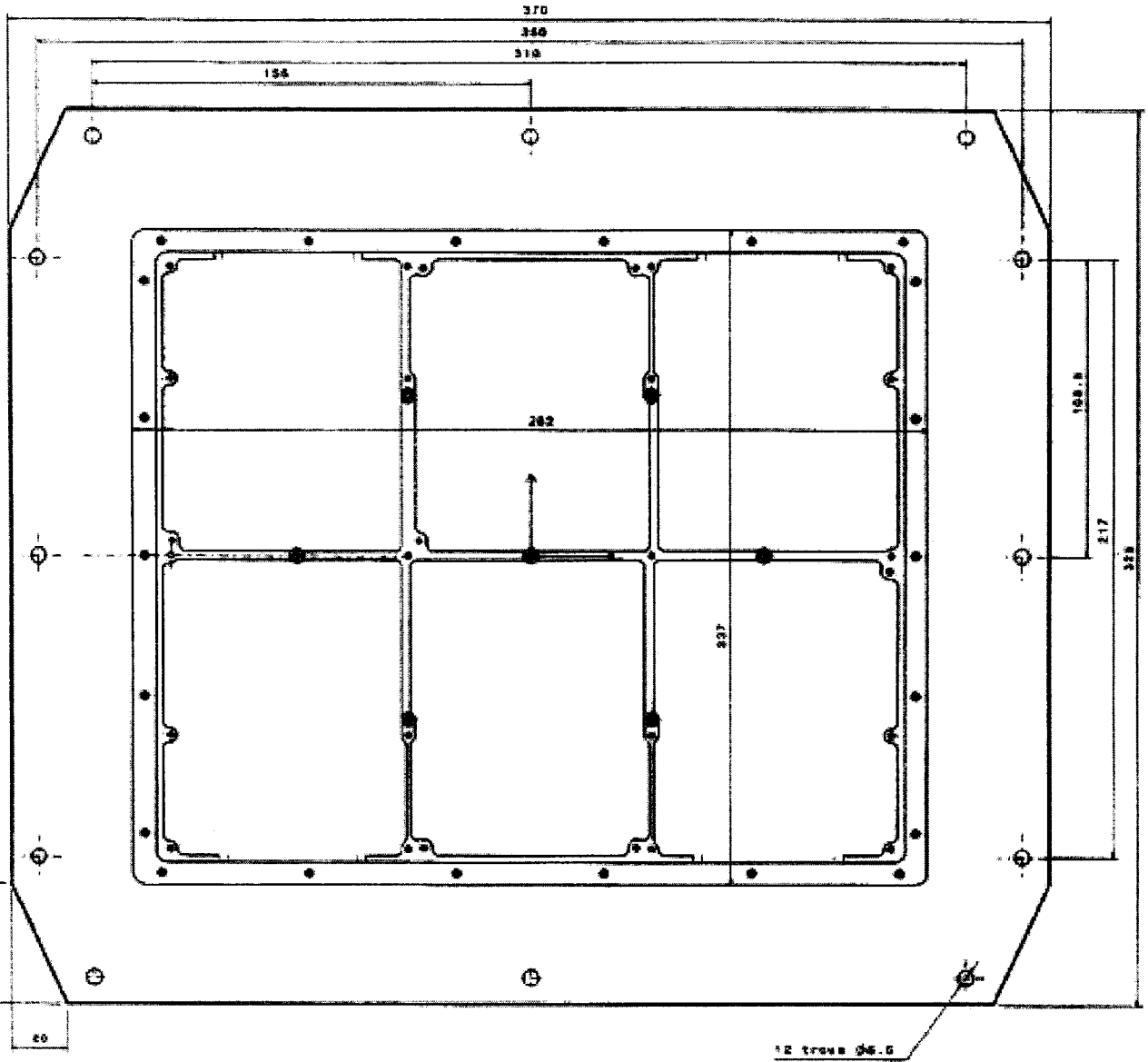
**SUBMITTED BY Name :** J. Fontignie

**Date :** 01/09/2003

**Visa :**

<b>AUTORISATION VISAS (name, date, signature)</b>				
	AUTHORITY	TECHNICAL	PRODUCT ASSURANCE	PROJECT MANAGER
Deviation <input checked="" type="checkbox"/>				
Waiver <input type="checkbox"/>	CEA	T. TOURRETTE	J. FONTIGNIE	J.L. AUGERES
Repair <input type="checkbox"/>				
Minor <input type="checkbox"/>	SPIRE System team			
Major <input checked="" type="checkbox"/>				
Critical <input type="checkbox"/>				

