

September Standards Summary Session

October 18, 2023

Welcome

- Please keep your audio on mute unless speaking (this minimizes background noise).
- Use the raise hand icon to indicate you have a question to ask aloud or type your question in the chat window to be read aloud by the moderator.
- Announce yourself before speaking - speak slowly and clearly.
- Do not interrupt. Share speaking time with others to ensure maximum participation.

Standards Overview

- Working groups are made up of volunteers from the industry who share their technical knowledge and expertise to write documents on controlling static electricity in the manufacturing process or testing device sensitivities.
- Meet face-to-face three times a year – March/June/September
- Everyone is welcome and encouraged to participate.
- For a complete overview of the standards business unit structure and document development process, please visit <https://www.esda.org/standards/standards-working-groups/#references> > Standards Development Presentation or scan the QR code.



CONFIDENTIALITY POLICY

Applicable to Committee Members, Guests & Visitors

- All committee members, guests, and visitors to EOS/ESD Association, Inc. Standards-related meetings must adhere to the Confidentiality Policy.
- Work-in-Process (WIP) documents are distributed to committee members only.
- Document development material is considered confidential and shall not be disseminated to any other standards development organization.
- Any standards committee or working group member who violates this policy will be removed as a member. If this policy is violated by a guest or visitor, that individual will be barred from attending future standards meetings.

ANTITRUST POLICY – Slide 1 of 2

The penalties for violating antitrust laws are severe, including fines and even imprisonment of individuals found guilty of illegal conduct. Contrary to the belief that the government has relaxed antitrust enforcement, the Justice Department has recommended jail sentences for the majority of persons convicted of violating antitrust laws. Moreover, the U.S. Supreme Court has ruled that a trade association may be held legally responsible for the unauthorized, as well as authorized, acts of its members. Accordingly, every effort must be made to avoid even the appearance of impropriety.

The most common violations of antitrust laws are agreements among competitors to fix prices, allocate customers, or share confidential company information. As for the EOS/ESD Association, Inc., the most important thing to keep in mind is that its purpose is to “advance the theory and practice of Electrostatic Discharge (ESD) avoidance”. This is accomplished through publishing Standards, holding technical conferences and training, and providing certification programs. Accordingly, it is not the business of EOS/ESD Association, Inc. to consider or discuss matters relating to product development, marketing, purchasing, pricing decisions, or confidential company information.

It is the responsibility of each participant attending an EOS/ESD Association, Inc sponsored event or meeting of any kind, to avoid raising improper subjects for discussion. This reminder constitutes your awareness of these obligations.

Antitrust Laws as related to EOS/ESD Association, Inc.:

- Do not preclude discussions on topics that are pertinent to the business of the EOS/ESD Association, Inc.
- Avoid the misuse of the standard development process in order to gain an unfair competitive advantage.
- Do not allow for improper conduct or conversations during any events or meetings.
- Restricts what can be divulged
- Restricts some actions of EOS/ESD Association, Inc., such as conspiring to capture market share
- Allows for activities that have a “pro-competitive” or positive effect

Discussions to Avoid:

- License Terms, price, or pricing policy of your individual company
- Direct or indirect sales, quotas, market share
- Identified individual company statistics, inventories
- Particular competitors or customers
- Commercial Liabilities, warranties, or guarantees
- Anything dealing with “arm twisting”, excluding or controlling competition
- Any discussions related to trade secrets and confidential company information

ANNEX A (NORMATIVE): EOS/ESD ASSOCIATION, INC. PATENT POLICY

A.1 EOS/ESD Association Patent Policy - Inclusion of Patents in EOS/ESD Association, Inc. Standards

There is no objection in principle to drafting an EOS/ESD Association, Inc. standard in terms that include the use of an essential patent claim (one whose use would be required for compliance with that standard) if it is considered that technical reasons justify this approach.

Participants in the ESDA/ANSI standards development process are encouraged to bring patents with claims believed to be essential to the attention of EOS/ESD Association, Inc.

