MEMS/NEMS North America TC Chapter

Meeting Summary and Minutes

SEMICON West 2017 Standards Meetings
Thursday, July 13, 15:30 – 17:30
Marriott Marquis Hotel, San Francisco, California

TC Chapter Announcements

Next TC Chapter Meeting
NA Standards Fall 2017 Meetings
Monday, November 6, 15:30 – 17:30
SEMI Headquarters, Milpitas, California

Table 1 Meeting Attendees

Italics indicate virtual participants

<table>
<thead>
<tr>
<th>Company</th>
<th>Last</th>
<th>First</th>
<th>Company</th>
<th>Last</th>
<th>First</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asahi Glass Company (AGC)</td>
<td>Takahashi</td>
<td>Mark</td>
<td>NIST</td>
<td>Allen</td>
<td>Richard</td>
</tr>
<tr>
<td>BW &amp; Associates</td>
<td>Wu</td>
<td>Bevan</td>
<td>Sonoscan</td>
<td>Martell</td>
<td>Steve</td>
</tr>
<tr>
<td>Frontier Semiconductor</td>
<td>Moore</td>
<td>Chris</td>
<td>SEMI</td>
<td>Nguyen</td>
<td>Laura</td>
</tr>
</tbody>
</table>

Table 2 Leadership Changes

None

Table 3 Committee Structure Changes

None

Table 4 Ballot Results

<table>
<thead>
<tr>
<th>Document #</th>
<th>Document Title</th>
<th>Committee Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>5267</td>
<td>New Standard, Specification for Microfluidic Port and Pitch Dimensions</td>
<td>Failed, returned to the TF for rework and reballot</td>
</tr>
<tr>
<td>6176</td>
<td>Reapproval of SEMI MS1-0307 (Reapproved 0812), Guide to Specifying Wafer-Wafer Bonding Alignment Target</td>
<td>Passed, as balloted</td>
</tr>
<tr>
<td>6177</td>
<td>Reapproval of SEMI MS10-0912, Test Method to Measure Fluid Permeation Through MEMS Packaging Materials</td>
<td>Passed, as balloted</td>
</tr>
</tbody>
</table>

#1 Passed ballots and line items will be submitted to the ISC Audit & Review Subcommittee for procedural review.

#2 Failed ballots and line items were returned to the originating task forces for re-work and re-balloting or abandoning.
Table 5 Activities Approved by the GCS between meetings of the TC Chapter

None

Table 6 Authorized Activities

Listing of all revised or new SNARF(s) approved by the Originating TC Chapter.

None

#1 SNARFs and TFOFs are available for review on the SEMI Web site at:
http://downloads.semi.org/web/wstdsbal.nsf/TFOFSNARF

Table 7 Authorized Ballots

<table>
<thead>
<tr>
<th></th>
<th>When</th>
<th>TF</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5267A</td>
<td>Cycle 6 or 7, 2017</td>
<td>MEMS Microfluidics</td>
<td>New Standard, Specification for Microfluidic Port and Pitch Dimensions</td>
</tr>
</tbody>
</table>

Table 8 SNARF(s) Granted a One-Year Extension

None

Table 9 SNARF(s) Abolished

None

Table 10 Standard(s) to receive Inactive Status

None

Table 11 New Action Items

<table>
<thead>
<tr>
<th>Item #</th>
<th>Assigned to</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017July#01</td>
<td>Rich, Mark Tondra, Steve &amp; Chris</td>
<td>Work on Doc 5267A to address the negatives and issue to re-ballot in cycle 6 or 7, 2017.</td>
</tr>
<tr>
<td>2017July#02</td>
<td>Rich Allen</td>
<td>To get into contact with Frank Shemansky about NIST’s presentation on reference materials.</td>
</tr>
<tr>
<td>2017July#03</td>
<td>Rich Allen, Steve Martell</td>
<td>To get in contact with Frank Shemansky about the survey results.</td>
</tr>
</tbody>
</table>

Table 12 Previous Meeting Action Items

<table>
<thead>
<tr>
<th>Item #</th>
<th>Assigned to</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017April#01</td>
<td>Rich Allen</td>
<td>To check if SEMI MS1 needs to be revised or looked at in conjunction with SEMI 3D15. Decided to send out for Reapproval. CLOSED.</td>
</tr>
<tr>
<td>2017April#02</td>
<td>Laura Nguyen</td>
<td>To submit SEMIViews for 3D15 and MS1 to Rich, Mark, Win, and Steve. Completed. CLOSED.</td>
</tr>
<tr>
<td>2017April#03</td>
<td>Laura Nguyen</td>
<td>To create SNARFs for reapproval ballots. Completed. CLOSED.</td>
</tr>
</tbody>
</table>

1 Welcome, Reminders, and Introductions

Steve Martell (Sonoscan) called the meeting to order at 15:42. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed. Attendees introduced themselves.