Proposed base plate :





<b>PROJECT/INSTRUMENT : HERCSHEL / SPIRE</b>		<b>SEGMENT</b> <small>GROUND ON BOARD</small>	Date : 19/08/2003
S-SYSTEME : FCU MODEL : FM	EQUIPMENT : MODEL :	SUB-ASSY : MODEL :	WBS n°
Drawing ref : FCU MICD ref. SPIR-MX-5200 000 F		Serial or lot ref : All	Company :
Affected Document ref: SCI-PT-IIDA-04624 3/0		Quantity 1	Destination : Spire system team

**TITLE : Number of interface fixation points for FCU****DESCRIPTION :**

SCI-PT-IIDA-04624 Issue 3/0 states "The preferred way for fixation of boxes is using M4 screws. Deviations shall be negotiated with Alcatel on case by case analysis"

A preliminary mechanical analysis (performed by ASTRIUM, PSU supplier for SPIRE's DRCU) shows that, given the the number FCU box feet, M4 screws do not insure a good enough mechanical behaviour on satellite wall according to AD1.

It is proposed that the FCU 12 attachment feet will be drilled to receive M5 screws.

(Original RFW raised by ASTRIUM, ref HSPIR.PSU.RFD.00012.V.ASTR)

Réf. NCR : None

Date close-out by CRM:

**REASON FOR CHANGE / JUSTIFICATION:**

After performing preliminary mechanical analysis taking into the mechanical environment required in AD1, it is shown that it is impossible to obtain satisfactory criteria for inserts and screws computation using the AD1 method : the insert criteria can reach values >> 1 required.

Calculations considering only static limit loads (combined) as required by ALCATEL-SPACE and performed with new insert mechanical characteristics provided by ALCATEL-SPACE (Pm=2500N , Qm=3620N) show that with M4 screws only sliding occurred on 3 feet whereas with M5 ones all the criteria of specified in AD1 are fulfilled.

**Note :** AD1 = SCI-PT-IIDA-04624 3/0

Ref. of justification. documents : SPIR-PSU-HSFCU Interface screws checking  
(by ALSPACE Technologies, 29/07/2003)

**AFFECTED CRITERIA**

Function	<input type="checkbox"/>	Interface	<input checked="" type="checkbox"/>	Interchangeability	<input type="checkbox"/>	Reliability	<input type="checkbox"/>	Safety	<input type="checkbox"/>	Other :
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**USING LIMITATIONS OR COMMENTS :**

**SUBMITTED BY Name :** J. Fontignie **Date :** 19/08/2003 **Visa :**

	<b>AUTORISATION VISAS (name, date, signature)</b>			
	AUTHORITY	TECHNICAL	PRODUCT ASSURANCE	PROJECT MANAGER
Deviation	<input checked="" type="checkbox"/>			
Waiver	<input type="checkbox"/>			
Repair	<input type="checkbox"/>			
Minor	<input type="checkbox"/>			
Major	<input checked="" type="checkbox"/>			
Critical	<input type="checkbox"/>			






RFW/RFD Number:

HR-SP-CEA-RFW-003

Issue 2

Spacecraft / Project	Herschel/SPIRE	Originator's Name	J. Fontignie	
System / Experiment / Model	PFM	Signature / Date	 20/09/2005	
Sub-System	DRCU	Request Type (Highlight applicable request)	Waiver (RFW)	Deviation (RFD)
Assembly	FCU	Organisation	CEA Saclay (France)	
Sub-Assembly	PSU	Ref. Doc. / Drwg No.		
Item		References	CEA's RFW ref : RFW n°12	
Serial No.				

