

Definition of the SPIRE CQM Delivered for system level testing
B. Swinyard

The following tables define the form and capability of the SPIRE instrument to be delivered for EQM testing.

Updated 19/2/2002 to reflect expected form of QM1 HSFCU

Revised 06 September 2004 in preparation for ASSED EQM AIT Meeting

Notes:

- It is the understanding of SPIRE that only C1, C3, C6, C10 and C11 will be present during the EQM programme.
- No SPIRE PSU is present to power the DRCU, so the 28V interface to the DRCU is not used
- The DPU **will** be powered by the 28V S/C bus when integrated into the EQM-SVM but an EGSE power supply will be used to power the DPU when it is not integrated into the SVM

Unit: HSFPU

Subsystem /component	Delivered CQM Form/Capability
Structure/baffles/wiring standoffs etc	Flight Representative – except <ul style="list-style-type: none"> • Instrument Isostatic Supports fabricated from Stainless Steel; PFM to be a composite of Stainless Steel and CFRP giving better thermal isolation • Detector Box supports fabricated from Stainless Steel; PFM to be a composite of Stainless Steel and CFRP giving better thermal isolation
Mirrors	Flight Representative
Filters	Flight representative
Beam steering mirror	Form and fit compliant Non-moving mirror Dummy coils to represent dissipation in motors No redundancy Electrical interfaces compliant Thermal conduction flight representative Thermal dissipation close to flight representative
3He Fridge/thermal straps	Form and fit compliant Functionally fully flight representative All parts flight build standard except thermometers and heaters will be commercial/industrial grade Cooler undercharged with 3-He by ~ 10% therefore hold time reduced proportionately 300- mK Thermal straps and external L0 straps fabricated from sub-optimal high-purity Copper – expect better thermal performance of both strap systems on PFM
300 mK Thermal control system	None
Photometer LW array	Flight representative
Photometer MW array	Form and fit compliant Resistors used to represent detectors. No Temperature monitors
Photometer SW array	Ditto
SMEC	Form and fit compliant Structural Model with no functionality Electrical interfaces must be compliant Thermal conduction flight representative Thermal dissipation may not be flight representative
Spectrometer SW array	As P/MW and P/SW arrays
Spectrometer LW array	Flight representative

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Subsystem /component	Delivered CQM Form/Capability
Photometer Calibrator	Form and fit compliant Functionally representative Electrical interfaces compliant Thermal interfaces compliant No redundancy)
Spectrometer Calibrator	Form and fit compliant Functionally representative Electrical interfaces compliant Thermal interfaces compliant No redundancy
Shutter	Subsystem has been deleted from SPIRE
JFET Racks	Flight Representative
JFET Modules and JFET box RF filter modules	Form and fit compliant Functionally representative for PLW Electrical interfaces compliant Thermal interfaces compliant Only JFETs for "live" detector channels will be provided Resistors for thermal dissipation in other channels will be provided (TBC) No savers Note: EMI Caps to be provided by industry to seal open connectors because of the missing C2, C4, C5, C7, C8 and C9 Cryoharnesses)
FPU RF Filters	Flight representative No savers Note: EMI Caps to be provided by industry to seal open connectors because of the missing C12 and C13 cryoharnesses)
Thermometry	Commercial grade thermistors, EM Thermistor mount, (No redundancy) Locations of thermistors as per PFM
FPU internal harnesses	Flight representative (No redundancy)

Unit: HSDCU

Subsystem /component	Delivered CQM Form/Capability
External structure/mechanical interfaces	Not Flight representative As per IID-B 3-3, DCU QM1 ICD Made EMI tight by Aluminium Tape
Electrical Interfaces	Two Photometer LIA card Three Spectrometer LIA cards Prime interfaces flight representative No redundant interfaces implemented
Functionality	Near flight performance on prime side No redundant side implemented
Electrical Component Level	Commercial/industrial level parts with near flight performance

Unit: HSFCU

Subsystem /component	Delivered CQM Form/Capability
External structure/mechanical interfaces	Not form and fit compliant - some of the sub-units will not be housed within the FCU flight envelope As per IID-B 3-3, DCU QM1 ICD

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Subsystem /component	Delivered CQM Form/Capability
	Made EMI tight by Aluminium Tape
Electrical Interfaces	Interfaces to S/C not flight representative – EGSE replaces power supply unit Prime instrument interfaces flight representative. No redundant interfaces implemented
Functionality	Near flight performance on prime side Except MCU (SMEC / BSM / MAC Boards) not functional. No redundant side implemented
Electrical Component Level	Commercial/industrial level parts with near flight performance

Unit: HSDPU (this unit will also be used for the AVM)

Subsystem /component	Delivered CQM Form/Capability
External structure/mechanical interfaces	Flight Representative
Electrical Interfaces	Prime interfaces flight representative No redundant interfaces implemented
Functionality	Near flight performance on prime side No redundant side implemented
Electrical Component Level	Commercial/industrial level parts with near flight performance

Unit: HSWIH (Warm interconnect harness)

Subsystem /component	Delivered CQM Form/Capability
External structure/mechanical interfaces	(W1 – W6 between DPU and DRCU) Flight representative W7/W8 Not present – replaced by EGSE Harness to connect to EGSE power
Electrical Interfaces	Flight representative
Functionality	Near flight performance
Electrical Component Level	Commercial/industrial level parts with near flight performance