Teach Your Staff How to Fast Track Product Compliance With Convenient and Professional Online Training Courses

ONLINE PROFESSIONAL TRAINING COURSES

EMC FASTPASS IS THE LARGEST ONLINE REPOSITORY OF ELECTRONIC PRODUCT COMPLIANCE-RELATED PROFESSIONAL DEVELOPMENT COURSES

Intrinsic Safety  Electromagnetic Compatibility (EMC)  Wireless (RF)

For More Information  enquiries@emcfastpass.com  +1-250-898-4567
www.emcfastpass.com/training
02  2016/17 Online Course Catalog

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## Comprehensive Programs

Start these courses any time. New modules delivered weekly.

- **EMC Design for Compliance**
  - Duration: 21 weeks (45-90 min/wk)
  - Enrollment Fees: $2497
  - Instructor: Andy Eadie (B.Eng)

- **Intrinsically Safe Hardware Design**
  - Duration: 12 weeks (90-120 min/wk)
  - Enrollment Fees: $2295
  - Instructor: Jason Long (B.Sc EE)

- **EMC Troubleshooting & Pre-Compliance Testing for Product Designers**
  - Duration: 6 weeks (Approx 60 min/wk)
  - Enrollment Fees: $995
  - Instructor: Kenneth Wyatt (BSEE, BSBS)

## Short Courses

Enroll any time to get full, immediate access.

- **EMC Testing Beginner’s Bundle**
  - Duration: 9 hours
  - Enrollment Fees: $1297

- **FCC Wireless (RF) Pre-Compliance**
  - Duration: 6.5 hours
  - Enrollment Fees: $995
  - Instructor: Andy Eadie (B.Eng)

- **Antenna Matching**
  - Duration: 2.5 hours
  - Enrollment Fees: $299
  - Instructor: Lee Vishloff (P.Eng, IEEE WCP)

- **EMC Design Review Case Study**
  - Duration: 2 hours
  - Enrollment Fees: $197
  - Instructor: Andy Eadie (B.Eng)

*Prices are USD and per person*
Online Design For Compliance Training in EMC, Safety and RF (Wireless) Delivered by Trusted Experts.

Welcome To The EMC FastPass Training Hub

EMC FastPass is home to a growing number of online training courses in the specialized domain of electronic product compliance.

We believe that the key to minimizing the pain of compliance testing such as electromagnetic compatibility, wireless (RF) and safety is knowledge. Knowledge of test requirements; knowledge of design methodologies; knowledge of refined and proven processes and knowledge of available tools & test equipment.

About EMC FastPass

EMC FastPass was born from a frustration with the unacceptably high failure rate (approximately 50%) which costs the manufacturing industry hundreds of millions of dollars per year in delays to market and lost sales.

With a background in hardware engineering, as well as test & measurement, EMC FastPass founder Andy Eadie saw firsthand the challenges that manufacturers face to obtain the certifications required to legally sell their products.

Bringing together industry experts and collating hard won experience into concise, professionally-produced online training courses, EMC FastPass is proud and grateful to be one of the first training providers to design courses specifically for online audiences to help manufacturers pass EMC, safety and RF certifications.
The EMC FastPass Training Platform

BENEFITS & FEATURES

Quizzes
Automated multiple choice quizzes to test understanding.

EMC Design Review Pro
Use our simple guided online design review tool to verify your circuit board for EMC design best practices.

INDUSTRIES SERVED

Automotive
Medical
Aerospace
Industrial
Telecoms/Wireless
Consumer
Test & Measurement
Consultants & Academia

Training for Teams and Enterprises
We specialize in rolling out a selection of our training course catalog to teams and larger organizations.

If you want to get your hardware and compliance engineers up to speed as fast as possible, we have several features that make it easy to roll out one or several of our courses throughout your organization.

01
Set up one or more groups to progress through the courses together.

02
Assign a group leader to monitor student progress and test results.

03
Customizable training delivery schedule (free setup with 10+ enrollments)

04
Expert support available throughout the courses.

05
Discounts available for multiple enrollments.
“Andy’s EMC Design for Compliance training is a great mix of theory with practical experiments, and helped me intuitively understand where EMC problems occur and how to avoid them.”

Colin O’Flynn, CTO, NewAE Technology Inc.

“Thank you, Andy! Great course! I learned a lot, understand EMC much better, and now am anxious to apply that knowledge to a few applications here that have been troubling me.”

Dave McCall, Lead Engineer, Steris Medical.
Description

The focus of this course is helping you to get your products through radiated and conducted emissions testing first time around. The design techniques you'll learn will have the added benefit of improving the internal EMC performance of your product. Cleaner power supplies, increased noise margins, finer analog measurements, larger eye diagrams and increased RF sensitivity are all typical side effects of good design for EMC performance.