RFW/RFD Title	HSFCU PSU electronic assembly not fully compliant with ECSS-Q-70-08 A
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**End Items(s) Affected (Hardware, Software)**

Name	CI-Number	Model(s)

**Requirement / Interface Documents Affected**

Specification/Drawing Title	Number	Issue	Date	App. Paragraph
The manual soldering of high reliability electrical connections	ECSS-Q-70-08	A	06 Aug 1999	10.3.3

**Description of Deviation / Discrepancy / Non-Conformance**

According to ECSS-Q-70-08 A § 10.3.3, "Soldering of components lead to plated through holes", "a complete solder fillet should be used around the entire periphery of the hole; the minimum solder fillet shall occupy 25% of the periphery", component side.

Technological inspection performed by the manufacturer (EADS ASTRIUM) shows that some solder joints of the PSU boards are not fully compliant with this requirement (no fillet visible component side). This is due to internal PCB copper layers and/or large tracks.

Refer to attached original RFW raised by EADS ASTRIUM (HSPUR.PSU.RFW.00143.V.ASTR Issue 01), EADS ASTRIUM considers that those solder joints are acceptable :

- Such solder joints have been qualified on a technological proof by EADS ASTRIUM (500VRT between -55°C and +100°C, vibrations and microsection),
- HSPSU has passed with success acceptance test (vibrations and thermal cycling),
- ESA has already approved similar RFW's on ATV program.

Also attached to this RFW :

Inspection reports ref. Sap-SPIRE-JF-0173-04 , Sap-SPIRE-JF-0174-04  
CNES approval for EADS ASTRIUM PID (July 2003 and October 2004)  
Status of qualification of operators who performed soldering

**Other Items or Requirements (Potentially) Affected**

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**Need for RFW/RFD and Rationale for Acceptance**

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RFW/RFD Number:

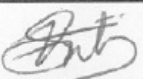
**HR-SP-CEA-RFW-003**  
Issue 2

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



RFW/RFD Number:

HR-SP-CEA-RFW-004

Spacecraft / Project	Herschel/SPIRE	Originator's Name	J. Fontignie / CEA	
System / Experiment / Model	PFM	Signature / Date	 17/08/2004	
Sub-System	DRCU	Request Type (Highlight applicable request)	Waiver (RFW)	Deviation (RFD)
Assembly	FCU	Organisation	CEA Saclay (France)	
Sub-Assembly	PSU	Ref. Doc. / Drwg No.		
Item		References	CEA's RFW ref : RFW n°13	
Serial No.				

RFW/RFD Title	HSFCU : conducted emissions on primary powerlines exceeds IIDA limits
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End Item(s) Affected (Hardware, Software)				
Name	CI-Number	Model(s)		
HS_FCUI		FM		
Requirement / Interface Documents Affected				
Specification/Drawing Title	Number	Issue	Date	App. Paragraph
Herschel/Plank Instrument Interface Document IID PART A	SCI-PT-IIDA-04624	3.2	15/04/2004	5.14.3.1.1

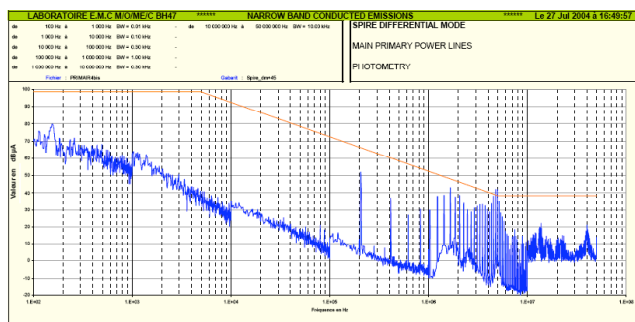
Description of Deviation / Discrepancy / Non-Conformance

Conducted emission (differential mode) on primary power lines exceeds the specification of § 5.1.3.1.1 of IID-A. This occurs in both photometry and spectrometry mode, at two frequencies :

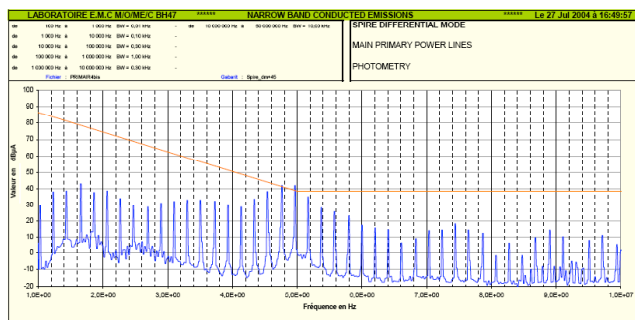
- at 4,77MHz : about 3,1dB over the limit on main i/f,
- at 4,97MHz : about 3,5dB over the limit on main i/f.

