MEMO

Date	7th of March 2019	**Ref**	ESA-TECMSP-MO-013162
From	G. Corocher, C. Villette Carole Villette Digitally signed by Carole Villette Date: 2019.04.05 18:31:27 +02'00'	**Visa**	T. Rohr Digitally signed by Thomas Rohr Date: 2020.01.23 08:45:46 +01'00'
To	SMT Approved assembly lines, ESA PA Managers, ESA skills training schools, ESA recommended microsectioning facilities	**Copy**	

Subject: Requirements for outsourcing laboratories performing microsectioning of electronic assemblies.

The present memo details the requirements applicable to the laboratories that perform microsectioning of electronic assemblies for ESA programmes.

The memo ESA-TECMSP-MO-013161 defines different categories of laboratories and the applicability of the following requirements to each category.

Five classes of requirements are defined:

1. Quality
2. Confidentiality
3. Training
4. Technical
5. Reporting

Quality requirements

ISO 17025 is applicable

Confidentiality requirements

- The laboratory shall have a policy in place for the control and protection of confidential information and shall treat all the results of the test as confidential.
- The laboratory shall sign a non-disclosure agreement as part of the contract when requested by the customer.

- The laboratory shall have a policy for the management of potential conflict of interest. For example, this is applicable to laboratories operated by industry which are offering their service to third parties or laboratories of organizations which are also offering consultancy services in the setting up and development of assembly processes.
- The company organization shall have processes in place to ensure the prevention of conflicts of interest, or risks of disclosure of confidential information.

Training

- Personnel performing visual inspection and/or assessment of the metallographic samples of electronic assemblies shall be ESA certified as Cat.2 to ECSS-ST-Q-70-08 and ECSS-ST-Q-70-38.
- The laboratory shall define a procedure for the training and assessment of the personnel authorised to perform microsectioning of electronic assemblies per ESA requirements.
- The laboratory shall maintain a competence matrix of the personnel authorised to perform microsectioning per ESA requirements.

Technical requirements

The following specific technical requirements are applicable:

Additional technical requirements are enclosed in the Annex 1

- The laboratory shall have a dedicated procedure for the microsectioning of electronic assemblies compliant to the ESA technical requirements.
- Visual inspection is mandatory.
- Cutting of the samples from the PCB shall be performed using methods which prevent to stress the PCB and the assembly. Vibrations and heating of the sample shall be avoided. Cutting shall be done with sufficient clearance from the device to prevent damage of the location to be examined. A minimum clearance of 5mm is recommended.
- Use of chemicals for the removal of conformal coatings is forbidden.
- Materials used for embedding of specimens shall be identified in the procedure. Only room temperature curing materials shall be used. Embedding materials leading to temperature higher than 40°C during curing shall not be used.
- The use of a fluorescent dye in the embedding resin is mandatory.

- Sectioning of the different types of devices shall be performed in accordance with the ECSS-Q-ST-70-38C Rev 1.
- Changes of the any processing material requires ESA approval.
- Inspection and assessment of the microsections shall be performed in accordance to the criteria outlined in ECSS-Q-ST-70-38C and ECSS-Q-ST-70-08C latest revisions.

Reporting requirements

- A report assessing if the analysed parts are compliant to the requirements of ECSS standards shall be prepared by the laboratory. The laboratory shall not use terms as: verified, validated, approved or qualified in the assessment. The terms compliant and not compliant shall be used.
- The report shall include a set of pictures from visual inspections and analysis of each sample submitted to microsectioning providing as a minimum the level of details and magnification indicated in the ECSS-Q-ST-70-38C Rev 1.
- All photographic documentation shall be provided in electronic format to the customer.
- Microsectioning samples and remaining parts of the PCBs shall be returned to the customer after conclusion of the activity.

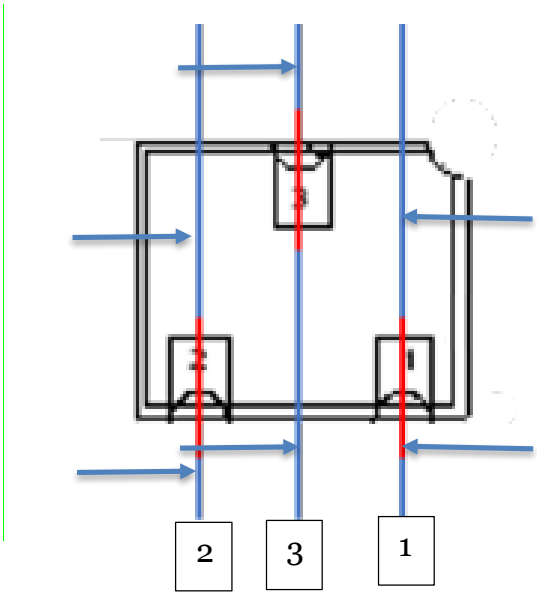
Annex 1: Technical microsectioning requirement

- Conformal coating removal from solder joints and leads is not allowed.

  Note: conformal coatings can be gently removed from top surface of large devices and top and bottom surface of PCBs provided that solder joints and leads are not disturbed. Removal of conformal coatings is only allowed with mechanical means, e.g. scalpel blade or (tapered) rod.

- removal of conformal coating on the solder joint of ceramic resistor and capacitors is required in order to identify delamination /cracks that can be created at the interface of the termination with the ceramic. The removal shall be performed with care and using soft tools avoiding to disturb the surface of the solder joints.
- Cutting of chip types of devices is not allowed, the sections plan for these devices shall be reached by grinding.
- Grinding the body of chip resistors, capacitors and diode shall be performed using SiC paper with grit size of 400 or finer.
- Use of grinding disks with embedded diamonds can induce damage to PCB and devices. Use of these disks is allowed only with grid size finer than 220. Use of diamond grinding disks is forbidden on ceramic resistors, capacitors and devices with glass body.
- Microsectioning of parts with cavity (SMDs, LCCs, …) shall be performed as followed in order to avoid to create damage in the packaging
    - The package is embedded in resin
    - Grinding is performed until opening of the cavity
    - The sample is embedded once again in order to fill the cavity. The filling is performed using the same resin used for initial embedding without addition of fluorescent dye.
    - The section planes required by ECSS-ST-70-38C last revision are analysed.
    - In Case of LCC3 and LCC6 package the sequence of analyses is the following:

      Section plane 1, section plane 2 and then section plane 3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