



HB-LED Global Technical Committee

North America (NA) Chapter

Meeting Summary and Minutes

SEMICON West 2018 Meeting
 July 9, 2018 9:00AM – 10:00AM
 San Francisco, CA

TC Chapter Announcements

Next TC Chapter Meeting
 November 8, 2018 at 9:00AM – 10:00AM
 Milpitas, CA

General Announcement – SEMICON West 2018 NA HB-LED TC Meeting

SEMI Staff member assumed the duties of presiding co-chair for the duration of the TC meeting to facilitate motions.

Table 1 Meeting Attendees

Italics indicate virtual participants

Co-Chairs: Andrew Kim (Innovation for X), Chris Moore (Covalent Metrology), Mike Feng (Silian), Iain Black (Philips)
SEMI Standards Staff: Inna Skvortsova

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
InnovationforX	Kim	Andrew	SEMI	Skvortsova	Inna
BW Associates	Wu	Bevan			

Table 2 Leadership Changes

<i>WG/TF/SC/TC Name</i>	<i>Previous Leader</i>	<i>New Leader</i>
NA Chapter of HB-LED TC	Iain Black (Emcore)	NONE

Table 3 Committee Structure Changes

<i>Previous WG/TF/SC Name</i>	<i>New WG/TF/SC Name or Status Change</i>
HB-LED Assembly TF [Disbanded]	n/a

Table 4 Ballot Results

<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
6387	Reapproval to SEMI HB2-0613, <i>Specification for 150 mm Open Plastic and Metal Wafer Cassettes Intended for Use for Manufacturing HB-LED Devices</i>	Passed

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

Note 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 Prior to the Originating TC Chapter meeting

#	Type	SC/TF/WG	Details
None			

Table 6 Authorized Activities

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

#	Type	SC/TF/WG	Details
6340	SNARF	n/a	Reapproval to SEMI HB4-0913, <i>Specification of Communication Interfaces for High Brightness LED Manufacturing Equipment (HB-LED ECI)</i> New SNARF approved by TC

Note 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

#	When	TF	Details
6340	Cycle 7-2018	n/a	Reapproval to SEMI HB4-0913, <i>Specification of Communication Interfaces for High Brightness LED Manufacturing Equipment (HB-LED ECI)</i>

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

#	TF	Title	Expiration Date
None			

Table 9 SNARF(s) Abolished

#	TF	Title
None		

Table 10 Standard(s) to Receive Inactive Status

Standard Designation	Title
None	

Table 11 New Action Items

Item #	Assigned to	Details
2018SW#1	(Inna S.)	To contact SEMI Korea staff for draft documents #5984-#5988. DONE
2018SW#2	(Andrew Kim)	To reach out to Matheson Corp. to support standardization effort started under HB-LED Source Material Task Force. DONE. New member/task force leader Mayank Bulsara (Matheson Corp) is joining HB-LED TC.
2018SW#3	(Inna S.)	Issue SNARF for Reapproval of SEMI HB4 due for 5 year review.



Table 12 Previous Meeting Action Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
2018Apr#1	(SEMI staff)	Arrange SEMIViews access for Andrew K. for SEMI HB2 and HB4 standards DONE
2018Apr#2	(SEMI staff)	To contact Brian Rubow (Cimetrix) for support of upcoming activities within NA HB-LED Equipment Communication Interface TF as well as standards development within China TC. DONE (yes if relevant, not at SW due to schedule conflict/travel)
2018Apr#3	(SEMI staff)	To contact Iain Black (Philips Lumileds) for support of upcoming activities within NA HB-LED TC or official withdrawal from TC leadership team by SEMICON West CLOSED
2018Apr#4	(SEMI staff)	To contact Paul Reid (Kulicke & Soffa) for support of HB-LED Assembly TF or to authorize TF inactive status at SEMICON West OPEN – message sent, pending feedback from Pual R. <bounce back on preid@kns.com > CLOSED
2018Apr#5	(SEMI staff)	To contact Mike Feng for re-engagement in NA HB-LED co-Chair role. OPEN – message sent, pending feedback from Mike.
2018Apr#6	(Andrew Kim)	To reach out to relevant companies in NA to support standardization effort for HB-LED Equipment Communication Interface TF in NA and China regions. OPEN. No feedback from VEECO and AMAT, but will try to reach out to Fab equipment companies.
2018Apr#7	(SEMI staff)	Forward to Andrew K. results of HB-LED ballots recently submitted by China Chapter in preparation for ballots adjudication. DONE
2018Apr#8	(SEMI staff)	Issue SNARF for Reapproval of SEMI HB2 due for 5 year review. DONE
2018Apr#9	(SEMI staff)	Get recommendation from HB-LED China Chapter on scope of 5 year revision for SEMI HB4. DONE. Recommendation is to reapprove as currently published.

