

**SPIRE qualification matrix**

20/03/2007

**SPIRE-RAL-DOC-002825 issue 2**

| Unit   | Model                 | IID-A requirement   | Test performed/ Expected Date  | Achieved levels                            | Test method            | Test Report  | Qualification status | NCR status   |
|--|-----------------------|---|--|--|------------------------|--|----------------------|--|
| <b>SPIRE DCU</b>   |                       |   |  |  |                        |  |                      |  |
| Sine   | HS_DCU QM2*           | 9.5.3.3   | Oct 05   | qualif. Level of IID-A 3.3 table 9.5.3-5   | shaker                 | Sap-SPIRE-HT-336-06  | Qualified            | no major NCR   |
| Random   | HS_DCU QM2*           | 9.5.3.4   | Oct 05   | qualif. Level of IID-A 3.3 (table 5.7.3-1) | shaker                 | Sap-SPIRE-HT-336-06  | Qualified            | no major NCR   |
| Shock  | HS_DCU QM2*           | 9.5.3.6   | Oct-05   | IID-A Issue 3.3 fig. 9.5.3-1               | high shock impact      | Sap-SPIRE-HT-337-06  | Qualified            | no major NCR   |
| TV   | HS_DCU QM2*           | 9.5.4   | Nov 05   | qualif. Level of IID-A 3.3 (table 5.7.3-1) | thermal vaccum chamber | Sap-SPIRE-HT-335-06  | Qualified            | CEA major NCR n° 396 ( no science data at cold start) NCR closed                       |
| EMC-CE   | --                    | 9.5.6.12<br>5.14.3.1  | not applicable to DCU (no 28V)   | --   | --                     | --   | --                   | --   |
| EMC-CS   | --                    | 9.5.6.13<br>5.14.3.3,<br>to<br>5.14.3.8                       | not applicable to DCU  | --   | --                     | --   | --                   | --   |
| EMC-RE   | HS_DCU QM2            | 9.5.6.14<br>5.14.3.9<br>5.14.3.11                             | Postponed on FM  | --   | --                     | --   | --                   | --   |
| EMC-RS E Field   | HS_DCU QM2            | 5.14.3.10   | dec 05 /jan 06   | iid-a 3.3                                  | as per iid-a           | Sap-SPIRE-DS-010-06  | Qualified            | Susceptibility found at 185 and 215 MHz (NCR 456) NCR closed, HR-SP-CEA-RFW-015 raised |
| EMC-RS H Field   | HS_DCU QM2            | 5.14.3.12   | dec 05 /jan 06   | iid-a 3.3                                  | as per iid-a           | Sap-SPIRE-DS-010-06  | Qualified            |  |
| ESD  | HS_DCU QM2            | 9.5.6.15<br>5.14.3.13   | Nov/Dec 05   | iid-a 3.3                                  | as per iid-a           | Sap-SPIRE-DS-010-06  | Qualified            | Susceptibility on bias (NCR453) NCR closed HR-SP-CEA-RFW-016 raised                    |
| Bonding, Isolation, Grounding  |                       |   |  |  |                        |  |                      |  |
| Isolation  | --                    | 5.10.3.4<br>5.10.3.5<br>5.10.3.9<br>5.10.4.4                  | not applicable to DCU (no 28V)   |  |                        |  | Qualified            |  |
| Bonding /grounding   | --                    | 5.10.3.1,<br>to 5.10.3.3,<br>5.10.3.6<br>5.10.3.7<br>5.10.4.9 | by design  |  |                        |  | Qualified            |  |
| Radiation  |                       | 9.5.7   | Analysis, demonstrating compliance of all components. By component selection or test |  |                        |  | Qualified            |  |
| Functional   | AVM                   | 9.3.2   | several ILT's  | n/a  | ILT                    | CQM Functional Test Report - 1, Ref. SPIRE-RAL-REP-002084, Issue 1.0, 12/07/2004 | Qualified            |  |
| * : vibration and shock performed with DCU QM2 partly fitted of STM boards |                       |   |  |  |                        |  |                      |  |
| <b>SPIRE FCU</b>   |                       |   |  |  |                        |  |                      |  |
| Sine   | FCU QM2* + HS_PSU STM | 9.5.3.3   | Dec 05   | qualif. Level of IID-A 3.3 table 9.5.3-5   | shaker                 | Sap-SPIRE-HT-372-06  | Qualified            |  |
|  | HS_PSU_FM             | 9.5.3.3   | July 04  | acceptance level of IIDA 3.0               | shaker                 | HSPiR.PSU.RE.00198.V.ASTR  | Qualified            |  |
| Random   | FCU QM2* + HS_PSU STM | 9.5.3.4   | Dec 05   | qualif. Level of IID-A 3.3 (table 5.7.3-1) | shaker                 | Sap-SPIRE-HT-372-06  | Qualified            |  |
|  | HS_PSU_FM             | 9.5.3.4   | July 04  | acceptance level of IIDA 3.0               | shaker                 | HSPiR.PSU.RE.00198.V.ASTR  | Qualified            |  |
| Shock  | FCU QM2* + HS_PSU STM | 9.5.3.6   | Mid Dec 05   | IID-A Issue 3.3 fig. 9.5.3-1               | high shock impact      | Sap-SPIRE-HT-379-06  | Qualified            |  |
|  | FCU_STM + HS_PSU EM   | 9.5.3.6   | feb. 2004  | IID-A Issue 3.0 fig. 9.5.3-1               | high shock impact      | HSPiR-PSU-REV-DA0018465-V-ASTR   | Qualified            |  |
| TV   | FCU QM2 + HS_PSU STM  | 9.5.4   | Nov 05   | qualif. Level of IID-A 3.3                 | thermal vaccum chamber | Sap-SPIRE-HT-380-06  | Qualified            |  |
| EMC-CE on prim. Pwr lines  | HS_PSU_PFM            | 9.5.6.12<br>5.14.3.1  | July / sep. 04   | iid-a 3.3                                  | as per iid-a           | HSPiR-PSU-REE-DA0018814-V-ASTR   | Qualified            | HR-SP-CEA-RFW-004 (accepted)   |
| EMC-CS on prim. Pwr lines  | HS_PSU_PFM            | 9.5.6.13<br>5.14.3.3<br>5.14.3.4<br>5.14.3.8                  | Nov/Dec 05   | iid-a 3.0                                  | as per iid-a           | HSPiR-PSU-REE-DA0018814-V-ASTR   | Qualified            |  |

