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# On-Site EMC testing for large industrial systems & devices

## CHALLENGE

Large industrial system manufacturers face difficulties complying with the EU EMC Directive 2014/30/EU and international standards. Machines or larger devices are often too large or complex for traditional laboratory EMC testing.

## SOLUTION

On-Site EMC Testing is carried out directly at manufacturing facilities by bringing mobile testing equipment to the manufacturer's facility where the machine is built. This approach:

- Addresses logistical challenges like size, power demands, and hazardous environments.
- Ensures conformity with EU harmonized standards and international requirements.
- Supports product development through early-stage EMC testing and iterative improvements.

Testing on-site may result in minor deviations from standards, which are documented in reports.

These deviations are minimized to ensure conformity with the EMC directive's essential requirements.

**KEY STEPS AND BENEFITS:****1. Testing Environment:**

- Machines tested in-situ at the factory floor instead of controlled labs.
- Justification typically involves technical or logistical challenges, e.g., cleanrooms, oversized machines, or installations requiring high AC power.

**2. Efficient System Setup:**

- EMC testing equipment is pre-configured for „plug-and-play“ power connections, eliminating delays and unsafe wiring errors.
- Packaging and shipping considerations (e.g., shock-protected transport) ensure smooth delivery for testing.

**3. Role of Experienced Engineers:**

- EMC experts ensure safety during complex connections (e.g., 3-phase AC wiring) and adapt to on-site deviations and environmental conditions. A test plan will be prepared before testing.

**4. Testing Standards:**

- Core standards for emission (EN 61000-6-4), immunity (EN 61000-6-2), and industry-specific norms (e.g. EN 55011, EN 61851-21-2, SEMI F47) are applied. Testing also includes essential immunity standards like EN 61000-4-X series.

**5. Timeline:**

- No additional transport and commissioning of the larger products.

**PROCESS OF EMC TESTING:****1. Emission Testing:**

- Radiated Emissions: Signal measurements from 30 MHz to 6 GHz using antennas.
- Conducted Emissions: Detection of interference on power lines.

**2. Immunity Testing:**

- Simulating disturbances (e.g., surge voltages, ESD) and monitoring machine performance.
- Adhering to performance requirements.

**3. Preparation:**

- Providing suitable power supply (e.g., 230 V, 32 A, 3-phase).
- Setting up the test area: sufficient space and proper tools.

**4. Duration:**

Approximately 3–5 days, depending on the complexity of the product and including setup and documentation.

**DESIGN OPTIMIZATIONS TO MINIMIZE EMC ISSUES:**

- **Power Line Filters:** Installed at the main power supply and locally at noise sources like frequency converters.
- **Shielding:** Use of shielded cables and metallic enclosures.
- **Grounding:** Effective grounding connections, such as braided grounding straps.
- **Subassemblies:** Use only CE-certified components and follow installation guidelines.

**APPLICATIONS AND FUTURE OUTLOOK:**

- On-site testing supports industries like renewable energy, electric vehicle charging stations, and heavy industrial machines. The next generation of integrated testing platforms will focus on faster, versatile setups to simplify complex testing.
- By adhering to EMC compliance through on-site solutions, manufacturers can efficiently navigate regulatory requirements and achieve faster market delivery worldwide.

## Have we sparked your interest?

Get in touch with us to learn more about our services and discuss your specific requirements.

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