1 Welcome, Reminders, and Introductions

Cochair Andrew Kim called the meeting to order at 9:30 AM.

After welcoming all attendees, a round of introductions followed. The SEMI meeting reminders on membership requirements, antitrust, patentable technology, and meeting guidelines were then presented and explained by Inna Skvortsova (SEMI).

Attachment 01: SEMI Standards Required Elements.ppt

2 Review of Previous Meeting Minutes

The TC Chapter reviewed and approved the minutes of the previous Spring 2018 Standards meeting.

- Motion:** To approve minutes as written.
- By / 2nd:** Andrew Kim (InnovationforX) / Bevan Wu (BW Associates)
- Discussion:** None
- Vote:** 2-0 in favor. Motion passed.

Attachment 02: NA HB-LED TC Meeting Minutes (Apr 2018).pdf



3 SEMI Standards Staff Report

Inna Skvortsova (SEMI) gave the SEMI Staff Report. Of note:

SEMI Global 2018 Calendar of Events

- SEMICON West (July 10-12, 2018, San Francisco, California)
- SEMICON Taiwan (September 5-7, 2018, Taipei, Taiwan)
- SEMICON Europa (November 13-16, 2018, Munich, Germany)
- SEMICON Japan (December 12-14, 2017, Tokyo, Japan)

Upcoming North America Meetings

- NA Standards Fall 2018 Meetings (November 5-8, 2018, SEMI HQ, Milpitas, California)
- NA Standards Spring 2019 Meetings (April 1-4, 2019, SEMI HQ, Milpitas, California)
- SEMICON West 2019 Meetings (July 8-11, 2019, San Francisco, California)

Letter Ballot Critical Dates for NA Standards meetings

- Cycle 6-18: due July 20 / Voting Period: Aug 1 – Aug 31
- Cycle 7-18: due Aug 22 / Voting Period: Sep 5 – Oct 5
- Cycle 8-18: due Oct 22 / Voting Period: Oct 26 – Nov 26
- Cycle 9-18: due Nov 14/ Voting Period: Nov 28 – Dec 28

<http://www.semi.org/en/Standards/Ballots>

- SEMI Standards Publications

Cycle	New	Revised	Reapproved	Withdrawn
April 2018	0	9	2	0
May 2018	0	3	5	0
June 2018	2	14	11	0

Total SEMI Standards in portfolio: 987. Includes 236 Inactive Standards

Cycle	Designation	Title	Committee	Region
June 2018	SEMI C96	Test Method for Determining Density of Chemical Mechanical Polish (CMP) Slurries	Liquid Chemicals	NA
June 2018	SEMI D77	Test Method for Measurements of Dimension of Films for FPD – Contour Matching Method	Flat Panel Display	JA



- New Forms, Regulations & Procedure Manual
 - New version of *Regulations* (June 8, 2018)
 - New version of *Procedure Manual* (June 8, 2018)
 - New TFOF & SNARF
 - New Ballot Review Templates
 - www.semi.org/standards
 - Bottom left, under **Resources!**
 - Regulations & Procedure Manual Changes
 - Improvements on Rules for Handling of Patented Technology (*Regulations* § § 16.1-16.3)
 - Patented Technology that might be material to the Standard is disclosed at the end stage of document development
 - Disclosed after the ballot is issued
 - Assessment for potential materiality and technical justifiability for inclusion shall be postponed to the next scheduled meeting.
 - A TF sometimes decides to use patented technology after it has started the document development project.
 - To require subsequent update of SNARF regarding use of Patented Technology and subsequent LOI process to ensure that TC Chapter agrees to the course of action recommended by the TF.
 - Improvements on Rules for Handling of Copyright and Trademark (*Regulations* § 16.4)
 - Improvement on handling copyright process
 - New process for handling trademarks
 - Additional Official Virtual TC Chapter Meeting Related Rules (*Regulations* ¶ 7.4.2 and § 9.5)
 - Loss of necessary infrastructure at the meeting location described in the Background Statement of the Letter Ballot
 - The necessary infrastructure (e.g., electrical power, internet connection, required software applications)
 - Procedure for Transition of Virtual Meeting (PM 4.3.6)
 - GTC Decision for Whether or Not to Adopt the Official Virtual TC Chapter Meeting
 - Clarification on the Use of Editorial Changes a Standard or Safety Guideline (Regs § 8.9.5)
 - Two types, made independently from a Letter Ballot.
 - Both requires TC approval and subsequent A&R approval.
 - Type 1:
 - minor changes (i.e., corrections of obvious misspelling, formatting changes to comply with the Style Manual; corrections of capitalization, the use of italics, incorrect spacing);
 - Type 2:



- those that introduce no change in technical content (e.g., changes to nontechnical information; insubstantial changes to existing Supplementary Materials; changes that reduce ambiguity; changes to eliminate an obvious technical content inconsistency; or adding/deleting/changing Notes or footnotes).
- Clarification on SNARF Revision vs. New SNARF (PM 2.2.6)
 - The SNARF should be revised if the Draft Document deviates technically from the scope described in the SNARF or changes in the ‘Intellectual Property Considerations’ section
 - New SNARF is required
 - expected result of activity changes from Line Item revision(s) to a major revision, or
 - scope change beyond modification of existing scope items (i.e., deleting existing or adding new scope items),
 - change of ballot type (e.g., reapproval to revision or vice versa), or
 - introduction of new Line Item(s)
- *SNARF(s) and TFOF(s) Approved by GCS in between TC Chapter Meetings*
 - NONE
- *SNARF Three- year status—TC Chapter may grant a one-year extension:*
 - NONE
- *Nonconforming Titles*
 - NONE

NOTE: For nonconforming title please refer to *Procedure Manual (PM)* Appendix Table A4-1 and A4-2.

- *Intercommittee Ballots*
 - NONE
- *Documents due for Five-Year Review*

Name	Due for Review	Title
SEMI HB2-0613	6/21/2018	Specification for 150 mm Open Plastic and Metal Wafer Cassettes Intended for Use for Manufacturing HB-LED Devices
SEMI HB4-0913	9/27/2018	Specification of Communication Interfaces for High Brightness LED Manufacturing Equipment (HB-LED ECI)

Attachment 03: SEMI Staff Report HB-LED TC (July 2018).ppt

Motion: To approve change in NA HB-LED TC Leadership team – Iain Black (Emcore) is stepping down from co-Chair position.

By / 2nd: Andrew Kim (InnovationforX) / Ben Wu (BW Associates)

Discussion: None

Vote: 2-0 in favor. Motion passed.



Motion: To disband the HB-LED Assembly Task Force. Task Force is inactive for extensive period of time.
By / 2nd: Andrew Kim (InnovationforX) / Ben Wu (BW Associates)
Discussion: None
Vote: 2-0 in favor. Motion passed.

4 Liaison Reports

4.1 HB-LED Korea Working Group

No report / changes from previous TC Meeting. The Working Group is currently not active.

NA Technical Committee recommendation is to disband the working group in Korea and transfer draft documents #5984, #5985, #5986, #5987, #5988 to NA TC Chapter.

NA Technical Committee will evaluate documents and if needed will recruit new members in NA region to finish the work on Source Material documents.

4.2 HB LED China Liaison Report

Report presented by Inna Skvortsova (SEMI). Of note:

- Meeting Information
 - Last Meeting:
 - Wednesday, April 18, 2018 at the SEMI Standards HB-LED TC Chapter Spring Meeting
 - Quanzhou Hotel, Quanzhou, Fujian, China Next meeting:
 - Next Meeting:
 - Wednesday, October 24, 2018 at the SEMI Standards HB-LED TC Chapter Fall Meeting
 - Nanchang, Jiangxi, China
 - Leadership Change:
 - HB-LED Equipment Communication Interface (new TF)
 - Steven Lee-AMEC
 - Edward Lee-AMEC
 - Committee Structure Change
 - HB-LED Equipment Communication Interface (new TF)
 - **Charter:** Define communication interfaces for use in HB-LED manufacturing and generate standards for the special features used in HB-LED industry.
 - **Scope:** The TF will focus on developing standards including:
 1. Identify the specifications for unique usages, processing methods, procedures and definitions of equipment communication used in HB-LED manufacturing, which are different from SEMI industry.
 2. Develop communication interface standards for HB-LED industry where existing standards are insufficient to meet the demands and particulars of HB-LED.
 3. Define terminology for HB-LED manufacturing automation, and provide guidelines applying the standards to LED industry and equipment automation.