|   |                          |  |  |                 |              |  |           |  |  |
|---|--------------------------|--|--|-----------------|--------------|--|-----------|--|--|
| EMC CS on sig bundles and sig ref   | Not applicable / no spec | 5.14.3.5<br>5.14.3.6<br>5.14.3.7                           |  |                 |              |  | Qualified |  |  |
| EMC-RE  | HS_PSU_PFM               | 9.5.6.14   | July / sep. 04   | iid-a 3.0       | as per iid-a | HSPIR-PSU-REE-DA0018814-V-ASTR   | Qualified |  |  |
|   | HS_FCU FM                | 9.5.6.14   | postponed on FM (no test on FCU QM2)   |                 |              |  | Qualified |  |  |
| EMC-RS  | FCU_QM2 + HS_PSU EM      | 5.14.3.10<br>5.14.3.12                                     | Nov/Dec 05   | iid-a 3.3       | as per iid-a | Sap-SPIRE-DS-011-06  | Qualified |  |  |
| ESD   | FCU_QM2 + HS_PSU EM      | 9.5.6.15<br>5.14.6.15                                      | Nov/Dec 05   | iid-a 3.3       | as per iida  | Sap-SPIRE-DS-011-06  | Qualified |  |  |
| Bonding, Isolation, Grounding   |                          |  |  |                 |              |  |           |  |  |
| grounding & isolation misc.   | By design                | 5.10.3.1 to 5.10.3.3,<br>5.10.3.6 to 5.10.3.8,<br>5.10.4.9 |  |                 |              |  | Qualified |  |  |
| Isolation prim/chassis & prim/sec, sec/chassis  | HS_PSU_PFM               | 5.10.3.4<br>5.10.3.5<br>5.10.3.9<br>5.10.4.12              | déc. 2004  | IID-A issue 3.0 | --           | HSPIR.PSU.RT.00248.V.ASTR  | Qualified |  |  |
| Radiation   |                          | 9.5.7  | Analysis, demonstrating compliance of all components. By component selection or test |                 |              |  |           |  |  |
| Functional  | QM1/QM2                  | 9.3.2  | several ILT's  | n/a             | ILT          | CQM Functional Test Report - 1, Ref. SPIRE-RAL-REP-002084, Issue 1.0, 12/07/2004 | Qualified |  |  |
| Nota : Vibrations and shocks performed on FCU QM2 partly fitted with STM boards (SCU main boards) |                          |  |  |                 |              |  |           |  |  |

