

YOUR GUIDE TO

Best practices for your EMC project

A guide for your electromagnetic compatibility (EMC) testing and certification project

Why is EMC important?

Markets around the world have legal requirements to ensure electrical and electronic equipment maintain an adequate amount of immunity to EMC phenomenon and don't produce an excessive number of emissions.

These requirements ensure electrical and electronic products:

- Meet the expectations of the consumer
- Are safe for the user and the environment where the product is used
- Don't affect other equipment
- Don't interfere with broadcast services

What are some common issues seen during EMC testing?

Ideally a product will undergo EMC testing, pass the test and be returned to the manufacturer with a positive test report within a few weeks of arrival at the testing laboratory.

Sometimes a product fails testing, due to issues like exceeded limits for conducted or radiated emission or functionality problems during or after certain immunity tests.

When issues like this come up during testing, the manufacturer may have to consider design changes or accept reduced functionality (quality) in order to pass the requirements before entering the market.

Some design changes can be straightforward and quick to implement but others may be time-consuming and costly.

Preparing your product for EMC testing

Use the steps below to prepare for the testing process. These best practices can help you avoid some of the common challenges and test failures seen during EMC testing projects. Following these best practices can help make the testing process more efficient, allowing you to get your product ready for your target markets.

Step 1

Know the applicable standards for your product

Usually, your product will fall under a particular EMC product standard category. For devices that need to be tested for performance or functional safety, or incorporate a radio module, there may be multiple EMC standards applicable to your product.

When you work with CSA Group, customers already familiar with the applicable standards receive a Constructional Data Form to complete. This form is used to collect required information about the product being submitted for evaluation.

If you're unsure of or unfamiliar with the applicable standards, CSA Group helps you prepare for certification through our Technical Information Service, offering training to educate customers on the application of a standard and how it is used. Our experts share their knowledge gathered from years of experience and explain how we approach the applicable tests or how we interpret the text of the standard.

Step 2

Know the environment where your product will be operated

Your product may be used in a residential, commercial and light industrial, heavy industrial, medical, avionic, maritime, road traffic, agricultural or railway environment. Each application of the product may have additional considerations that impact on the EMC testing requirements, such as:

- Residential, commercial and light-industrial (EN 55011, EN 55014-1, EN 55014-1, EN 55015, EN 55032, EN 61000-3-2, EN 61000-3-3, EN 55035, EN 55022, EN 61000-6-1, EN 61000-6-3, EN 61000-6-8 and EN 61326-1)
- Industrial (EN 61000-6-2, EN 61000-6-4, and EN 61326-1)
- Medical (EN 60601-1-2, IEC TR 60601-4-2)
- Avionic (DO 160)
- Maritime (EN 61945, DNVGL)
- Road traffic (ERC 10, ECE R10, EN 55012, EN 55025)
- Agricultural (EN ISO 14982)
- Railway (EN 50121-3-2)

Step 3

Prepare for the EMC testing process

Before testing can begin, there are steps you need to take to prepare for the process. Ensuring you have this information ready while working with a third-party evaluator can help the testing process go smoothly and efficiently.

Here are some of the product details you may need to provide, depending on the scope of your project and the product you're testing:

- Number of samples
- Grounding of equipment under test (EUT)
- General size and weight
- Input voltages that need to be tested
- The number of active functions
- The number of operation modes to cover all functions and mains voltages
- The cycle time of a product's complete program (e.g. washing machine takes two hours to complete a wash cycle)
- The response time of the EUT
- The number of signal input and signal output ports
- The length of cables which are permitted to be connected to these ports
- If these cables are shielded or unshielded or can be both
- If the lab can test without needing the manufacturer to operate the product/equipment

When you work with CSA Group, this information is collected through the Constructional Data Form that's completed before testing begins.

Step 4

Provide samples as soon as possible and ensure certifiers can operate the product

By delivering your samples required for testing as soon as possible, you can reduce the risk of delaying the start of your project. If your product is complex, it's important to also make sure that the certifier will be able to operate the product. If the manufacturer doesn't need to be present to operate the product being tested, this can also lead to faster turnaround times, because projects can be worked on during late shift or shifted to another CSA test site if there is free capacity.

CSA Group has a number of certification services to fit the unique needs of the different manufacturers we work with. If you have special needs or unique requirements for your product evaluation, our experts are happy to work with you to determine which service(s) will be the best fit.



Step 5

Respond to technician questions as quickly as possible

It's important for manufacturers to respond to any questions that the person working on your project may have in a timely fashion. This keeps your

project moving and ensures that the certifiers have all the information needed to properly evaluate your product according to applicable standards.

Step 6

Leverage services for global market access

Once the test report is issued, demonstrating that the product has passed testing and complies with the applicable standards, you should consider whether you will be bringing your product to global markets.

Some testing service providers, like CSA Group, offer services to help manufacturers achieve global market access. CSA Group's international certification team provides a one-stop shop to help manufacturers navigate and comply with local,

regional, and international requirements to access target markets around the world. With offices in North America, Europe, and Asia, we offer technical guidance, have the relevant accreditations, liaisons, and recognitions to perform the needed tests and provide local support with experienced multilingual experts. Each customer is assigned a project specialist to manage their international approvals from start to finish. These specialists have thorough and up-to-date knowledge of national regulations in different industries and regulatory sectors.

Combined testing for more efficient evaluation projects

Some EMC products require multiple tests to assess compliance with multiple applicable standards. Combining these required testing activities into a single evaluation project can create a more efficient project. These tests may include:

- Primary function EMC performance testing
- Radio module EMC testing
- Electromagnetic disturbances testing for functional safety

Tests can be performed sequentially, on a single piece of equipment under test (EUT) or in parallel (if several samples are provided).

The benefits of completing multiple tests through a single service provider include:

- Reduced shipping costs of sending samples to multiple locations
- Possibility to run several tests on the one sample
- Faster turnaround times
- Coordination through a single point of contact
- Technicians that are already familiar with the product



Why CSA Group?

When you work with CSA Group, you'll interact directly with the certifiers assigned to your project. This gives you direct access to a wealth of technical expertise in the standards that affect your business.

Our direct-contact approach helps your compliance testing run efficiently. In the unfortunate event of a failure or non-compliance, our experts provide detailed descriptions of the findings to help you understand where the product does not meet the requirements, providing you with the information you need to make the necessary corrections and get your project back on track.

Let's work together

Put CSA Group's industry-leading knowledge and experience to work for you.

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