Attachment: SEMI Standards Required Meeting Elements
2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

**Motion:** To accept the previous meeting minutes as written.

**By / 2nd:** Richard Allen (NIST) / Chris Moore (Frontier Semiconductor)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

**Attachment:** [2017Spring] MEMS Minutes FINAL

3 Liaison Reports

3.1 SEMI Staff Report

Laura Nguyen (SEMI) gave the SEMI Staff Report. Of note:

- SEMI Global 2017 Calendar of Events
  - SEMICON West (July 11-13, 2017, San Francisco, California)
  - SEMICON Taiwan (September 13-15, 2017; Taipei, Taiwan)
  - PV Taiwan (October 12-14, 2017; Taipei, Taiwan)
  - SEMICON Europa (November 14-17, 2017; Munich, Germany)
  - SEMICON Japan (December 13-15, 2017; Tokyo, Japan)

- Upcoming North America Standards Meetings
  - NA Standards Fall 2017 Meetings (November 6-9 [tentative], SEMI HQ in Milpitas, California)
  - NA Standards Spring 2018 Meetings (April 2-5, 2018 [tentative], SEMI HQ in Milpitas, California)
  - SEMICON West 2018 (July 9-12, 2017, San Francisco, California)

- Letter Ballot Critical Dates for 2017
  - Fall 2017 adjudication
    - Cycle 6: ballot submission due: Jul 21/Voting Period: Aug 1 – Aug 31
    - Cycle 7: ballot submission due: Aug 18/Voting Period: Sep 1 – Oct 2

- Standards Publications Report

<table>
<thead>
<tr>
<th>Cycle</th>
<th>New</th>
<th>Revised</th>
<th>Reapproved</th>
<th>Withdrawn</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2017</td>
<td>0</td>
<td>16</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>April 2017</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>May 2017</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>June 2017</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total in portfolio – 974 (includes 191 Inactive Standards)

- GTC Charter & Scope Review
  - Problem Statement
    - Majority of GTCs have defined charter but many don’t have distinct Scope
• It is stipulated in the Regulations that each GTC ought to have a distinct charter and scope. (See Regulations ¶5.7.3.2, §6.2)
  • As charter is often very generic (e.g., The XXXGTC discusses and creates consensus-based specifications and guides that promote mutual understanding and improved communication between users and suppliers of XXXX), it may not be useful to decide if the TF is within the scope of GTC or judge if a technical area proposal for installation of new GTC is really new.
  • Status as of today… [See attachment for chart]
    • SEMI Website publishes charter of GTC
      • http://downloads.semi.org/web/wstdsbal.nsf/StdCharters
    • Only a couple of GTCs clearly define scope while most of them define its Standards’ scopes or at least include scope description in its charter.

• MEMS/NEMS GTC
  • Current Charter
    • The MEMS / NEMS Technical Committee works on unique requirements of Standards for MEMS & NEMS devices that cannot be handled by existing technical committees.
  • Current Scope
    • Undefined

• Requirements/Process Reminders for TC Chapter Meetings
  • Standards Document Development Project Period
    • Project period shall not exceed 3 years (Regs 8.3.2)
      • SNARF approval to TC Chapter approval
    • If document development activity is found to be continuing, but cannot completed with the project period, TC Chapter may grant one-year extension at a time, as many times as necessary.
    • The TC Chapter should review the expiration dates for all applicable SNARFs at each TC Chapter meeting. (PM Note 10)
  • SNARF Review Period
    • A submitted SNARF for a new, or for a major revision to an existing, Standard or Safety Guideline is made available to all members of a TC Chapter’s parent global technical committee for two weeks for their review and comment. (Regs 8.2.1)
      • If the SNARF is submitted at a TC Chapter meeting, the committee can review and approve, but the SNARF will need to be distributed for two weeks and then approved via GCS.
  • SNARF & TFOF Form: [See attachment for forms]
  • Procedures for Correcting Nonconforming Titles of Published Standards Document (PM Appendix 4)
    • Some Standards qualify for a special procedure where a line item change can be used to correct the titles. Otherwise, the corrective action will likely require a major revision.
    • Use of PIP form is allowed to correct title if all of the following conditions are met:
      • Standards having only one Subtype
      • Changes either Specifications to Specification or Test Methods to Test Method
      • No concomitant text change is required
4 Ballot Review
NOTE 1: TC Chapter adjudication on ballots reviewed is detailed in the Audits & Review (A&R) Subcommittee Forms for procedural review. The A&R forms are available as attachments to these minutes. The attachment number for each balloted document is provided under each ballot review section below.

4.1 Document #5267, New Standard, Specification for Microfluidic Port and Pitch Dimensions

- The committee found the negatives related and persuasive. The ballot failed and returned to the task force for re-work and re-ballot in the next cycle if ready. See attachment for ballot results.