Learning Outcomes

The course contains over 60 topics spanning a wide array of subject matter. Below you will find some of the top level subjects that we cover, and each subject may have several sub-topics that dig into much more detail.

- Learn about the EMI coupling mechanisms.
- Learn how board stack configuration and layer usage affects EMI.
- See EMC experiments that help to illustrate several fundamental EMC phenomena.
- Learn how to implement design rules that IBM used to reduce EMC related board average re-spins from 2 to zero per product.
- Learn how tuning your power distribution network (PDN) can vastly improve EMI.
- Learn about the importance of return paths.
- Learn about common mode vs. differential mode noise.
- Learn how to choose, place and route de-coupling capacitors effectively.
- Learn about effective board level grounding.
- Learn how to place components and set up component zones for optimal EMI performance.
- Learn how to choose the right types of filters and implement them correctly.
- Learn about cabling, connectors and cable filtering.
- 5 hours are devoted to signal integrity (high speed design) and how it relates to EMI performance.
- Learn about power supply design for radiated and conducted emissions performance.
- Learn about shielding and enclosure materials.
- Learn about system level ground implementation and multiple PCB considerations.
- Learn how to prioritize EMI design rules.

Instructors

Andy Eadie is the content director and instructor for this course with assistance from several subject matter experts.

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To see full details and enroll online, visit: www.emcfastpass.com/emcdfc
Because time-to-market and budget factors often drive many of today’s high-tech designs, electromagnetic compatibility/interference (EMC/EMI) issues often surface at the last moment in the design cycle, potentially delaying product introductions.

Very often, simple pre-compliance measurements and techniques can identify issues early when the cost of implementation is substantially lower and design improvements may be made with less impact on schedules.

This training course covers the basics of EMC design and how to correct typical design issues, simple pre-compliance bench top measurement methods, and includes a number of simple techniques and tools useful in characterizing designs at various stages of development that will better prepare products for EMC qualification.

The presentation also includes video demonstrations of many of the basic principles. Finally, several case studies will also be described.

Who is this course for?
The course should prove useful for circuit designers, project managers, mechanical engineers, or systems engineers.

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Learning Outcomes
The course contains over 60 topics spanning a wide array of subject matter. Below you will find some of the top level subjects that we cover, and each subject may have several sub-topics that dig into much more detail.

- Troubleshoot and solve common EMC issues.
- Understand the causes of the most common EMC issues: radiated emissions/immunity and electrostatic discharge.
- Make or purchase simple, low-cost bench top troubleshooting tools.
- Perform simple evaluation and pre-qualification tests to ensure likeliness of compliance.

Attendees will be introduced to:

- EMI measurements and techniques.
- The most common EMC issues.
- Troubleshooting and solving radiated/conducted emissions.
- Troubleshooting and solving electrostatic discharge (ESD).
- Troubleshooting and solving radiated/conducted immunity.
- Troubleshooting and solving lightning surge and electrically fast transient (EFT).
- Practical tools and techniques that can be used for pre-compliance measurements.
- Case studies for several types of products.

To see full details and enroll online, visit: www.emcfastpass.com/emctroubleshooting
Description

If you’re new to EMC testing or perhaps you’ve been tasked with doing pre-compliance EMC testing on your own products and you want to get to grips with exactly what the tests are and how they should be applied. This course covers everything you need to get up to speed as quickly as possible.

We cover the fundamentals of what each of the main emissions and immunity tests are that your product may face at an EMC test lab. We cover items like: What each test is for, test equipment used, test methods, how the tests will be applied to your product (for immunity tests), typical failure modes and more.

Learn the intricacies of measuring radiated and conducted emissions as well as all of the most common immunity tests such as ESD, radiated immunity, EFT, surge, conducted immunity and much more.

You’ll also learn the processes and procedures for picking the right route to market for North America and Europe. You’ll learn how to find and navigate the EMC and RF standards that apply to your product, how to keep up with the latest standards and the pros and cons of using wireless modules.

You’ll essentially get a bird’s eye view of the regulatory requirements and how to efficiently navigate them, exactly like 3rd party EMC test labs do.

Whether it’s an intentional or unintentional radiator, you’ll learn how to efficiently navigate FCC and CE standards and requirements.

Learning Outcomes

This course is the ‘problem definition’ portion of the EMC problem.

- Learn the test methods for radiated & conducted emissions testing.
- Learn the test methods for immunity (susceptibility) tests such as ESD, EFT, surge, conducted & radiated immunity, voltage dips & interruptions and more.
- Identify key test equipment required for each test.
- Learn how each test is applied to a product on a per port basis.
- Predict which tests are likely to adversely influence your product (typical failure modes).

Who is this course for?

