

AVIONICS magazine TECH REPORT

The Benefits of Third-Party EMC Testing



The pressure to bring new products to market faster, more economically and with higher

quality has never been greater. And keeping development projects on schedule, within budget, all with less support staff available, is a constant battle. Not to mention dealing with challenging, and ever-changing, Department of Defense (DoD), FAA and international regulations. The answer to these challenges may be third-party test labs.

In approaching a product launch, one must determine how to address the importance of electromagnetic compatibility (EMC) testing. And in the final stages of the development process, this decision could be critical: Do it in-house or use a third-party test lab?

Knowing Your Team's Strengths

Teamwork is essential to bring a new product to market. With leaner internal staffs, more and more people are “wearing many hats,” as companies strive to maximize value out of internal resources. Maintaining quality within a cost-savings environment can be a difficult balancing act.

Part of the teamwork involves managing the process so each “team member” is used properly and positioned to help you win. Talent gaps can be filled with outside resources. The best team, including internal and external sources, ensures you have the best overall support on a project.

The first step in this balancing act is to recognize and leverage your internal strengths. If you have an internal EMC test lab, you should ask if it is the right lab for your project. It may seem like the appropriate choice from a budget perspective, but your lab's strengths may not match your needs. You should ask, therefore, does your EMC lab:

- Accommodate your schedule?
- Prepare meaningful and actionable test reports?
- Effectively interface with FAA?
- Provide an objective critique of test protocols?
- Represent the state of the art?
- Have a staff that is experienced on the latest EMC test methods?
- And meets DoD, FAA and international requirements?



These factors show that maintaining a strong internal EMC test lab represents a significant investment. Which is one reason why many aerospace companies turn to third-party EMC test labs for the equipment and expertise that is becoming more difficult to build and maintain in-house.

Selecting an EMC Test Lab

Exploring third-party EMC test labs, like most evaluations, works on two levels: the basics and the intangibles.

The basics are easier to identify. EMC testing is a demanding, specialized process. Several specific equipment and certification requirements identify the test labs equipped to handle your work. For infrequent or limited users of EMC testing, conforming to these requirements may be all that is needed. In this more task-driven relationship, you hope to find and work with a test lab that can perform the necessary tests on time and within budget.

The intangibles are a little more difficult to recognize, but they can become more valuable to your organization. Finding the right lab means looking for more than reverberation chambers, HIRF (high intensity radiated field) testing capabilities and the ability to prepare an EMC test report documenting test results. It also means finding a partner or teammate, not a vendor. In other words, a lab that will work with you, learn your business and apply its EMC testing expertise to support your business goals. Beyond task-driven, this type of relationship is more solutions-driven.

The Basics

This first level of evaluation identifies the labs that can handle your project. Preparing your request for proposal, you describe the equipment being tested, its application and any additional requirements needed.

From the responses you determine the equivalent of the “first cut” of a sports team. You eliminate those labs that can't perform the necessary testing within the budget and schedule that you have predetermined. From a visit to the respondents' facilities and from other research, you then investigate each lab's:

- Reputation in the marketplace,
- Staff experience,
- Technical expertise,
- Test lab capabilities,
- Test equipment,
- Certifications,
- Reporting capabilities,
- Schedule, and
- Cost.

Even if you are an infrequent user of EMC testing, alliance with a top-quality lab is important to assure your team's hard work won't be jeopardized. Be sure to check references. Also make the lab



demonstrate how it works with companies that are similar to yours in size and scope of work. View a potential teammate as the equivalent of a “pinch hitter.” You don't necessarily use him frequently, but when you need his specialized skill, he dependably performs his role and “heads back to the bench.”

Beyond the Basics

If you are a frequent user of EMC testing or deal with mission-critical applications, you need to move beyond the basics. And your EMC test lab needs to move beyond the basics with you. In this situation you need an EMC test lab with a service level “beyond the basics.” Now your investigation is looking at the lab's:

- Reputation in the marketplace—not just domestic but also international;
- Staff experience—trained and re-trained to stay ahead of changing regulations;
- Technical expertise—the ability to make adjustments during tests and still keep on schedule;
- Test lab capabilities—chambers to handle a wide range and demanding test environments;
- Test equipment—with adequate depth

and breadth to handle possible challenges during testing;

- Certifications—both military and commercial;
- Reporting capabilities—generating a top-notch report to pass along to clients;
- Schedule—the flexibility to marshal additional internal resources to keep a project on track when surprises arise; and
- Cost—which means no misunderstandings with scope of work and quotes.