If EOS/ESD Association, Inc. receives a notice that a proposed, revised, or approved standard may require the use of such a patent claim that is not already covered by the existing assurance, the procedures in this clause shall be followed.

A1.1 Statement from the patent holder

EOS/ESD Association, Inc. shall receive from the patent holder, or a party authorized to make assurances on its behalf, in written or electronic form, either:

- a) assurance in the form of a general disclaimer to the effect that such party does not hold and does not currently intend to hold any essential patent claim(s); or
- b) assurance that a license to such essential patent claim(s) will be made available to applicants desiring to utilize the license for the purpose of implementing the standard without compensation and under reasonable terms and conditions that are demonstrably free of any unfair discrimination.

Such assurance shall indicate that the patent holder (or third party authorized to make assurances on its behalf) will include in any documents transferring ownership of patents subject to the assurance, provisions sufficient to ensure that the commitments in the assurance are binding on the transferee and that the transferee will similarly include appropriate provisions in the event of future transfers with the goal of binding each successor-in-interest.

The assurance shall also indicate that it is intended to be binding on successors-in-interest regardless of whether such provisions are included in the relevant transfer documents.

A1.2 Record of statement

A record of the patent holder's statement shall be retained in the files of EOS/ESD Association, Inc. and shall be made publicly available (at EOS/ESD Association's election, either on EOS/ESD Association, Inc.'s website or ANSI's LOA repository).

A1.3 Notice

When EOS/ESD Association, Inc. receives from a patent holder the assurance set forth in A.1.1.b above, the standard shall include a note substantially as follows:

NOTE – The user's attention is called to the possibility that compliance with this standard may require the use of an invention covered by patent rights.

By publication of this standard, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer.

A1.4 Responsibility for identifying patents

Neither EOS/ESD Association, Inc. nor ANSI is responsible for identifying patents for which a license may be required by an EOS/ESD Association, Inc. standard or for conducting inquiries into the legal validity or scope of those patents that are brought to the Association's attention.

Can download a copy of all three policies from www.esda.org > Committees > Standards Working Groups.

Send questions to standards.eosesda@esda.org.

WG 1 – Wrist Straps

- Currently published documents:
 - ANSI-ESD S1.1-2021, “Wrist Straps”
 - ESD TR1.0-01-01, “Survey of Constant (Continuous) Monitors for Wrist Straps”

- Current Top 3 WG activities
 - Update TR1.0-01-01 Add new continuous monitor technology and provide more information
 - Discussion on possible changes to ANSI/ESD S1.1 when the 5-year review cycle starts (for example, add a section on dual wire wrist straps and cords and possibly remove life cycle testing)

WG 1 – Wrist Straps Cont.

- In the most recent WG meeting:
 - Summary of discussions/activities/document reviews during the most recent WG meeting.
 - Reviewed continuous monitor section for ESD TR20.20 - handbook
 - Reviewed ESD TR1.0-01-01 Survey of Continuous Monitors for Wrist Straps

- Currently published documents:
 - ANSI-ESD STM2.1-2018, “Garments – Resistive Characterization”
 - ESD TR2.0-01-01, “Consideration for Developing ESD Garment Specifications”
 - ESD TR2.0-01-02, “Static Electricity Hazards of Triboelectrically Charged Garments”

- Current Top 3 WG activities
 - 5-year review of the standard test method ANSI/ESD STM2.1 “Garments – Resistive Characterization”
 - Discussion on improvements to the document

- In the most recent WG meeting:
 - Summary of discussions/activities/document reviews during the most recent WG meeting.
 - Discussed instrument leads laying on garment in photos. Suggested that if the test equipment system is verified, it should not matter if the leads are on the garment.
 - Discussed verification procedures for the test instrument system
 - Test procedures may not exactly correlate with the test reporting section. Need to verify and correct test procedures.
 - Discussed removing single wire monitor reference from the table in the Annex.