The course should prove useful for project managers, junior design engineers, hardware & firmware engineers, or testing/compliance technicians.

| Duration | 9 hours |
| Format   | Online  |
| Schedule | Start any time |
| Access   | 1-year access to all training material |
| Cost     | $1297 USD per enrollment |

To see full details and enroll online, visit: www.emcfastpass.com/emctesting
Reduce uncertainty and speed up time to market by doing RF pre-compliance testing.
FCC 15.247 Pre-Compliance Testing (Bluetooth, Zigbee, Wi-Fi etc.)

Description
Tight project timelines make failing at a test lab an almost untenable situation. This training course helps you to ensure that your RF transmitters (such as Bluetooth, Zigbee, Wi-Fi, 802.15.4) are verified prior to full certification testing.

It offers a step-by-step process that any manufacturer can implement to verify with high degree of certainty that newly-designed transmitters meet the FCC’s limits. With only a small amount of test equipment (e.g. a low cost used spectrum analyzer), you can undertake the majority of tests that a full compliance lab would do.

You'll get a step-by-step walkthrough of how to make conducted RF measurements such as spurious emissions, emissions bandwidth and peak power.

You'll learn how to compare those measurements to the FCC's limits to give yourself the best possible chance of passing certification testing first time.

Note:
The information in this training course was tailored specifically for transmitters that fall under FCC Part 15.247 (CFR47 Part 15 subpart C) such as Bluetooth, Zigbee, Wi-Fi, 802.15.4 and many other low power wireless transmitters.

However, the measurement techniques apply to many other types of transmitters that fall under different rule parts.

Learning Outcomes
- Learn how to specify an adequate spectrum analyzer.
- Learn how to prepare your hardware and firmware for RF pre-compliance testing.
- Learn how to operate a spectrum analyzer for RF measurements.
- Learn how the FCC’s rules apply to different types of RF transmitter.
- Step-by-step video walkthrough of making conducted RF measurements for DTS devices.
- Step-by-step video walkthrough of making conducted RF measurements for spread spectrum (DSS) devices.
- Learn about product labeling and modular certifications.
- Learn how to create your certification application package.
- Learn what you need to do if the transmitter design is changed after certification.

Who is this course for?
This course is ideal for test and hardware engineers looking for a plug and play verification process.

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To see full details and enroll online, visit: www.emcfastpass.com/fccwireless
Antenna Matching

A common RF problem encountered when completing a wireless product is electrically matching your wireless transmitter to your chosen antenna. Failure to properly match the antenna impedance to the radio module will reduce your product’s range resulting in unhappy customers. For products containing a cellular module, poor performance will usually result in a certification failure and an inability to sell the product for use on a carrier’s network.

Who is this course for?
- This course is for hardware design engineers and their team leaders whose products use wireless technology.
- Hardware engineers new to RF antenna issues.
- Technicians who need to verify a product’s antenna performance during production or development.
- Engineers preparing a product for cellular over-the-air performance testing.
- Design engineers who find their product is not performing as well as expected, or not as well as a competitor’s product.

Description
The course will show you step-by-step procedures for impedance matching a radio to an antenna. The course includes demonstrations of matching a single-band antenna and a dual-band antenna.

Learning Outcomes
- Learn what equipment you need to perform antenna impedance matching.
- Limitations of impedance matching.
- How to set up your test environment to reduce test cable influences on the results.
- Using complex impedance and a Smith Chart to realize your matching circuit.
- Examples of typical matching circuits and their application.

Duration
Approx 2.5 hours
Format
Online
Schedule
Start any time
Access
1-year access to all training material
Cost
$299 USD per enrollment
To see full details and enroll online, visit: www.emcfastpass.com/antennamatching

Lee Vishloff
(P.Eng, IEEE WCP)
Lee has over 30 years of experience in wireless and telecom design. Currently he is the Vice Chair of the IEEE Vancouver Section and he has delivered over 20 separate training sessions on wireless topics over the last 2 years.
He has spent the majority of his career managing teams and providing technical leadership for various industries including wireless, satellite, telecom, semiconductors, consulting and fiber optics.
He has worked in numerous technical areas including wireless system design, product design, analog, RF, digital, embedded firmware, modems and satellite equipment.
Intrinsically Safe Hardware Design

Description

Intrinsically Safe (IS) hardware design and certification to hazardous location standards for US, Europe and the rest of the world is an extremely challenging, time-intensive and expensive process.

Even the smallest oversight or design error can cost tens of thousands of dollars in lost certification fees and months of time waiting, fixing, and resubmitting a design only to fail again.

This course summarizes 15 years of IS design experience and delivers the most critical information to your hardware designers to greatly de-risk the process of creating and certifying products.

The course packs in a lot of information and challenges participants to prove their knowledge through hands-on case studies and take-home exercises. Extensive take-home material on intrinsic safety is provided for future reference.

Who is this course for?

- Engineers tasked with designing hardware intended for intrinsic safety certification and deployment in hazardous locations where the explosion hazard is gas-based (Class I Division 1 Group A, B, C, D or Class I Zone 0 Group IIC).