The intangibles that power a solutions-driven relationship are more than a process; they're an attitude that raises the level of service you receive. The benefit of working with a third-party EMC test lab is leveraging the intangibles, so the lab becomes a trusted member of your team and not just an occasional "pinch hitter." Finding the intangibles from a lab means examining the chemistry, knowledge, flexibility and passion.

Chemistry

EMC testing can be a demanding, pressure-packed environment. A good working relationship, or the "right chemistry," with the test lab and its engineers helps during this stressful time. To determine the chemistry you should find a test lab that asks you more questions than you ask them. Learning more about you will help them make sure you maximize the value of your test. There may be multiple ways and different equipment available to conduct a specific test. Insight into product usage can mean the test is run to meet standards above and beyond the immediate need. Sometimes a simple modification can mean a test meets both military and commercial standards. This saves time and money and possibly opens a new selling opportunity for your product.

Some companies are concerned about confidentiality of proprietary information shared with the test facility, especially if the lab has worked with a competitor. Most labs will sign a nondisclosure agreement. The EMC testing category is a "small world," and integrity is crucial to any lab's success. One "smudge" would ruin a lab's reputation.

The experience of testing similar devices can actually work to your advan-

tage. Test labs become more proficient as they test similar products, improving test planning, setup and performance. Sometimes these insights can help even before the test process starts, by identifying potential problems at the test planning stage and making the appropriate adjustments. This is the value of an ongoing and active relationship with your lab.

Knowledge

You shouldn't have to focus on the ever-changing EMC environment. A knowledgeable and experienced EMC lab should proactively educate you on changes that have an impact on your business. Sharing new developments in EMC testing is an important role for the third-party lab.

Sometimes the preparation of comprehensive test procedures, prior to testing, will streamline the process. Your lab should discuss this option with you at the initiation of a project.

At the end of a project a lab will pre-



pare a detailed report. Before selecting an EMC test lab, evaluate a sample report. Is it comprehensive? Thorough? Insightful? Professional looking? And does it have a complete listing of all test results? You should feel comfortable putting your name on a report from the EMC test lab.

Working with a lab that has both military and commercial experience can be beneficial, especially if your products are used in both markets. DO-160 is the commercial avionics specification and it resembles military standards, but there are differences. From DO-160 to MIL-STD-464 to MIL-STD-461E, if you clearly outline your product development/marketing plans, your test lab can deliver an appropriate testing approach.

A knowledgeable test lab maintains strong relationships with FAA and DoD. At times the lab may communicate direct-

ly with them to help speed the testing and approval process.

Flexibility

EMC testing always brings change. Not thrown off course, a good test lab can solve new and different EMC issues or "glitches" on a daily basis. You need a lab with a wide array of equipment and test chambers to get around the problem. More important than the hardware or location is an engineering and technical staff that can quickly brainstorm a new testing approach to keep your project on track.

Sometimes a project requires additional collaboration. Your test lab may be able to assist you with coordinating non-EMC tests (i.e. European CE Marking or environmental) conducted at other labs. Some of the larger labs can actually handle multiple test applications internally.

The key is to be able to trust your lab to manage the entire testing process. This frees your internal resources to concentrate on what they do best.

Schedule flexibility is probably the most sensitive issue for companies. The larger EMC labs have more flexibility with scheduling and utilization of resources.

Passion

How do you find a test lab with passion? There is no test for passion, but one can feel it. Your test lab should be a mirror image of your energy and desire to bring your product to market quickly, economically and at the highest quality.

The best test labs move beyond the technical task of testing and strive to integrate their service into their customers' overall business objectives. A third-party EMC test lab can become a strong strategic resource and valuable member of your project management team.

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