WG 3 - Ionization

- Currently published documents
 - ANSI/ESD STM3.1-2015 - Ionization
 - ANSI/ESD SP3.3-2016 – Periodic Verification of Air Ionizers
 - ANSI/ESD SP3.4-2016 – Periodic Verification of Air Ionizers Using a Small Test Fixture
 - ANSI/ESD SP3.5-2020 – Air Assist Bar Ionizers, Soft X-Ray (Photon) Ionizers, Room Ionization Alternatives, and Non-Airflow Alpha Ionizers
 - ESD TR3.0-01-02 - Alternate Techniques for Measuring Ionizer Offset Voltage and Discharge Time
 - ESD TR3.0-02-05 - Selection and Acceptance of Air Ionizers

- Current Top 3 WG activities
 - Reaffirm existing STM3.1 to give the WG time to do a major re-write of the STM
 - Review/revise/withdraw existing documents to re-align new documents with ESDA use of TR53 for all periodic/compliance verification testing
 - Consider round-robin testing using the charged plate monitor in the existing STM as it likely was not done for the original document.

- In the most recent WG meeting:
 - The working group reviewed the document revision proposals presented by the WG chair and the agreement by TAS of the plan to move forward.
 - Agreed to send ANSI/ESD STM3.1 to STDCOM for re-affirmation to allow time to make major revisions.
 - Agreed to publish an article explaining to the industry the plans for the ionization documents.

- Currently published documents
 - None

- Current Top 3 WG activities
 - Developing a document that will serve many industries detailing how ESA affects processes and common mitigation techniques.

WG 28 – Electrostatic Attraction Cont.

- In the most recent WG meeting:
 - Reviewed several figures submitted by members of the working group.
 - Continued editing the document with comments from TAS and members.

WG 4 – Worksurfaces

- Currently published documents
 - ANSI/ESD STM4.1-2017 - Worksurface – Resistance Measurements
 - ESD TR4.0-01-02 - Survey of Worksurfaces and Grounding Mechanisms

- Current Top 3 WG activities
 - Working a new technical report for resistance measurements of conveyors.
 - Five-year review of ANSI/ESD STM4.1-2017.

WG 5.0 – Device Testing

- Currently published documents
 - ANSI/ESD SP5.0-2018 - Reporting ESD Withstand Levels on Datasheets
- Current Top 3 WG activities
 - Five-year review of ANSI/ESD SP5.0-2018
 - Brainstorming on future topics – not much progress on this in Sept as much of the hour focused on DSP5.0 – follow-up call planned for members to continue discussion

- In the most recent WG meeting:
 - DSP5.0 completed reviewing Industry Review comments
 - Brainstorming
 1. D2D testing (after InC WP and CDM JWG TR are out?)
 2. HBM testing to high levels for IEC robustness – any procedure change (combinations needed? All combinations or pin to GND or pin to Supply/GND?) Simple TR? Do we really want/need?
 - This HBM testing uses the JS-001 waveform, but stress combinations are not aligned with the JS-001 method.
 - HV HBM stress is done in a number of ways:
 - All NS pins to GND only.
 - All NS pins to VDD and GND.
 - All NS pins to VDD, GND, and all ganged.
 - NS, VDD, GND pin to the JS-001 method (a.k.a. subset of pins treated like a full device).
 - An NXP datasheet with examples was shared in June

3. HBM/CDM/LU on the same units? Are there risks? Standard says tests are destructive – could we clarify?
 - Is there a strong argument against HBM & CDM stress on the same units to pass both qualification requirements?
 - General consensus that Latch-up should not be included.
 - How should we close this?
4. Reusing same units at multiple levels with ATE testing only at the beginning/end?

