Overlapping EMC Testing to Minimize Test Time and Maximize Global Acceptance

Merritt Pulkrabek
Regulatory Compliance Engineer

Topics

- Product Roadmap
- Country List
- Product Categorization
- Working With a Regulatory Reviewer
- Samples, Accessories, and Test Modes
- Pretesting Samples
- Lab selection
- Lab Support
- Leveraging Tests/Reports
- Awareness of Regulatory Changes
- The Value of Consistency

Product Roadmap

Is this a:

- Completely new product that is not similar to another product offering?
- A new product that is the next generation of a family of products already being marketed?
- A re-design of an existing product?
- Is the global marketing footprint being expanded?

Country List

The country list is a critical in determining how to combine testing and reports to leverage certifications.

The most common are the USA and EU. Many countries have MRA's that allow the acceptance of certified test reports from these countries/regions to be used for certification.

Some countries allow a sub-set of the test reports from other countries but have some national variations that must be addressed.

Finally, there are countries that are highly restrictive and rarely accept reports from other countries.

The above information is constantly changing, dependent on the category of product, and can be difficult to determine.

Product Categorization

What is my product? Why do we care?

- Places like the USA and Canada typically do not care what the product is or how it is used. Hence the standards are more “generic”.
- The EU on the other hand will direct the requirements for your product based on its application or use.
- Is the product:
- Audio/Visual, an industrial control, measurement equipment, medical, consumer, professional install, toy, used in a vehicle, an accessory, connected to the internet, connected to the power grid, battery powered?
- You may have noticed that test labs ask these kind of questions so they know what specific tests will need to be performed.
- To determine a products “category” it must be supported by the user manual, marketing materials, installation guides etc.
- Setting the product category determines the entire scope of testing and certification.

Example:
What category is this?
A small camera that can be mounted indoor or outdoor
Powered by rechargeable Li batteries or 12VDC through a AC/DC adapter or vehicular adapter.
It connects to the internet via WiFi or directly to a phone via BLE.
It is going to be marketed to the consumer as a home security device, healthcare as a way to monitor patients, and to the automotive industry for professional installations.

Working With a Regulatory Reviewer

A Regulatory Reviewer can:

- Help categorize the product for maximum regulatory acceptance.
- Determine the maximum re-use for reports.
- Provide more accurate approval schedules.
- Pre-screen potential labs for suitability.
- Coordinate global approval efforts.
- Provide in-country support if roadblocks arise.

Samples, Accessories, and Test Modes

Determine the # of samples needed early in the design process.

a. Limited samples can slow your process and cause delays
b. Some countries require multiple samples
c. Providing more than one sample is always recommended.

More than one sample configuration may be needed.

a. Some tests may damage samples.
b. Special hardware/software configurations may be needed.

Some countries require accessories to be provided with the product

a. Even if the accessories have no electronics
b. Common cables or mounting hardware may also be needed
c. If it is offered to the final customer it may be needed to for testing.

Evaluate what test modes will be necessary to accomplish the testing

a. Some products have multiple operating modes
b. Low power, accelerated processing, or different software configurations.
c. Not all modes need to be tested but the modes need to be evaluated to determine their differences.

Pretesting Samples

Pretesting samples is one of the most important steps to decrease lab time and increase approval certification.

Are there special test modes that are needed?

a. Continuous run mode
b. Idle mode
c. Max power mode

If there are parameters that are close to the limit, then analyze the risk of failures. Typical issues arise with:

a. Spurious Emissions
b. Radiated Immunity
c. Surge, Burst, or ESD.

Develop clear step by step instructions to properly set up and operate the product and place it in the proper test modes detailing:

a. Cable lengths/connections
b. Software settings/configurations
c. Grounding
d. Placement of accessories

It is recommended to provide photos or short videos that show how to properly set up the product.

Lab Selection

- ❑ Is the lab accredited to do all of the tests?
- ❑ Are they able to accommodate your schedule and what is their typical queue time?
- ❑ Can they do all of the testing in one location or will they product have to be shipped to other locations?
- ❑ What kind of technical support do they have if there is a failure?
- ❑ Are they willing to “overlap” tests and possibly provide multiple test reports for different countries?
- ❑ Do they have multi-lingual support in cases where the testing is taking place outside of the home country?
- ❑ Are they willing to support your global approval plan?

Lab Support

There are always questions that arise during testing, even if the product is accompanied by the manufacturer:

- What is the response time of the product?
- Are all the ports accessible to the end user?
- What are the exact cable lengths?
- The product “did this”. It is a correct response or a failure?
- We recorded this emission….. That was over the limit.
- Explain the justification for the mode you have suggested for “worse case” operation.

Have a team of key individuals from different internal organizations ready to answer questions or provide guidance. For Example:

- Engineering may need to provide troubleshooting or design clarification information.
- Marketing may want to have input as to where labels are located.
- Your legal department may need to review some laws or requirements of your product in particular countries.
-
- Technical writing teams may need to add or update information to manuals
- User manual translations are required for many countries.

Leveraging Tests/Reports

This is a common practice but let's look at some issues.

Family Approvals

Modules

Minor Deviations

Same test but different passing limits

Declarations vs Certifications

Category Differences

Awareness of Regulatory Changes

- How long will the test report be valid?
- Will the product meet the proposed new requirement?
- What about unknown regulation changes?
- Test beyond the current limits to find the failure point if possible.
- Document actual measured values, not just “Pass” statements.
- Insist on detailed test set-up information that includes photos and equipment settings.
- Screen shots of spectrum analyzers are extremely helpful.

The Value of Consistency

Documents should be consistent to facilitate re-use in multiple certifications

A. Model numbers
B. Product name or trademarks
C. Technical specs
D. General descriptions
E. Company addresses etc.

Across all documentation

A. Reports
B. Manuals
C. Marketing Material
D. Declarations
E. Technical files (schematics, block dia. Etc.)

Summary

- ✓ Know where the product has been, where it is now, and where it is going.
- ✓ Know what category the product fits.
- ✓ Know where the product is to be marketed.
- ✓ Work with a regulatory reviewer to determine the global requirements.
- ✓ Create a plan to meet current and pending changes in regulations
- ✓ Preplan for the # of samples you will need.
- ✓ Verify the design is locked.
- ✓ Select a lab that is accredited and can support your product and plan.
- ✓ Develop any special product operating instructions.
- ✓ Have a plan to support the lab in a “minute man” fashion.
- ✓ Closely review test reports to ensure accuracy and consistency
- ✓ Crosscheck the all documents for consistency

Approve-IT

Address: 8011 34th Avenue South
Suite 342, Bloomington, MN 55425, USA

Office: +1 (651) 647-5930

Website: www.approve-it.net

email: team@approve-it.net