

Collaborations with the IBIS Open Forum

The IBIS Open Forum is an official subcommittee under SAE-ITC, and is the industry organization responsible for the management of the IBIS specifications and standards including IBIS, IBIS-ISS, ICM, and Touchstone. [2] The IBIS is a standard for electronic behavioral specifications of integrated circuit input/output analog characteristics. In order to enable an industry standard method to electronically transport IBIS modeling data between silicon vendors, simulation software vendors, and end customers, the IBIS template is proposed. The intention of this template is to specify a consistent format that can be parsed by software, allowing simulation vendors to derive models compatible with their own products. [3]

Intel initiated IBIS in the early 1990s. Intel needed to have all of its divisions to present a common standardized model format to its external customers. This prompted Intel to solicit EDA vendors to participate in the development of a common model format. The first IBIS model, version 1.0, was aimed at describing CMOS circuits and TTL I/O buffers [4] and officially released in April 1993. [5]

The IBIS Open Forum has some collaboration with the IEEE Design Automation Standards Committee (DASC) (www.DASC.org). DASC is associated with the IEEE Standards Association and the Computer Society, and manages the standardization process for a variety of design automation frameworks (including Verilog-AMS, System C, System Verilog and the like). There is no formal relationship between IEEE DASC and IBIS. However, IBIS has been invited to be a DASC member organization, and several officers and former officers (including the author of this article) have been or still are DASC members and attend their monthly meetings.

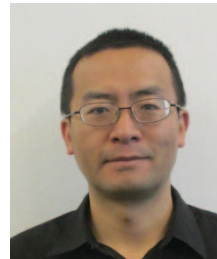
Dr. Zhiping Yang, the Vice-Chair of the IEEE EMC Society Technical Advisory Committee (TAC), started the discussion with the IBIS Open Forum on the potential collaboration between the IEEE EMC Society and the IBIS Open Forum on Power Integrity and Power Consumption standardization several months ago. After that, we have officially kicked off the Sister Society agreement discussions. Dr. Vignesh Rajamani, the Vice-President of Member Services for the IEEE EMC Society, is working with the IEEE legal team on the details.

For the upcoming 2020 IEEE EMC+SIPI virtual symposium, we will host a half-day IBIS Summit event on Friday, August 28, from 1:00 pm to 5:00 pm CDT. This will be the first IBIS Summit event collaboration between IEEE and IBIS. We plan to have topics on IBIS standard introductions to the IEEE EMC Society, collaborations between IEEE and IBIS on Power Integrity standardization discussions, and any IBIS related technical topics. This event is open to anyone who is interested in IBIS.

A full-day IBIS summit at the 2021 IEEE EMC+SIPI symposium in Raleigh, North Carolina (April 30-May 6, 2021) and Glasgow, Scotland (July 30-August 6, 2021) is under discussion at the IBIS Open Forum.

- [1]: <https://epsrc.ukri.org/funding/applicationprocess/routes/network/ideas/whatisasandpit/sandpitpsychology/>
- [2]: <https://ibis.org/info/>
- [3]: <https://ibis.org/about/>
- [4]: https://en.wikipedia.org/wiki/Input/output_Buffer_Information_Specification
- [5]: <https://ibis.org/specs/>

Get to Know Zhiping Yang, EMC Society Technical Advisory Committee Vice-Chair



Zhiping Yang is a Senior Hardware Manager in the Google Consumer Hardware Group where his team is responsible for new technology development for Google branded laptops and tablets. Prior to joining Google, he was a senior manager at Apple and a principal engineer at Cisco. He has published more than 50 research papers and holds 17 patents. His research results and

patents have been applied to Apple iPhone, Apple MacBook, Cisco Nexus 6K/4K/3K, Cisco Cat6K switches, and Cisco UCS server. He is an IEEE Senior Member and recipient of the 2016 IEEE EMC Society Technical Achievement Award. He is an Associate Editor for the IEEE Transactions on EMC, Vice-chair of the IEEE EMC Society Technical Advisory Committee, and the Chair of TC-12 (EMC for Emerging Wireless Technologies). He obtained his Ph.D. degree from the University of Missouri-Rolla (currently Missouri University of Science and Technology), and his B.S. and M.S. degrees from Tsinghua University, Beijing. He can be reached at zhipingyang@google.com. **EMC**



Managing Functional Safety Risks Caused by EMI: IEEE 1848 Now Approved for Publication

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Where Functional Safety risks must be kept low throughout the lifecycle of an electronically-controlled safety system, the acceptable level for the risks that could be caused solely by electromagnetic disturbances or electromagnetic

interference (EMI) is about 100 dB (i.e. 100,000 times) lower than the acceptable risk of failing normal EMC immunity tests.

