

KOTEL 141: RELIABILITY AND LIFETIME ESTIMATION OF FLEXIBLE CAPACITOR (REFLEX)

1. PROJECT DEFINITION

Project background and present state

Several component suppliers have developed flexible capacitors for PCBAs that can endure bending of PCBA. There is a need to find out what studies and tests exist, do benchmarking type of testing and failure analysis and to understand lifetime and reliability of flexible capacitors, especially under different, combined stresses (bending, voltage, temperature and humidity). Non-flexible capacitors are considered also in benchmarking testing.

2. PROJECT GOAL

Project goal(s)

- Aging, lifetime, failure modes and root causes of flexible capacitors
- Benchmarking test of flexible capacitor manufacturers
- Valid comparison information of mechanical robustness of flexible vs ordinary capacitors

Project restriction

- Testing only components from chosen suppliers and packages

Information gathering process

- State of art study. Responsible: testing company. Input: testing company, theory, project participants
- Test planning. Responsible: testing company. Input: testing company, theory, project participants
- Test PCBA design and manufacturing: Responsible: design and manufacturing organized by testing company. Input: testing company, theory, project participants, test PCBA manufacturer
- Testing, monitoring, analysis and reporting. Responsible: testing company. Input: test, testing company, theory, project participants

Participants

- Minimum 4 companies. Cost per participants á 9000eur (+VAT)

Project length

- 1 year

3. PROJECT PHASES AND RESULTS

Project is divided into six ½-1 day work packages (workshops):

- Work packages
 - WP1: Plan project construction & state of art.
 - WP2: Review state of art. Plan test PCBA and test.

- WP3: Review test PCBA and test. Start testing.
- WP4: Review test status and follow-up actions.
- WP5: Review failure analysis and report review.
- WP6: Review project handbook/report.
- WP7: Project (internal) seminar

4. UTILIZATION OF THE RESULTS

- State of art
 - Flexible capacitor lifetime and stress tests studies and results
 - Flexible capacitor manufacturer ways/methods/materials to protect against mechanical bending risks
- Workshops
 - Plan and review to ensure correct direction for the project
 - Increase participant and company knowhow of what key information exists (suppliers, flexible component types, experiences)
- Tests
 - Understand lifetime and reliability of flexible capacitors, especially under different, combined stresses (bending, voltage, temperature and humidity).
 - Benchmarking of flexible capacitor and of non-flexible capacitors
- Handbook
 - Contains information from all above. Easy to read and implement.

Benefit for company: project participation vs. purchasing ready handbook from KOTEL

- Participating to the project
 - Learning by doing, discussions in each workshop
 - Participant can affect to the output of the project and handbook
 - Fast access to the final handbook and draft version for quick utilization
 - No 'time of competitive restriction' (direct access)
- No project participation (purchasing ready handbook from KOTEL)
 - No learning by doing, no company external discussions, higher probability that utilization of handbook subjects is not successful to the company
 - No possibility to affect on the project or handbook content & output
 - No fast access to draft documents
 - Possible delay due to 'time of competitive restriction' (e.g. 1-2 year delay after the project is ready)

5. RESOURCES AND ORGANISATION

KOTEL work groups will participate in the project. Testing company is responsible of state of art study, test planning, testing, analysis and writing project report/handbook. A management group and a responsible leader are set for the project.

6. TIMETABLE

Project is implemented between Q2 2014 – Q2 2015. More precise timetable will be written after the first project meeting and updated project plan.

7. RISKS & RISK MITIGATION

- Risk: Project doesn't contain enough valid information => Mitigation: Testing company and participants have information from the project area and give input to all project phases: state of art study, test planning, test and analysis
- Risk: Project resources and management => Mitigation: Company participants, named project responsible, follow-up
- Risk: Project is not ready when planned => Mitigation: deadlines for work packages, strong project management

8. COST ESTIMATE AND FUNDING

Preliminary cost estimate for the project is 36 000 €

COST ESTIMATE is without value added tax (VAT)

Testing company

State of art, test plan, test, analysis	30 000 €
Handbook (with general expenses)	<u>4 000 €</u>
Overall	34 000 €

KOTEL ry

Management (overall)	<u>2 000 €</u>
Overall	2 000 €

Overall **36 000 €**

FUNDING

KOTEL ry (100 %) 36 000 €

Overall **36 000 €**

Company funding shares: 4-7 companies á 9000€+ VAT

Example distribution of costs of 1 participating company (with 5-7 paying companies in the project):

2014: 9000 €(+VAT)

If less than 4 companies will participate, participating cost will be kept the same. Focusing and reducing of the content will be discussed together with the participating companies to fit to the new project budget.