WG 5.0 – ESD DSP5.0 Changes

- After a review of IR comments – one change decided by the WG was the removal of Annex A
- The main body of the document now references JS-001/JS-002 directly rather than reference Annex A
 - The change in reference drives a STDCOM LB

ANNEX A (INFORMATIVE) – HBM AND CDM CLASSIFICATION LEVELS

These tables are from the current document versions at the time of publication of this document. For the most recent information, the user should consult the latest versions of ANSI/ESDA/JEDEC JS-001 and ANSI/ESDA/JEDEC JS-002.

Table 2. HBM Classification Levels (ANSI/ESDA/JEDEC JS-001)

Classification	Voltage Range (in volts)*
0Z	< 50
0A	50 to < 125
0B	125 to < 250
1A	250 to < 500
1B	500 to < 1000
1C	1000 to < 2000
2	2000 to < 4000
3A	4000 to < 8000
3B	≥ 8000

*See JEDEC JEP155 for recommended target levels for safe ESD handling. Higher thresholds and classifications do not result in a significant increase in ESD handling safety.

Table 3. CDM Classification Levels (ANSI/ESDA/JEDEC JS-002)

Classification Level	Classification Test Condition (in volts)**
C0a	< 125
C0b	125 to < 250
C1	250 to < 500
C2a	500 to < 750
C2b	750 to < 1000
C3	≥ 1000

**See JEDEC JEP157 for recommended target levels for safe ESD handling. Higher thresholds and classifications do not result in a significant increase in ESD handling safety.

JWG HBM – Human Body Model

- Currently published documents
 - ANSI/ESDA/JEDEC JS-001-2023 - Human Body Model (HBM) – Device Level
 - ANSI/ESD SP5.1.3-2022 - Human Body Model (HBM) – A Method for Randomly Selecting Pin Pairs
 - ESD JTR001-01-12 - User Guide of ANSI/ESDA/JEDEC JS-001 Human Body Model Testing of Integrated Circuits

- Current Top 3 WG activities
 - ANSI/ESDA/JEDEC JS001-2024 limited ballot
 - ESDA/JEDEC JTR001 complete review (draft ready)
 - Cloned IO allowance review

- In the most recent WG meeting:
 - JS001 2024 limited ballot
 - TAS comments adjudication
 - Document sent for STDCOM review
 - Comments will be addressed in the next F2F meeting
 - User Guide references and Cloned IO modifications will be included in next limited ballot
 - Cloned IO
 - Cloned IO definition and flow chart update approved by the WG
 - To be included in a next limited ballot
 - Sample size for high number of cloned pin
 - Case study → random selection of 30 pins over 3300 was not capable to pick low threshold ones
 - Ask statistician for help (move to 10% requirement?)
 - Functional failure
 - Failure criteria for cloned IO is curve tracing → functional failure not detected
 - User guide
 - Done most of the writing, but still need to consolidate and harmonize
 - Target to have it ready for WG comments in late August

JWG HBM – Human Body Model Cont.

- User guide
 - Writing and harmonization done
 - Most of writing team comments addressed
 - Call on October 20th to finalize remaining comments
 - To be sent to all members by the end of November for review by the end of 2023.
 - Goal is to get the document to TAS for review by the March meeting series.
 - Would not require a STDCOM review
 - JEDEC review will follow
- Parking Lot Items
 - Table 2A with 2-channel tester – if you don't know coupled pins test shall be done each IO vs. each other IO (Table 2A or Table 2B)
 - Revisit JS-001 to incorporate references to JTR
 - How to Report tester settings
 - Delay between zaps
 - Pin/polarity Partitioning
 - Continuity
- Walk on topics
 - 500-ohm resistance – why 1%? 5% should be enough.
 - We don't control frequency, why control % so tightly.

