

MEMO

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To	ESA projects, PA managers, PCB/SMT WG	Copy	

Subject: RFA justified by project qualification using group 6

1 INTRODUCTION

PCBs are qualified in accordance with ECSS-Q-ST-70-10C and procured in accordance with ECSS-Q-ST-70-11C. It is recommended to procure the PCB from qualified sources in case the required technology is available from them. In this case, no Request For Approval (RFA) is required.

In case the required technology is not available from qualified sources or not covered by the applicable ECSS standards, the use of PCB technology that is not ECSS-qualified shall be handled through an RFA issued by the user submitted to the project. This is specified in ECSS-Q-ST-70C clause 5.4.2.d. In this case, the requirements of this memo shall apply.

2 REQUEST FOR APPROVAL

2.1 Design review

- a. The user shall submit the first issue of the RFA to final customer. This shall include the following:
 - i. Description of PCB design and technology (build-up, dimensions, materials, surface finish, via technology, lamination sequences, etc),
 - ii. Compliance to ECSS-Q-ST-70-12C for PCB design,
 - iii. Compliance to ECSS-Q-ST-70-10C for PCB qualification and description of the non-qualified aspects,
 - iv. Compliance to the manufacturer's applicable Process Identification Document (PID),
 - v. Description of the (thermal, electrical and mechanical) environment of the application.

- b. It is recommended to perform a Design Review with support of the PCB manufacturer and the final customer to review the manufacturability and reliability of the design. In case risk factors are identified, specific tests and inspections (see §2.2.b) can be defined during this meeting to mitigate the risk. The Design Review shall also cover previous heritage and test campaigns performed.

- c. It is recommended to procure the (non-qualified) PCB technology from a PCB manufacturer that is qualified per ECSS-Q-ST-70-10C for other technology, as listed on escies.org/pcb/. In this case only a delta qualification needs to be performed for the specific technology feature that is not qualified. This reduces the risk, since other technologies are already qualified and periodic auditing has been performed.

2.2 Test plan

- a. As an outcome of the design review, it may be required to perform a project qualification and/or to perform specific evaluation on coupons or a non-destructive analysis (NDA) on flight model (FM) PCBs.
- b. Before initiating the test campaign, the user shall submit the project qualification test plan to the final customer for approval.
- c. To avoid performing the extensive test regime specified in ECSS-Q-ST-70-10C on several samples and coupons, a group 6 accumulated test flow is specified in §3 on a single sample. The group 6 test shall be the baseline for a project qualification test plan. It may be tailored to cover specific project requirements or PCB technology features.
- d. In addition to the project qualification, it is recommended to demonstrate the acceptability of the FM PCBs by including coupons on the panel for Interconnect Stress Testing (IST).

2.3 Test report

- a. The user shall issue the project qualification test report as attachment 1 with the final version of the RFA.
- b. The user shall issue the test report for specific evaluation on coupons (such as IST) or NDA on FM PCBs as attachment 2 with the final version of the RFA.
- c. The user shall provide the Certificate of Conformance (CoC) from the PCB manufacturer as attachment 3 with the final version of the RFA.

3 GROUP 6 TEST FLOW

3.1 Test vehicle

- a. The test vehicle for a group 6 test shall be an entire PCB.
- b. The test vehicle shall be representative of the PCB under qualification.

3.2 Environmental test

- a. Simulation of assembly environment by 2 times reflow soldering in accordance with the assembly PID (e.g. vapour phase reflow as per ECSS-Q-ST-70-10C clause 7.4.2.2 or convection reflow).
- b. Rework simulation as per ECSS-Q-ST-70-10C clause 7.4.3 on $\geq 4x$ PTH with various diameter. Rework (temperature and heat cycles) as specified in the assembly PID shall be covered by the rework simulation.



- c. Thermal cycling on entire PCB as per ECSS-Q-ST-70-10C clause 7.5

3.3 Analysis

- a. Microsectioning of PTH with rework after end of test sequence.
- b. Microsectioning of all other technology features under qualification.

3.4 Non-conformance criteria

- a. Defects are not acceptable. Evaluate as per ECSS-Q-ST-70-10C clauses 7.3.4.3.3 and 7.2.3.