On the redundant i/f no peaks over the limit are present (measured values are about 1dB below the limit).

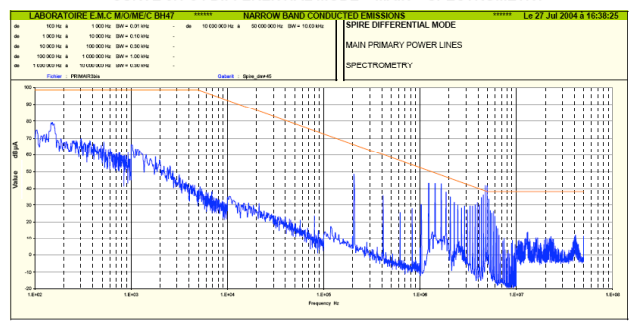
CURVE 5.1-3 : DIFFERENTIAL MODE – MAIN – PHOTOMETRY



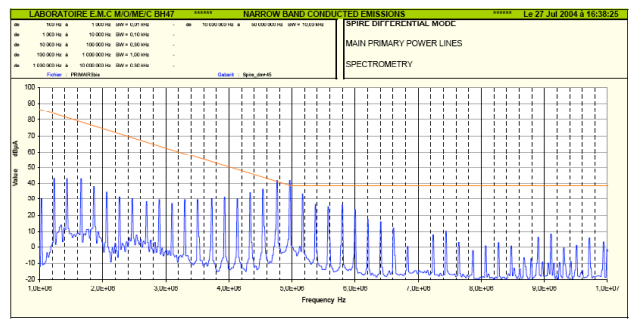
CURVE 5.1-4 : ZOOM OF THE CURVE BEFORE



CURVE 5.1-5 : DIFFERENTIAL MODE – MAIN – SPECTROMETRY



CURVE 5.1-6 : ZOOM OF THE CURVE BEFORE





RFW/RFD Number:

HR-SP-CEA-RFW-004

**Other Items or Requirements (Potentially) Affected**

**Need for RFW/RFD and Rationale for Acceptance**

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



RFW/RFD Number:

HR-SP-CEA-RFW-???

<b>Spacecraft / Project</b>	Herschel/SPIRE	<b>Originator's Name</b>	J. Fontignie	
<b>System / Experiment / Model</b>	PFM	<b>Signature / Date</b>	25/07/06 	
<b>Sub-System</b>	DRCU	<b>Request Type</b> (Highlight applicable request)	Waiver (RFW)	<del>Deviation (RFD)</del>
<b>Assembly</b>	DCU	<b>Organisation</b>	CEA Saclay (France)	
<b>Sub-Assembly</b>		<b>Ref. Doc. / Drwg No.</b>		
<b>Item</b>		<b>References</b>	CEA's RFW ref : RFW n°15	
<b>Serial No.</b>				

<b>RFW/RFD Title</b>	HSDCU : Susceptibility to E Field
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End Items(s) Affected (Hardware, Software)				
Name	CI-Number	Model(s)		
Requirement / Interface Documents Affected				
Specification/Drawing Title	Number	Issue	Date	App. Paragraph
IID-A	SCI-PT-IIDA-04624 Issue 3.3	3.3	30/06/2004	5.14.3.10
Description of Deviation / Discrepancy / Non-Conformance				
<p>Ref CEA NCR n°456, Susceptibility to E Field has been found during EMI-EMC tests performed on DCU QM2 model. Tests reconducted by similarity on FM.</p> <p>Refer EMC test report Ref Sap-SPIRE-010-06 § 6.3, susceptibility found at 215MHz (0dB Margin) and 185MHz (5dB negative margin).</p>				
Other Items or Requirements (Potentially) Affected				
Need for RFW/RFD and Rationale for Acceptance				
<p>Sharp resonances are relevant to the geometrical size of the experimental setup. Recommended I/O R/F filtering could not be implemented (too high components density on LIA board)</p>				



RFW/RFD Number:

HR-SP-CEA-RFW-???