JWG CDM – Charged Device Model

- Currently published documents
 - ANSI/ESDA/JEDEC JS-002-2022 - Charged Device Model (CDM) - Device Level
 - ESDA/JEDEC JTR002-01-22 - User Guide of ANSI/ESDA/JEDEC JS-002 – Charged Device Model Testing of Integrated Circuits
 - ANSI/ESD SP5.3.3 – Charged Device Model (CDM) - Component Level – Low Impedance Contact CDM as an Alternative CDM Characterization Method
 - ANSI/ESD SP5.3.4-2022 - Charged Device Model (CDM) Testing – Component Level – Capacitively Coupled – Transmission Line Pulsing as an Alternative CDM Characterization Method
- Current Top 3 WG activities
 - Limited Ballot draft changes to ANSI/ESDA/JEDEC JS-002 removing 1 GHz oscilloscope information and requiring use of high bandwidth (≥ 6 GHz) oscilloscopes.
 - Creating a Bare Die CDM TR (Technical Report) detailing issues with determining CDM robustness of Bare IC die.
 - Defining scope of upcoming multi-site data gathering comparing LICCDM and Field-Induced CDM to support successful Round Robin needed to include LICCDM method / procedure / waveform limits within JS-002 Standard document.

- In the most recent WG meeting:
 - Review of limited ballot writing team changes on ANSI/ESDA/JEDEC JS-002-2022 and JTR002 documents which are related to the removal of 1GHz oscilloscope information in both documents.
 - Review of the status of the TR draft on bare die CDM testing.
 - Presentations/Discussion on further topics related to
 - Time-Dependent Conductance in CDM and Implications for D2D Manufacturing
 - Voltage to Current Correlation for CDM Testing (CDM test of small packages)
 - ESD Risk Assessment for Devices on Printed Circuits Boards
 - Further data on 1-zap vs. 3 zap CDM data / justification

WG 5.5 – Transmission Line Pulsing

- Currently published documents
 - ANSI/ESD STM5.5.1-2022 - Transmission Line Pulse (TLP) - Component Level
 - ESD TR5.5-01-08 - Transmission Line Pulse (TLP)
 - ESD TR5.5-02-08 - Transmission Line Pulse Round Robin
 - ESD TR5.5-03-14 – Very-Fast Transmission Line Pulse Round Robin
 - ESD TR5.5-04-22 – Transmission Line Pulse (TLP) – User and Application Guide
 - ESD TR5.5-05-20 – Transmission Line Pulse (TLP) – Transient Response Evaluation

- Current Top 3 WG activities
 - Working on the use of VF-TLP for transient analysis
 - Working on statistical application of TLP methods
 - Actively maintaining the user guide
 - When topics come up that are relevant for users of TLP systems or TLP data the User & Application Guide (TR5.5-04) will be updated/extended

WG 5.5 – Transmission Line Pulsing Cont.

- Standard Practice on Transient Analysis with VF-TLP
 - Measurements on inductors and capacitors were shown and used to demonstrate verification methods for transients: we can extract the L & C from the transient waveforms.
 - Effects of different probe situations were clearly visible
 - The definition of transient parameters, such as overshoot and turn-on time, was discussed. The STM definitions, using the integration window, are not always useful for transient analysis.
 - An option is to use reference data on a 50 Ohm load.
- Technical Report on Statistical use of TLP
 - Automated measurement can be done by many, bottleneck is automated parameter extraction/analysis.
 - Examples sparked an interesting discussion on repeatability/outliers and sources of variation. Volunteers will add additional data for these experiments.
- Ringing Requirements for VF-TLP
 - Some problems with the present definitions were presented, in particular for VF-TLP.
 - These mainly arise since definitions are based on the plateau or the last point of the pulse.
 - Similar as above, this might be addressed by using a reference measurement instead.
 - Another suggestion is to widen the specifications.

WG 5.6 – Human Metal Model

- Currently published documents:
 - ESD SP5.6-2019 - Human Metal Model (HMM) - Component Level

- Current Top 3 WG activities:
 - Work on ESD TR5.6-02-2x

- In the most recent WG meeting:
 - Work on TR5.6-202x-WIP: summarizes the collective knowledge of WG5.6
 - Reviewed and discussed comments on the TR draft document.

