Comments on QA/QC and Others

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$$\varepsilon_1 \left| \varphi_{\mathrm{FF}} \right\rangle + \varepsilon_2 \left| \varphi_{\mathrm{TH}} \right\rangle; \quad \varepsilon_1 >> \varepsilon_2$$

More QA/QC Items [1]

- **Post-assembly QA [1]**
  - Thermal stress test (thermal cycling)
    - What to see practically: absolute deformation, number of iterations to break the module or ladder, something more?
    - Study should be done in a climate chamber.
    - Issues to be defined:
      - Temperature range (–20-50 C^{o}) and RH range
      - Origin of the deformation measurement.
      - Measurement positions on the ladder.
      - Measurement tool of the deformation: digital camera, laser displacement sensor, glass scale, or else.

More QA/QC Items [2]

- **Post-assembly QA [2]**
  - Thermal deformation test from the APV25 + cooling pipe
    - Study should be done with a cooling system or its mimic (–20 C^o).
    - What to see practically: absolute deformation.
    - Similar issues need defined as the thermal cycling stress test.

More QA/QC Items [3]

- **Post-assembly QA [3]**
  - Gravitational sag
    - What to see practically?
    - Study should be done on an end-ring-like jig holding the ladder.
    - Issues to be defined:
      - Choices of rotational angle: 0^o,~~45^o~~,~~90^o~~,~~135^o~~ ,180^o.
      - Similar issues need defined as the thermal cycling stress test.

More QA/QC Items [4]

- **QA before/after the transportation**
  - FW/BW modules (at Pisa and at L4/L5/L6 sites)
    - Mechanical healthiness: relative misalignment of the parts.
      - Should be measured by the CMM.
    - Electrical healthiness: typical electrical parameters: gain and noise.
      - Should be measurement by the APVDAQ.
  - Full ladders (at L3/L4/L5/L6 sites and at KEK)
    - Mechanical healthiness: relative misalignment of the sensors.
      - Should be measured by the CMM.
      - Each assembly site has the CMM but KEK not. What should we do?
    - Electrical healthiness check as well as the FW/BW module.

More QA/QC Items [5]

- **General affairs**
  - "Criteria":
    Once we obtain the procedure or parameters that qualify the predefined criteria, what should we do next?
    1. Keep pursuing further better procedure/parameter.
    2. Switch to the next issues that need defined.

More QA/QC Items [6]

- **Gluing QC**
  - Thickness: *p*+/–*q* μm
    - The thickness seems not very critical.
  - Flatness: *x*+/–*y* μm
    - If the PA is glued to the DSSD too wavily, the chucking vacuum of the PA leaks.
- **Wire bonding QC**
  - Loop height, *etc*.
    - How do we assure wires not touching others?
  - DSSD pinhole
    - Do we make wire bonding on pinhole strips?

BPAC: Nov.9th–10th, 2014 [1]

- **Access to the Kavli IPMU, the University of Tokyo**
  - http://www.ipmu.jp/access-0
- **Discussion: what to present?**
  - What the reviewers expect to hear?
    - Here, let me list issues only relevant to the ladder assembly.
  - In that context, what should we present?

BPAC: Nov.9th–10th, 2014 [2]

- **My naïve guess just to start the discussion**
  - What the reviewers expect to hear?
    - How do we control the quality of assembled ladders.
    - When can we start the mass production of ladders.
    - … *please edit …*

BPAC: Nov.9th–10th, 2014 [3]

- **My naïve guess just to start the discussion – cont'd**
  - What to present?
    - borrowed from F.Forti-san's Twiki page…
      - Assembly environment and facilities: clean room, CMM, gluing robot, wire bonding machine, APVDAQ, …
      - Assembly procedure in technical detail: (preparation of) documents, (preparation of) the full assembly procedure (much more detail should be presented), (preparation of) the parts tracking control.
      - List of human resource and assignment to the task.
      - Schedule before the mass production: (realistic) self-settled milestones, list of issues to be solved, self confidence of the list.
      - *… please edit …*