Motion: To find the negative technically persuasive, fail Doc 5267, and re-ballot in Cycle 6 or 7, 2017.
By / 2nd: Rich Allen (NIST) / Chris Moore (Frontier Semiconductor)
Discussion: None.
Vote: 4-0 in favor. Motion passed.
Attachment: [Ballot Results] Cycle 04-17 MEMS NEMS

4.2 Document #6176, Reapproval of SEMI MS1-0307 (Reapproved 0812), Guide to Specifying Wafer-Wafer Bonding Alignment Target

- The ballot passed TC Chapter review as balloted. See attachment for ballot adjudication.

Attachment: 6176ProceduralReview

4.3 Document #6177, Reapproval of SEMI MS10-0912, Test Method to Measure Fluid Permeation Through MEMS Packaging Materials

- The ballot passed TC Chapter review as balloted. See attachment for ballot adjudication.

Attachment: 6177ProceduralReview

5 Subcommittee and Task Force Reports
The following task forces are currently inactive:

- Packaging TF
- Reliability TF
- Terminology TF
- Wafer Bond TF
5.1 MEMS Microfluidics Task Force

Rich Allen (NIST) reported for the MEMS Microfluidics Task Force. The task force reviewed Ballot Document 5267 that was balloted in Cycle 4, 2017. The committee decided to fail the ballot and re-ballot in the next upcoming cycle.

Please see Section 4.1 for ballot results.

Action Item: 2017July#01, Work on Doc 5267A to address the negatives and issue to re-ballot in cycle 6 or 7, 2017.

5.2 Joint MSIG, MEMS Substrate, and MEMS Material Characterization Task Force

Steve Martell (Sonoscan) reported that during this joint task force meeting, the SEMI MEMS/NEMS committee members met with some of the MSIG members and discussed the two open SNARFs (Doc 6108 and 6007) under the MEMS Substrate and Materials Characterization Task Force. Valuable input and feedback were received. The objective is to put together enough material in time for Fall meetings to issue for ballot.

Please contact Chris Moore, chrisjlmoore@frontiersemi.com, regarding activity on Doc 6108, New Standard: Specification for Silicon Substrates used in fabrication of MEMS Devices.


6 Old Business

6.1 Previous Action Items

Previous action items are noted in Table 12 in ‘red’ and for recent updates in ‘blue’. There is no further old business.

7 New Business

7.1 Presentation on current NIST reference materials

Rich Allen (NIST) addressed the committee on this topic. NIST has a reference materials presentation that Rich would like to present to the MSIG members. The presentation is on the NIST 5-in-1 reference materials, items 8096 and 8097.

Here are the links for the reference materials that are tied to the various ASTM and SEMI (MS2 and MS4) standards:

https://www-s.nist.gov/srmors/view_detail.cfm?srm=8096
https://www-s.nist.gov/srmors/view_detail.cfm?srm=8097

Action Item: 2017July#02, Rich to get into contact with Frank Shemansky about NIST’s presentation on reference materials

7.2 Locate Survey

Rich Allen (NIST) and Steve Martell (Sonoscan) inquired about a survey that MSIG send out and would like to see if that can be utilized in the SEMI MEMS/NEMS Committee.

Action Item: 2017July#02, Steve and Rich to get in contact with Frank Shemansky about the survey results.
8 Next Meeting and Adjournment

The next meeting is scheduled for Monday, November 6, at the SEMI Standards North America Fall 2017 Meetings located at SEMI Headquarters in Milpitas, California. See http://www.semi.org/standards-events for the current list of events.

Tentative Schedule:
- Monday, November 6
  - 13:00-13:30 Microfluidics (TF)
  - 13:30-15:30 Joint MSIG, MEMS Substrate, and Material Characterization (TFs)
  - 15:30-17:00 MEMS / NEMS (C)

Adjournment: 16:10.

Respectfully submitted by:
Laura Nguyen
Coordinator, International Standards
SEMI Headquarters
Phone: +1.408.943.7019
Email: lnyuyen@semi.org

Minutes tentatively approved by:

<table>
<thead>
<tr>
<th>Win Baylies (BayTech-Resor), Co-chair</th>
<th>&lt;Date approved&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steve Martell (Sonoscan), Co-chair</td>
<td>October 5, 2017</td>
</tr>
</tbody>
</table>

Table 13 Index of Available Attachments#1

<table>
<thead>
<tr>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>SEMI Standards Required Meeting Elements</td>
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</tr>
<tr>
<td>[2017West] Staff Report MEMS NEMS</td>
<td>6177ProceduralReview</td>
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</tbody>
</table>

#1 Due to file size and delivery issues, attachments must be downloaded separately. A .zip file containing all attachments for these minutes is available at www.semi.org. For additional information or to obtain individual attachments, please contact Laura Nguyen at the contact information above.