WG 7 - Flooring

- Currently published documents
 - ANSI/ESD STM7.1-2020 – Floor Materials – Characterization of Materials
 - ESD TR7.0-01-23 – Static Protective Floor Materials

- Current Top 3 WG activities
 - Reviewed Second Draft of Flooring Training Module Based on Content in TR7.0

- In the most recent WG meeting:
 - Reviewed changes made to the initial draft of a slide deck to be used as a training module based on the information in TR7.0 on Flooring Systems.
 - Agreed on final changes to be made to several slides.
 - Discussed preparing the script for the training module.
 - Generally agreed on the length of the training module.

- Currently published documents
 - ANSI/ESD STM11.11-2022 - Surface Resistance Measurement of Planar Materials
 - ANSI/ESD STM11.12-2021 - Volume Resistance Measurement of Planar Materials
 - ANSI/ESD STM11.13-2021 - Two-Point Resistance Measurement
 - ANSI/ESD STM11.31-2018 - Bags
 - ANSI/ESD S11.4-2022 - Static Control Bags
 - ANSI/ESD S541-2019 - Packaging Materials
- Current Top 3 WG activities
 - Task Teams
 - Box Shielding
 - Incline Plane
 - Low Charging

WG 13 – Handtools

- Currently published documents:
 - ANSI/ESD S13.1-2019 - Electrical Soldering/Desoldering Hand Tools
 - ESD TR13.0-01-99 - EOS Safe Soldering Iron Requirements

- Current Top 3 WG activities
 - Continued work on technical contents (measurement methods) of Technical Report TR13.1-02-2X “Resistance Measurements of Hand Tools”
 - Started 5-year review of ANSI/ESD S13.1-2019

- In the most recent WG meeting:
 - Summary of discussions/activities/document reviews during the most recent WG meeting.
 - Discussion items around the 5-year review for ANSI/ESD S13.1
 - Items that may need to be added
 - Volunteers for review
 - Is there any conflicts between this document and other standards
 - Continued Development of ESD TR13.0-02 (Evaluating Unpowered Hand Tools)
 - Types of resistance measurements
 - Ideas for potential voltage generation testing

WG 14 – System Level ESD

- Currently published documents
 - ESD TR14.01-00 - Calculation of Uncertainty Associated With Measurement of Electrostatic Discharge (ESD) Current
 - ESD TR14.02-13 - System Level Electrostatic Discharge (ESD) Simulator Verification (Formally ANSI/ESD SP14.1)
 - ANSI/ESD SP14.5 - Near Field Immunity Scanning -Component/Module/PCB Level (EMC/ESD Scanning)

- Current Top 3 WG (Working Group) activities
 - Where do we go with this WG?
 - Discussion on a proposed Direct Pin Injection test, similar to IEC61000-4-2
 - Discussion on CDE (Cable Discharge Event) test method development

- In the most recent WG meeting:
 - Meeting started with the question of what direction should this working go. Should we go dormant?
 - This led to discussions on a proposed Direct Pin Injection test method
 - Although the IEC61000-4-2 standard states that this method should not be used directly on connector pins, device manufacturers are being asked to provide test levels on external connection pins
 - Discussing Direction Pin Injection testing brings up the question as to whether CDE (Cable Discharge Event) is simply another stimulus type of Direct Pin Injection testing.
 - Should we continue the development of a CDE document?
 - With the main contributor stepping away, do we have another contributor who can step in?
 - Several attendees felt there's a need to continue the investigation into Direct Pin Injection testing
 - Follow-up survey will be sent to find out how many companies are performing this testing.
 - Meetings will be set up to determine the next steps.

- Currently published documents
 - ANSI/ESD STM15.1-2019 - Methods for Resistance Measurement of Gloves and Finger Cots
- Current Top 3 WG activities
 - Discussions on establishing limits for glove testing.