○ Ballots Results

Doc #	Document Title	TC Chapter Action
R5776A	New Standard: Test Method for Detecting Surface Defects of GaN based LED Epitaxial Wafer Used for Manufacturing HB-LED	Go to A&R
5723C	New Standard: Specification for Single Crystal Sapphire Intended for Use for Manufacturing HB- LED Wafers Discussion	Passed, with technical changes; Ratification Ballot to be issued
5775C	New Standard: Specification for Sapphire Single Crystal Ingot Intended for Use for Manufacturing HB-LED Wafers Discussion	Failed and rebalot in cycle 5-2018

○ Authorized Activities

Doc #	Type	SC/TF/CFG	Title/Details
6370	SNARF	HB-LED Equipment Communication Interface Task Force	New Standard: Specification of Susceptors for HB-LED MOCVD Equipment Communication Interface – TC Member Review took place between 03/27/2018 and 04/10/2018 before approval at the TC Chapter Meeting
6371	SNARF	Patterned Sapphire Substrate Task Force	New Standard: Test Method for Determining Geometrical Parameters of Patterns on Patterned Sapphire Substrate – TC Member Review took place between 03/27/2018 and 04/10/2018 before approval at the TC Chapter Meeting

○ Authorized Ballots

Doc #	When	TF	Document Title/Details
R5723C	Cycle 4 or 5-2018	Single Crystal Sapphire Task Force	New Standard: Specification for Single Crystal Sapphire Intended for Use for Manufacturing HB- LED Wafers Discussion
5775D	Cycle 4 or 5-2018	Sapphire Single Crystal Ingot Task Force	New Standard: Specification for Sapphire Single Crystal Ingot Intended for Use for Manufacturing HB-LED Wafers Discussion
6192	Cycle 4 or 5-2018	Patterned Sapphire Substrate Task Force	New Standard: Specification for Dry Etching Patterned Sapphire Substrate (DPSS)

Task Force Highlights

- *GaN based LED Epitaxial Wafer Task Force*
 - Doc R5776A, New Standard: Test Method for Detecting Surface Defects of GaN based LED Epitaxial Wafer Used for Manufacturing HB-LED
 - Pending A&R



- *HB-LED Equipment Communication Interface Task Force*
 - New Standard: Specification of Susceptors for HB-LED MOCVD Equipment Communication Interface
 - TC Chapter authorized
 - *Patterned Sapphire Substrate Task Force*
 - Doc 6192, New Standard: Specification for Dry Etching Patterned Sapphire Substrate (DPSS)
 - Authorized to ballot in Cycle 4 or 5 - 2018
 - New Standard: Test Method for Determining Geometrical Parameters of Patterns on Patterned Sapphire Substrate
 - TC Chapter authorized
 - *Sapphire Single Crystal Ingot Task Force*
 - Doc 5775D, New Standard: Specification for Sapphire Single Crystal Ingot Intended for Use for Manufacturing HB-LED Wafers
 - Authorized to ballot in Cycle 4 or 5 - 2018
 - *Sapphire Single Crystal Orientation Task Force*
 - Doc 5945, New Standard: Test Method for Determining Orientation of A Sapphire Single Crystal
 - Published as SEMI HB8-0217
 - *Sapphire Single Crystal Orientation Task Force*
 - Doc 5945, New Standard: Test Method for Determining Orientation of A Sapphire Single Crystal
 - Published as SEMI HB8-0217
 - *Single Crystal Sapphire Task Force*
 - Doc R5723C, New Standard: Specification for Single Crystal Sapphire Intended for Use for Manufacturing HB-LED Wafers
 - Authorized to ballot in Cycle 4 or 5-2018
 - Doc 5946, New Standard: Test Method for Grain Boundary of Single Crystal Sapphire by Optical Homogeneity Technique (OHT)
 - TC Chapter authorized
 - Doc 5629, New Standard: Guide for Identification Defects on Bare Surfaces of Sapphire Wafers
 - TC Chapter authorized
- Contact information: Daniel Qi (fqi@semi.org)/China

Attachment 04: China HB-LED Liaison Report (April 2018).ppt

5 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.