|                               |              |                        |                                   |                            |                 |  |           |           |  |
|-------------------------------|--------------|------------------------|-----------------------------------|----------------------------|-----------------|--|-----------|-----------|--|
| <b>SPIRE DPU</b>              |              |                        |                                   |                            |                 |  |           |           |  |
| Sine                          | PFM          | 9.5.3.3                | Apr-06                            | 9.5.3.3                    |                 | HERS-SPIRE-RP-CGS-013  | Qualified |           |  |
| Random                        | PFM          | 9.5.3.4                | Apr-06                            | 9.5.3.4                    |                 | HERS-SPIRE-RP-CGS-013  | Qualified |           |  |
| Shock                         | CFM1         | 9.5.3.6                | Nov 05                            |                            | ringing plate   |  |           |           |  |
| TV                            | PFM          | 9.5.4                  | Apr-06                            | Max NOP 70 Max OP 55 Min C |                 | HERS-SPIRE-RP-CGS-021 Iss1   | Qualified |           |  |
| EMC-CE                        | PFM          | 9.5.6.12               | Oct 05                            |                            |                 | HERS-SPIRE-RP-CGS-009 issue 1  | Qualified |           |  |
| EMC-CS                        | PFM          | 9.5.6.13               | Oct 05                            |                            |                 |  | Qualified |           |  |
| EMC-RE                        | PFM          | 9.5.6.14               | Oct-05                            |                            |                 |  | Qualified |           |  |
| EMC-RS                        | PFM          | 5.14.3.10<br>5.14.3.12 | Nov 05 (EQM)                      |                            |                 |  | Qualified |           |  |
| ESD                           | CFM1         | 9.5.6.15               | Oct 05                            |                            |                 | Not carried out  |           |           |  |
| Bonding, Isolation, Grounding | PFM          |                        | Oct 05                            |                            |                 | HERS-SPIRE-RP-CGS-009 issue 1  | Qualified |           |  |
| Radiation                     |              | 9.5.7                  | Parts procured via the CPP scheme |                            |                 |  |           | Qualified |  |
| Functional                    | AVM/CFM1/PFM | 9.3.2                  | several ILT's                     | n/a                        | ILT             | CQM Functional Test Report - 1, Ref. SPIRE-RAL-REP-002084, Issue 1.0, 12/07/2004 | Qualified |           |  |
|                               |              |                        |                                   |                            | Unit level test | HERS-SPIRE-RP-CGS-006  |           |           |  |
|                               |              |                        |                                   |                            | Unit level test | HERS-SPIRE-RP-CGS-007  |           |           |  |
|                               |              |                        |                                   |                            | Unit level test | HERS-SPIRE-RP-CGS-008  |           |           |  |

|                               |     |                        |                                   |  |                  |   |           |           |  |
|-------------------------------|-----|------------------------|-----------------------------------|--|------------------|---|-----------|-----------|--|
| <b>SPIRE FPU</b>              |     |                        |                                   |  |                  |   |           |           |  |
| Sine                          | CQM | 9.5.3.3                | 28/03/2004                        | IID-A plus notch to limit interface forces | Cryo vibe at CSL | SPIRE-MSS-REP-002049                                | Qualified |           |  |
| Random                        | CQM | 9.5.3.4                |                                   |  |                  |   | Qualified |           |  |
| Shock                         | n/a |                        |                                   |  |                  |   |           |           |  |
| TV                            | n/a |                        |                                   |  |                  |   |           |           |  |
| EMC-CE                        | PFM | 9.5.6.12               |                                   |  |                  | SPIRE-RAL-REP-002853 "SPIRE EMC DRB Status Summary" | Qualified |           |  |
| EMC-CS                        | PFM | 9.5.6.13               |                                   |  |                  |   | TBA       |           |  |
| EMC-RE                        | PFM | 9.5.6.14               |                                   |  |                  |   | Qualified |           |  |
| EMC-RS                        | PFM | 5.14.3.10<br>5.14.3.12 |                                   |  |                  |   | TBA       |           |  |
| ESD                           | n/a |                        |                                   |  |                  |   |           |           |  |
| Bonding, Isolation, Grounding | n/a |                        |                                   |  |                  |   |           |           |  |
| Radiation                     |     | 9.5.7                  | Parts procured via the CPP scheme |  |                  |   |           | Qualified |  |
| Functional                    |     | 9.3.2                  | many functional tests             |  | ILT              | SPIRE-RAL-REP-002834/5/6/7/8/9                      | Qualified |           |  |