- In the most recent WG meeting:
 - Presentation on limits for gloves
 - Review of an industry survey that was overwhelming in favor of limits with several additional comments on the need for charging limits.
 - Lively discussions on limits and the importance of same.

WG 17 – Process Assessment

- Currently published documents:
 - ANSI/ESD SP17.1-2020 - Process Assessment Techniques
 - ANSI/ESD SP10.1-2016 - Automated Handling Equipment (AHE)
 - ESD TR17.0-01-15 - For ESD Process Assessment Methodologies in Electronic Production Lines – Best Practices Used in Industry

- Current Top 3 WG activities
 - Completion of ANSI/ESD SP17.1 Rev. 2 after IEC TC101 meeting (July 3-6, 2023)
 - Start working on new document (TR). Focus: Application of flow and methods of ANSI/ESD SP17.1 to different applications, including die-to-die interfaces. Experts outside WG 17 will be invited to support.
 - Task teams and Writing Teams continue work on introductory slide set on ANSI/ESD SP17.1, on ANSI/ESD SP17.2 (“Process Assessment of Electrical Disturbances”), and Technical Report on ESD event detection (former ANSI/ESD SP10.2)

- In the most recent WG meeting:
 - Final review of proposed technical changes in ANSI/ESD SP17.1 Rev. 2: approach for determination of “contact resistance”, decision: Suggest three methods:
 - Characterize contacting material with resistance point to point or surface resistance
 - Characterize resistance of contacting material at higher voltage to account for resistance changes during ESD
 - Sophisticated characterization and extraction method based on publications of Toni Viheriäkoski will be used
 - Presentation on alternative risk assessment method of printed circuit boards (PCBs); results could be added in a future revision of ANSI/ESD SP17.1.

- Currently published documents
 - ESD TR18.0-01-14 – ESD Electronic Design Automation (EDA) Checks
 - ESD TR18.0-02-20 – Latch-up Electronic Design Automation (EDA) Checks

- Current Top 3 WG activities
 - New revision of ESD TR18.0-01 on ESD EDA
 - ESD EDA Workshop at the 2023 EOS/ESD Symposium
 - EDA section of ESD Technology Roadmap (2024)

- In the most recent WG meeting:
 - New ESD TR18.0-01 version: covers all verification types
 - Schematic-based static topological
 - Layout-based
 - Package
 - Plus investigation on the entire verification FLOW
 - System
 - Spice
 - TCAD
 - Finalizing schematic & layout-based checks chapters
 - Currently working on FLOW chapter
 - Discussed and frozen general template table to represent several EDA topics (checks presence / required input data / runtime performance) at different verification areas & integration Levels
 - ESD EDA Workshop
 - Organized World Café format EDA workshop “ESD EDA: What Can be Done Now and in the Future?” at 2023 ESD Symposium. 9 WG members led discussions.
 - Preparing workshop summary for publication in Threshold.
 - ESD Technology Roadmap
 - Prepared sections on EDA and Machine Learning, SPICE section is under development
 - Created ESD EDA history roadmap graphic timeline

- ANSI/ESD S20.20–2021 - Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)
- ESD TR20.20-2016 - ESD Handbook

- Review chapters for ESD TR20.20 and update per newest release of ANSI/ESD S20.20-2021.
 - This is the handbook for ESD control programs that support ANSI/ESD S20.20

- Currently published documents
 - ESD TR22.0-01-14 – Relevant ESD Parameters for Seamless ESD Design and Verification Flow
 - ESD TR22.0-02-18 – Relevant ESD Parameters for Seamless ESD Design and Verification Flow – Part 2 – ESD Parameters from Intellectual Property (IP) Providers)

- Current Top 3 WG activities
 - Update of ESD TR22-01
 - Update of ESD TR22-02

WG 25 – (CBE) Charged Board Event

- Currently published documents
 - ESD TR25.0-01-16 - Charged Board Event (CBE)
 - ESD TR25.0-02-23 - Charged Board Event (CBE) – Test Methods of Electronic Assemblies