5.1 Ballot #6387

The TC Chapter reviewed the Document #6387, Reapproval of SEMI HB2-0613: *Specification for 150 mm Open Plastic and Metal Wafer Cassettes Intended for Use for Manufacturing HB-LED Devices.*

The ballot **Passed** and will be forwarded to ISC A&R as balloted

Motion: Document # 6387 is not a Safety Document, when all safety-related information is removed, Document is still technically sound and complete.

By / 2nd: Andrew Kim (InnovationforX) / Bevan Wu (BW Associates)

Discussion: None.

Vote: 2-0. Motion passed.

Motion: Forward Document # 6387 to the ISC A&R for procedural review as balloted.

By / 2nd: Andrew Kim (InnovationforX) / Bevan Wu (BW Associates)

Discussion: None.

Vote: 2 -0. Motion passed.

Attachment 05: 6387 Procedural Review

6 Subcommittee and Task Force Reports

6.1 *HB-LED Wafer TF*

No report presented by the Task Force

6.2 *Patterned Sapphire Substrate (PSS) TF*

No no report presented by the Task Force

6.3 *HB-LED Source Materials Task Force*

No report presented by the Task Force

Action Item: (Inna S.) To contact SEMI Korea staff for draft documents #5984-#5988. **DONE**

Action Item: (Andrew Kim) To reach out to Matheson Corp. to support standardization effort started under HB-LED Source Material Task Force. **DONE.**

7 Old Business

7.1 *Standards Due for Five-Year Review.*

Inna Skvortsova addressed the TC Chapter on this topic. Of note:

Name	Due for Review	Title	Status
SEMI HB4-0913	9/27/2018	Specification of Communication Interfaces for High Brightness LED Manufacturing Equipment (HB-LED ECI)	Reapproval ballot to be issued.

Action Item: (Inna S.) To issue reapproval ballot for SEMI HB4-0913 in Cycle 7-18.

7.2 SNARFs Approaching Three-Year Review

The TC Chapter reviewed the SNARFs approaching the three-year document development period.

- No SNARFs needed extension.

8 New Business

8.1 New TFOFs and SNARFs

- No new TFOFs approval during the meeting;
- New SNARF approval for Reapproval of SEMI HB4-0913

Motion: To approve SNARF for reapproval of SEMI HB4-0913 *Specification of Communication Interfaces for High Brightness LED Manufacturing Equipment (HB-LED ECI)*

By / 2nd: Andrew Kim (InnovationforX) / Bevan Wu (BW Associates)

Discussion: None

Vote: 2-0 in favor. Motion passed.

8.2 New Ballots Authorized

Ballot for Reapproval of SEMI HB4-0913, *Specification of Communication Interfaces for High Brightness LED Manufacturing Equipment (HB-LED ECI)* is authorized for submission in Cycle 7-2018.

Motion: To authorize ballot submission for Cycle 7 2018 for Reapproval of SEMI HB4-0913.

By / 2nd: Andrew Kim (InnovationforX) / Bevan Wu (BW Associates)

Discussion: None

Vote: 2-0 in favor. Motion passed.

9 Action Items Review

9.1 Previous Meeting(s) Action Items

None

9.2 New Action Items

Inna Skvortsova (SEMI) reviewed the new action items. These can be found in the New Action Items table at the beginning of these minutes.

10 Next Meeting and Adjournment

The next meeting is tentatively scheduled for November 8, 2018 at SEMI HQ, Milpitas CA. See <http://www.semi.org/en/events> for the current list of meeting schedules.

Having no further business, a motion was made to adjourn. Adjournment was at 10:04AM.



Meeting Minutes respectfully submitted by:

Inna Skvortsova

Sr. Standards Coordinator

SEMI North America

Phone: 408-943-6996

Email: iskvortsova@semi.org

Minutes tentatively approved by:

Andrew Kim (InnovationforX), Cochair	
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Table 13 Index of Available Attachments#1

<i>Title</i>	<i>Title</i>
(Attachment 01) SEMI Standards Required Meeting Elements.ppt	
(Attachment 02) NA HB-LED TC Meeting Minutes Spring 2018.pdf	
(Attachment 03) SEMI Standards Staff Report HB-LED TC (July 2018).ppt	
(Attachment 04) HB-LED China TC Liaison (April 2018)	
(Attachment 05) 6387_Procedural Review	

#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 Inna Skvortsova at the contact information above.