For this and other reasons (see below) functional safety risks are

Join Us for the Next Meeting of the IEEE P1848 Working Group!

August 24, 2020

The IEEE P1848 Working Group will meet on-line, provisionally booked for August 24, 08:30-11:30 Central USA Time, as part of the 2020 IEEE International Virtual Symposium on EMC+SIPI.

One discussion will be on creating an industry/application-specific version of IEEE 1848, and so far, we have had interest in NATO/military; Machinery; Railways; Avionics; Automotive, and Medical. Other possibilities include Process Industry, Nuclear, and more.

Like all Technical Committee and Standards Working Group meetings, this meeting is open to everyone, including IEEE non-members. Meeting attendees are required to register for the Symposium via <https://www.emc2020virtual.emcss.org/> and at least "purchase" a Guest Pass for \$0.00.

incapable of being verified or validated by EMC immunity testing alone – no matter how much the test levels are increased!

IEEE 1848 is a new type of IEEE Standard that provides requirements and guidance on how to deal with this modern safety engineering issue. It has just been approved for full publication, but some editing must be done first so for now we only have the draft, at: <https://standards.ieee.org/project/1848.html>.

Briefly:

- 1) Even when a modern digital system passes all its EMC tests, this cannot prove that it is Functionally Safe as regards EMI
- 2) There are so many digital states in a modern digital system, that testing them all – even once – is impossible

- 3) EMC testing requires hundreds of tests, so testing to prove that EMI can't cause safety problems, is even more impossible
- 4) Digital systems are non-linear, so even if we could prove by testing that, say, 99% of their digital states were safe (which we can't), we could not assume that the 1% untested states would also be safe
- 5) Functional Safety risks that can be caused by EMI can be managed and reduced using a set of well-proven practical techniques and measures, called: 'Electromagnetic Resilience'
- 6) The new IEEE Standard 1848:2020 describes how to apply Electromagnetic Resilience in practical detail

The well-proven techniques and measures in IEEE 1848:2020 cover the following lifecycle stages:

- Project management
- System design
- Operational design of hardware and software Design verification
- Design validation
- Assembly/installation
- Commissioning
- Maintenance
- Upgrade and refurbishment disposal

Although intended for reducing Functional Safety risks, the techniques and measures in IEEE 1848 can also be used for reducing any quantifiable risks (mission-critical, reputational, financial, etc.) that could be caused by electromagnetic disturbances or EMI.

For further information, I recommend reading the early-access article that has just been published in the June 2020 IEEE Letters on EMC Practice and Applications (L-EMCPA): <https://ieeexplore.ieee.org/document/9113675>, and the article in the EMC Magazine (Vol 5, Qtr 1, 2016) <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7477140>.

EMC



SDECom Meeting Report

By Ross Carlton, SDECom Chair

The Standards Development and Education Committee (SDECom) has not held a formal meeting since February 2020; however, I can update you on a few items that may be of interest.

SDECom currently sponsors 14 active projects with the IEEE Standards Association (IEEE-SA). Information about our standards and standards projects can be found at the IEEE-SA website at <https://standards.ieee.org>. Working Groups are open to anyone to participate. For almost all SDECom-sponsored projects, neither IEEE nor IEEE-SA membership is required to participate. Please join us if you are interested.

• New projects looking for members:

- P2855 "Recommended Practice for the Electromagnetic Characterization of Cable/Connector Assembly Shielding Effectiveness in Frequency Range of Direct Current to 40 GHz". This project was recently approved in March 2020. The working group chair is Huadong Li. We are seeking interested parties to participate.
- P2838 "Standard for Aircraft Component Lightning Strike Direct Effects Qualification". This project was recently approved in November 2019. The working group chair is Fred Heather. We are seeking interested parties to participate.