- Current Top 3 WG activities
 - Collect case studies from the industry to update ESD TR25.0-01-16

WG 25 – (CBE) Charged Board Event

- In the most recent WG meeting:
 - Members agreed that WG will not create Standard Practice or Standard at this time.
 - Cooperation with other WGs
 - WG14 System Level ESD
 - WG17 Process Assessment – this may be useful a debug tool
 - Discussion about Education activities, can something be created around the 2023 TR?
 - Update CBE Tutorial / Webinars how to conduct CBE testing / Discussion groups during future conferences
 - WG25 will now go dormant for one year

- Currently published documents
 - ESD TR26.0-01-23 - Behavioral IC Modeling to Perform System Level ESD Simulations – General Description and Trends

- Current Top 3 WG activities
 - Final ESD TR26.0-02 corrections
 - Preparing activities for revising ESD TR26.0-02
 - Verification is needed
 - Additional Measurements are needed
 - Component Modeling is needed
 - System Level modeling is needed

- In the most recent WG meeting:
 - Reviewed status on technical reports
 - Presentation of modeling on TVS protection device with two different approaches and comparison of system measurements and simulation results for CAN application
 - Discussion about ways to speed up progress by pooling some company funding to support TU Graz with measurement and simulation

- Currently published documents
 - ANSI/ESD SP27.1-2018 – Recommended Information Flow Regarding Potential EOS Issues between Automotive OEM, Tier 1, and Semiconductor Manufacturers

- Current Top 3 WG activities
 - 5-year review of ANSI/ESD SP27.1
 - WIP TR27.0-01 – Fault Tree Analysis (FTA) document to be published

- In the most recent WG meeting:
 - Future of SP27.1 was discussed since 5-year review is coming up; alignment with USCAR needed
 - Status of FTA document was presented in TR format already; OEM and Semi part in good shape; Support for Tier1 group needed
 - Need for a similar non-automotive document discussed => parking lot

- Currently published documents

- None

- Current Top 3 WG activities

- Developing a new technical report - ESD TR29.0-01 - Guidance for Control of Electrostatic Hazards in Healthcare Facilities.

- In the most recent WG meeting:
 - Completed review of 2nd round of TAS comments
 - Focused primarily on Annex discussing risk due to flammables ignition
 - Now just need to update bibliography and turn it back to TAS
 - Will start working on a plan on how to promote the document
 - Short video on the need and overview of content
 - Article in InCompliance

- Currently published documents
 - ANSI/ESD STM97.1–2015 - Footwear/Flooring System – Resistance Measurement in Combination with a Person
 - ANSI/ESD STM97.2–2016 Footwear/Flooring System – Voltage Measurement in Combination with a Person

- Current Top 3 WG activities
 - ANSI/ESD STM97.1 – review for 10-year mark (July 2025); WG adjudicating STDCOM comments and two disapprovals
 - ANSI/ESD STM97.2 – review for 10-year mark (November 2026); WG discussed TAS comments and WG Chair’s response and new walking test data

WG 97- Footwear/Flooring Cont.

- In the most recent WG meeting:
 - ANSI/ESD STM97.1: WG discussed technical and general STDCOM comments and WG Chair's response to comments; decisions:
 - Troubleshooting sections (Annexes) will go to TR20.20
 - All other changes, such as sample size, cleaning procedure ... accepted as proposed by WG Chair
 - ANSI/ESD STM97.2: WG discussed TAS comments and WG Chair's response to TAS comments
 - Main concern of TAS: definition of equipment, particular maximum system capacitance
 - Walking test data by Dale Parkin and Ron Gibson reviewed; data show that influence of cable is negligible for ESD shoes on conductive flooring
 - WG agreed to start with more data gathering to address TAS comments on equipment
 - Decision point whether equipment section will be changed has to be in June 2025 latest