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



RFW/RFD Number:

HR-SP-CEA-RFW-???

Spacecraft / Project	Herschel/SPIRE	Originator's Name	J. Fontignie	
System / Experiment / Model	PFM	Signature / Date	25/07/06 	
Sub-System	DRCU	Request Type (Highlight applicable request)	Waiver (RFW)	Deviation (RFD)
Assembly	DCU	Organisation	CEA Saclay (France)	
Sub-Assembly		Ref. Doc. / Drwg No.		
Item		References	CEA's RFW ref : RFW n°16	
Serial No.				

RFW/RFD Title	HSDCU : Susceptibility to ESD
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End Items(s) Affected (Hardware, Software)				
Name	CI-Number	Model(s)		
Requirement / Interface Documents Affected				
Specification/Drawing Title	Number	Issue	Date	App. Paragraph
IID-A	SCI-PT-IIDA-04624 Issue 3.3	3.3	30/06/2004	5.14.3.13
Description of Deviation / Discrepancy / Non-Conformance				
<p>ESD susceptibility tests performed on DCU QM2 shows susceptibility under ESD conductive tests (refer to [RD1] § 6.4). Reconducted by similarity on FM.</p> <p>Affected requirements :</p> <p>[AD1], § 5.14.3.13 "no malfunction, degradation of performance or deviation beyond the tolerance indicated in its individual specification shall occur when the subsystem equipment and its interface lines are exposed to a repetitive electrostatic arc discharge.</p> <p>All bias potentially affected [AD2], (requirement n° DRCU-REQ 34 (BDA bias), DRCU-REQ 35 (jfet Vss/Vdd bias) , DRCU-REQ-37 (jfet heater bias) ).</p> <p>[AD1] : Ref SCI-PT-IIDA-04624 Issue 3.3            [AD2] : DRCU subsystem specification Ref Sap-SPIRE-CCa-25-00            [RD1] : EMC Test report on DCU QM2 Ref Sap-SPIRE-DS-010-06</p>				
Other Items or Requirements (Potentially) Affected				
Need for RFW/RFD and Rationale for Acceptance				
<p>No material damages were found. Nominal bias levels are recovered sending relevant commands to the DRCU. This requirement is highly severe since the probability of occurrence of such ESD is void on a clean platform.</p>				



RFW/RFD Number:

HR-SP-CEA-RFW-???

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



RFW/RFD Number:

HR-SP-CEA-RFW-???

<b>Spacecraft / Project</b>	Herschel/SPIRE	<b>Originator's Name</b>	J. Fontignie	
<b>System / Experiment / Model</b>	PFM	<b>Signature / Date</b>	25/07/06 	
<b>Sub-System</b>	DRCU	<b>Request Type</b> (Highlight applicable request)	Waiver (RFW)	<del>Deviation (RFD)</del>
<b>Assembly</b>	DCU	<b>Organisation</b>	CEA Saclay (France)	
<b>Sub-Assembly</b>		<b>Ref. Doc. / Drwg No.</b>		
<b>Item</b>		<b>References</b>	CEA's RFW ref : RFW n°17	
<b>Serial No.</b>				

<b>RFW/RFD Title</b>	HSDCU & HS_FCU : no radiated emission tests performed
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End Items(s) Affected (Hardware, Software)				
Name	CI-Number	Model(s)		
Requirement / Interface Documents Affected				
Specification/Drawing Title	Number	Issue	Date	App. Paragraph
IID-A	SCI-PT-IIDA-04624 Issue 3.3	3.3	30/06/2004	5.14.3.9 & 5.14.3.11
Description of Deviation / Discrepancy / Non-Conformance				
<p>Schedule considerations has not permitted to perform Radiated E field and Radiated H field measurements on HS_DCU FM &amp; HS_FCU FM (IIDA requirements).</p> <p>Agreed with SPIRE in teleconference.</p>				
Other Items or Requirements (Potentially) Affected				
Need for RFW/RFD and Rationale for Acceptance				
Schedule considerations				





RFW/RFD Number:

HR-SP-CEA-RFW-???

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