

Highly Practical EMC Book Will Pay For Itself

[EMC for Product Designers](#), 5th Edition, Tim Williams, Newnes (Elsevier), September 2016, 564 pages, \$85.95.

Reviewed by Kevin Parmenter, Contributor, How2Power Today

If you can have only one text on EMC in your library, “EMC for Product Designers, 5th Edition,” by Tim Williams, should be it. This book is one of the most—if not *the* most—practical works I’ve seen on the subject. For years I’ve relied heavily on the previous editions of this book when working on systems, and I’ve frequently referred to it when teaching EMC for power electronics designers in Asia and other regions.

I don’t know about you, but I can’t use a textbook whose sole purpose is to prove Maxwell’s equations to the ninth exponent in order to impress readers with deep dives into theory. Working engineers have to build and test products, which meet standards in order to ship them. Luckily, Williams’ book offers a comprehensive text on EMC that is truly practical.

“EMC for Product Designers” spans the basics; defining what EMC is as well as setting a baseline on compatibility. It covers radiated and conducted EMI as well as such specific topics as the self-jamming effect of systems being compatible with themselves. Additionally, there is a great overview of the EMC directives and regulatory, legislative and compliance requirements globally with specifics on each.

Refreshingly, the text separates the different EMC requirements for commercial, industrial, medical, automotive, rail, aerospace and military. It also gives extensive coverage and explanations of immunity, including susceptibility vs. emissions in product design and testing including an expanded section on safety. Several chapters are devoted to test planning and test methods and the necessary equipment with details on the required procedures and “how to” test methods and instrumentation. The expanded section on low-frequency tests especially mains harmonics, flicker, magnetic field and power quality immunity are critical to understanding the newer regulations including IEC 60601 4th edition EMC.

If you are tasked with designing practical products, then the chapter on grounding and layout, including PCB design and layout for EMC, is a must-read. (I was glad to see this topic broken out into both digital and analog design.) And it helpfully specifies how to design for immunity in system design, including for EFT, transient and RF immunity. I was also pleased to see grounding and shielding being discussed at length, with a chapter devoted to shielding. This is a much neglected topic in training of engineers at all levels and certainly information on shielding is no longer taught in schools.

The sections borrowing the Kimmel–Gerke source–path–receptor model offer a great approach to EMC troubleshooting. The other chapters that have been expanded and updated are on EMC management, the desperately needed system-level EMC and an overview of CAD and CAE tools for EMC along with the requisite case studies always present in EMI-EMC-RFI writings.

System-level EMC is another underserved topic—one which I don’t believe is being taught anywhere in the academic field. So Williams’ book is eminently useful for test engineers, compliance engineers, system designers, and circuit design engineers. In other words, just about anyone who is tasked with getting systems designed, built and tested so they can pass regulatory tests applicable to their markets.

Also, helpfully, the book contains a practical design checklist to make sure that you have covered all the bases in your design. It has information and references on CAD tools for EMC, case studies and useful tables, formulas and reference for your day-to-day work.

At the moment, I’m using Williams’ book for some work I’m doing on how to properly select a power line filter, a topic on which I’ll be giving a presentation at APEC 2017 in an Industry Session. I’m using it because I believe this book can save you time and money if you are tasked with applying practical efforts in the power electronics industry. In fact, the first time you use something out of the book it will pay for itself several times over. And if you need a practical guide for training students in EMC, this book will also serve you well in that effort.

There are lots of EMC books out there, but this is one of the few that you want to have at arm’s reach at your desk or bench when you need to simplify practical day-to-day design work. For people like me who prefer having hard copy reference books, you can find copies on Amazon or other sellers. If you need a handy EMC

reference book during your development or testing, I highly recommend that you get this latest version of Tim Williams' excellent resource.

About The Author



Kevin Parmenter has over 20 years of experience in the electronics and semiconductor industry. Kevin is currently vice president of applications engineering in the U.S.A. for Excelsys Technologies. Previously, Kevin has served as 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 based in Tempe, Arizona.

Prior to that, he 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 where he worked on high-speed electro-optical communications and digital power supply semiconductors.

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 also has design engineering experience in medical and military electronics. 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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