- Participants should have strong skills in hardware design both in schematic capture and PCB layout.

- Understanding both digital and analog circuit fundamentals and components is critical.

Learning Outcomes

- Learn trusted processes and best practices that are essential knowledge for embedded designers doing intrinsically safe products.

- Learn how to navigate and understand the key information in the 60079 series of Hazardous Location Certification standards for UL/CSA, IEC and ATEX certification.

- Build knowledge for designing hardware within the limitations of the standards.

- Gain skills to review and discover non-compliances before starting intrinsic safety certification.

- Learn how to build strategies for successfully navigating the intrinsic safety certification process to minimize time and cost.

- Maximize the probability of achieving compliance on the first attempted assessment.

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To see full details and enroll online, visit: www.emcfastpass.com/intrinsicallysafe
WE GIVE AWAY LOTS OF GREAT CONTENT FOR FREE!

Here are some of our most popular free resources

Online tutorials

Find the articles at www.emcfastpass.com/blog

01 The In-House EMC Testing Equipment Guide
• Learn how to save tens of thousands on 3rd party testing costs.

02 The EMC Pre-Compliance Testing Guide
• Learn about the many options for radiated and conducted emissions pre-compliance testing.

03 The Beginner’s Guide to EMC Testing
• A fun introduction to the world of EMC testing.

In-depth on-demand webinars

EMC Emissions & Immunity Testing

In this fast paced, information packed webinar, you’ll learn:
• The 8 traits of companies who consistently pass EMC testing.
• A bird’s eye view of the EMC problem.
• How to create an emissions and immunity test plan so that you can prepare for testing.

Intro to PCB Design For EMC/EMI Compliance

In this hour long video, here’s what you’ll learn:
• Get a bird's eye view of the EMC problem as we map out the many branches of EMC.
• Learn how to avoid 3 of the most common EMC design issues we see at the PCB level.
• Learn about EMC design reviews (and their limitations).
• Get an introduction to the Design Review Pro tool.

To find our free webinars, visit: www.emcfastpass.com/training
EMC Design Reviews

If you’d like to de-risk your next EMC testing process we’re here to help

EMC design reviews are a great way to de-risk the EMC testing process. Using our comprehensive checklist-based EMC design review, we manually review your schematics and layout for industry standard design for compliance best practices. This is an in-depth process that usually takes 1-2 business days to complete and the deliverable is a comprehensive report detailing suggested and critical action items. Refined over the last 5 years, read on below to hear from some of our happy customers:

**Powell Industries**

“We found the review to be very useful and in-depth. It definitely assisted us in preparing a robust design ready for EMC testing”

*Ondrej Mecl, Senior Design Engineer*

**Securnov Group**

“The design review assisted us to pass testing first time around. We would not hesitate for one second to recommend this company.”

*Andre Girard, President*

**Exegin Technologies**

“...your report has a wealth of useful suggestions and information. We will be implementing a few of your suggestions right away, and most of them in the next major release”

“The changes you suggested corrected a noisy channel problem we had”

*Fred Fierling, President*

**3 Flares Technologies**

“I am pleased with the level of detail and the reference material document is great”

*Chad Murphy, Owner*

To learn more, visit: www.emcfastpass.com/services/emc-design-review
Other Services

EMC Troubleshooting
Failed an emissions or immunity test? WE CAN HELP.

Remote Troubleshooting
Don’t want to pay for a consultant to come to your office? No problem, we can work with your schematics, layout and test results to formulate a plan of action and suggest remedial fixes.

We have successfully solved many problems from a distance. Give us a try.

On-site Troubleshooting
We are happy to travel anywhere in the world to address your EMC testing issues.

We have a full suite of portable troubleshooting and pre-compliance test equipment that covers most standard EMC tests including ESD, radiated immunity, EFT, surge, conducted immunity, voltage dips, radiated emissions, conducted emissions and flicker/harmonics.

Free 15-minute consultation.

Contact us at consulting@emcfastpass.com with your EMC issue today.

In-House Pre-Compliance Lab Setup and Training
For organizations doing frequent EMC testing, setting up an in-house EMC test lab can often make a lot of sense, both economically and in terms of accelerating time to market.

An in-house test lab can be very useful for:

- Pre-compliance testing prototypes to de-risk the certification process.
- Bringing some finals testing in-house (take 3rd party labs out of the equation).
- Lower the cost of troubleshooting.

We can help in the following ways:

- Assistance calculating the ROI and working out which tests to bring in-house.
- Specifying and sourcing the right test equipment.
- Assistance constructing test setups.
- Hands on training of staff on equipment usage and test procedures.
- Creation of documentation and test report templates.

Contact us at consulting@emcfastpass.com to arrange an initial consultation today.