

## ***APEC 2020 Resources Help Engineers Address Power Supply Safety and Compliance Needs***

*by Kevin Parmenter, Chair, and James Spangler, Co-chair, PSMA Safety and Compliance Committee*

APEC season is coming up soon and this means the brightest minds and top suppliers in the power electronics industry will be gathered in one place. This year the [IEEE Applied Power Electronics Conference \(APEC 2020\)](#) will be in New Orleans, March 15-19 and as always, we will be there to participate.

Over 300 exhibitors will be there this year showcasing their latest technologies and practical solutions to proximate problems in our industry. From a safety and compliance standpoint, this unique collection of suppliers and service providers presents a special opportunity to obtain the components, tools and advice we need as engineers to meet our regulatory requirements.

As power electronics engineers, we will be interested in what the various component suppliers have available that satisfy environmental regulations such as RoHS, WEEE, REACH(SVHC), and California Prop 65 as well as rules governing the so-called "conflict materials," so that that engineers can easily get parts qualified for use in their designs. We will also be looking for methods and test equipment to test and ensure the safety of power electronic products to meet global standards such as 60601 and 62368 as well as others related to specific product design and development.

We will also be on the look out for EMI-EMC related products. The common belief is that with the advent and proliferation of wide-bandgap devices with their fast switching edges, EMI will be increasing and thus new techniques for filtering, snubbers, shielding and so forth will increase. Whether the EMI does in fact get worse remains to be seen because the new devices are used in new topologies, which might have better EMC performance. For example, in theory LLC designs are easier to filter.

Exhibitors are there to answer attendee questions on issues such EMI and EMC. However, they will also go a step further in providing instruction through exhibitor seminars. One of the planned seminars this year will be on "Mitigating EMI Problems & Filter Selection," presented by ITG Electronics, which should be a very useful session. How to choose filters is one of the topics we've addressed in this column but having the opportunity to learn about and discuss this topic live with an expert is invaluable. Similarly, a professional education seminar to be presented on Monday, March 16th will provide instruction on "EMC Measurement and Reduction Techniques for Switch-Mode Power Converters" which should be well worth attending.

EMC is one of those areas that's not taught in engineering school and requires sharing of tribal knowledge among practicing engineers. The same might be said about magnetics, a design area that very much influences power supply compliance in various ways. Very few understand how magnetics work let alone how to design transformers and inductors properly. This is ironic since the key to power converter success is the design, control, and manufacturing of the magnetics.

Moreover, magnetics design directly impacts many aspects of safety and compliance requirements including power supply efficiency, materials compliance, reliability, EMI and more. Poorly designed magnetics can produce extensive EMI and compromised safety. For those who would like to increase their knowledge of magnetics design, there will be a workshop on magnetics on the Saturday before APEC 2020 (March 14, 2020). There will also be one or more tutorials offering instruction on magnetics design. With the latest proliferation in wireless power transfer, magnetics design and EMC – EMI compliance will be even more critical going forward.

In addition, I [Kevin] will be moderating a RAP session on magnetics at APEC 2020 that asks "Where does the expertise for the next generation of magnetics come from? The magnetics companies, or the engineer designing the power supply?" This rap session features engineer panelists from Analog Devices (Linear Technology), Vicor, Payton Magnetics, Renco, Rompower, Maxim and Ridley Engineering, which has taught over 3000 engineers magnetics design. This discussion may shed some light on which engineers in the power supply design chain will be responsible for managing safety and compliance issues in the near future. It will for certain be a lively discussion on who owns the magnetics design IP —the magnetics companies or the design engineer at the OEM, or an ODM-CM or the semiconductor reference design companies? Come and see how this turns out, as RAP sessions are usually unpredictable and can go in any and all directions.

Attendees will also find practical safety and compliance-related information in the APEC industry sessions such as one that Jim and I are chairing on gate drivers. In this area, semiconductor technology is now giving the long standing optical and magnetic isolation technologies lots of competition. With wide-bandgap devices needing isolated gate drive in many cases, the semiconductor companies making the isolated devices spend a great deal of time on addressing the applicable safety requirements. The industry session on gate drivers will offer an opportunity for engineers to learn about the latest efforts to address isolation directly from the semiconductor companies.

In general, semiconductor companies are in the thick of the battle to meet environmental, safety, EMC and efficiency requirements, all with the same highly integrated parts. As power supply ICs move to higher and higher levels of functional integration, ultimately leading to power supply on a chip, more of the responsibility for assuring compliance will fall on the chip makers.

But semiconductor companies are not the only ones with a role to play. The component suppliers for passive and electromechanical parts as well as active devices will have their latest products on display in the APEC exhibition and will be available to discuss safety and compliance issues as they relate to their products. This year the exhibition will have extended hours so attendees have a bit more time to see all the booths.

As was mentioned previously, the PSMA will have host a magnetics workshop on the Saturday before APEC. The organization will also present a capacitor workshop on the same day. In these workshops, and during the annual meeting of the PSMA on Monday morning, the PSMA will have representatives from the Safety and Compliance committee on hand to answer questions.

The regular (oral) paper presentations will cover a plethora of topics in EMC and safety including wireless power transfer, which always poses challenges in making the system work while still meeting FCC and CISPR EMI regulations. Poster sessions will likely have safety and compliance themes or aspects to them.

There is something for everyone in the electronics industry at APEC from energy harvesting and picowatts to alternative energy, motor drives, and wireless power transfer at all power levels to medical and industrial electronics as well as electrification of transportation and beyond. If you are involved in any aspect of power electronics, including safety and compliance you should be at APEC 2020. See you in New Orleans!

### About The Authors



*Kevin Parmenter is an IEEE Senior Member and has over 20 years of experience in the electronics and semiconductor industry. Kevin is currently director of Field Applications Engineering North America for Taiwan Semiconductor. Previously he was vice president of applications engineering in the U.S.A. for Excelsys, an Advanced Energy company; director of Advanced Technical Marketing for Digital Power Products at Exar; and led global product applications engineering and new product definition for Freescale Semiconductors AMPD - Analog, Mixed Signal and Power Division.*

*Prior to that, Kevin worked for Fairchild Semiconductor in the Americas as senior director of field applications engineering and held various technical and management positions with increasing responsibility at ON Semiconductor and in the Motorola Semiconductor Products Sector. Kevin also led an applications engineering team for the start-up Primarion.*



*Kevin serves on the board of directors of the [PSMA](#) (Power Sources Manufacturers Association) and was the general chair of APEC 2009 ([the IEEE Applied Power Electronics Conference](#).) Kevin has also had design engineering experience in the medical electronics and military electronics fields. He holds a BSEE and BS in Business Administration, is a member of the IEEE, and holds an Amateur Extra class FCC license (call sign KG5Q) as well as an FCC Commercial Radiotelephone License.*

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For further reading on power supply-related safety and compliance issues, see How2Power's special section on [Power Supply Safety and Compliance](#).