

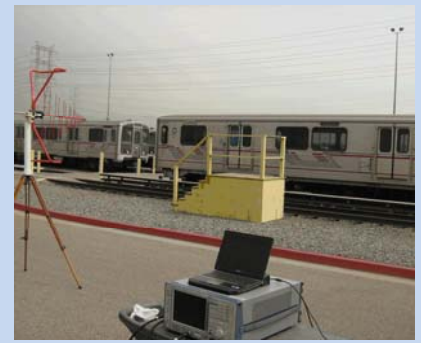


EMC Testing for the Rail Industry



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As railroad regulations change and evolve with technology, rail owners and operators will be increasingly faced with the challenge of ensuring electromagnetic compatibility of new systems and equipment. TÜV Rheinland® has the experts, equipment, and experience to ensure smooth integration.



Why EMC Testing?

All electric or electronic devices transmit and also receive electromagnetic waves that can potentially cause **electromagnetic interferences (EMI)** with other electronic or electrical equipment. For many products, the challenge of **electromagnetic compatibility (EMC)** testing has become more daunting than ever. What makes it particularly difficult is that the source of an interference and the receiving equipment subject to that interference often are different technologies. To deal with this problem a number of standards, regulations and many client specifications require components, subsystems and complete railway systems to be tested to see whether they emit beyond allowable emission limits and also for their own immunity to other sources of electromagnetic noise.

Sources of such electromagnetic noise can be, but are not limited to:

- Overhead catenary lines
- High voltage line to substations
- Propulsion equipment using thyristors, GTOs or IGBTs
- Auxiliary apparatus with high power ratings
- Auxiliary power converters
- Electrical train lines feeding lights, HVAC, battery chargers and converters
- Wayside cabinets
- Other railway systems in near proximity
- Wayside radio
- Portable radios and phones
- Nearby overhead power lines or power systems
- Radar at airports or on military equipment,
- Industrial plants.



Our EMC & EMI Services

Our experienced experts are available to help you tackling the task of preventing, evaluating or mitigating electromagnetic interference problems on railway components and systems. Services we provide include, but are not limited to:

- EMC Control Plan development
- Product evaluation and creation of appropriate test plans
- EMC/EMI testing on component and system level be it in the laboratory or in the field
- Issuance of EMC test reports
- Conducting on-site EMI surveys
- Provide EMC Consulting
- Help with EMC Specifications
- Provide Product Certification.

Codes and Standards

We have experience with a wide range of EMC & EMI specifications, standards and regulations. Some of the more common codes and standards for railway applications we can help you with include:

- Code of Federal Regulations Title 47 Part 15
- CFR Title 49-Transportation; Part 234 & 236-Signal and Train Control Systems
- UMTA-MA-06-0153-85-6, "Conductive Interference in Rapid Transit Signalling Systems" - Volume II: Suggested Test Procedures, Method RT/CE02A, "Conducted Emission Test, Vehicle"
- UMTA-MA-06-0153-85-8, Inductive Interference in Rapid Transit Signalling Systems Volume II: Suggested Test Procedures, Method RT/IE01A, "Inductive Emissions of Vehicular Electrical Power Subsystem, Rail-to-Rail Voltage from 20 Hz to 20 kHz"
- UMTA-MA-06-0153-85-11, Radiated Interference in Rapid Transit Signalling Systems - Volume II: Suggested Test Procedures, Method RT/RE01A, "Broadband Emissions of Rapid Transit Vehicles -140 kHz to 400 MHz"
- MIL-STD-461E Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment



- IEC 62236 “Railway Applications – Electromagnetic Compatibility”, 2003 (EN Equivalent: EN 50121)
- IEC 61000-1-2 Electromagnetic Compatibility; Part 1-2: General – Methodology for the achievement of the functional safety of electrical and electronic equipment with regard to electromagnetic phenomena
- AREMA Manual Part 11.5.2 (IEC 62236, 61000)
- EN 50121 series Railway applications: Electromagnetic compatibility
- EN 50238, Railway Applications - Compatibility Between Rolling Stock and Train Detection Systems
- APTA SS-E-010-98 Development of an Electromagnetic Compatibility Plan
- Client’s EMC/EMI Specs.

delays, damaged equipment etc.

- The truck provides a weather protected work environment for test engineers on-site.
- Immunity testing, where possible, is fully automated under computer control to increase efficiency.
- For emissions testing, full plotting and printing capability are included.

Our EMC Testing Qualifications

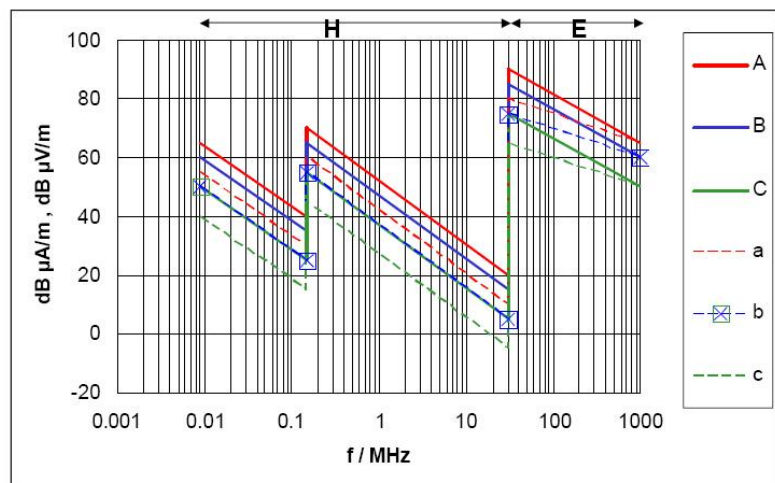
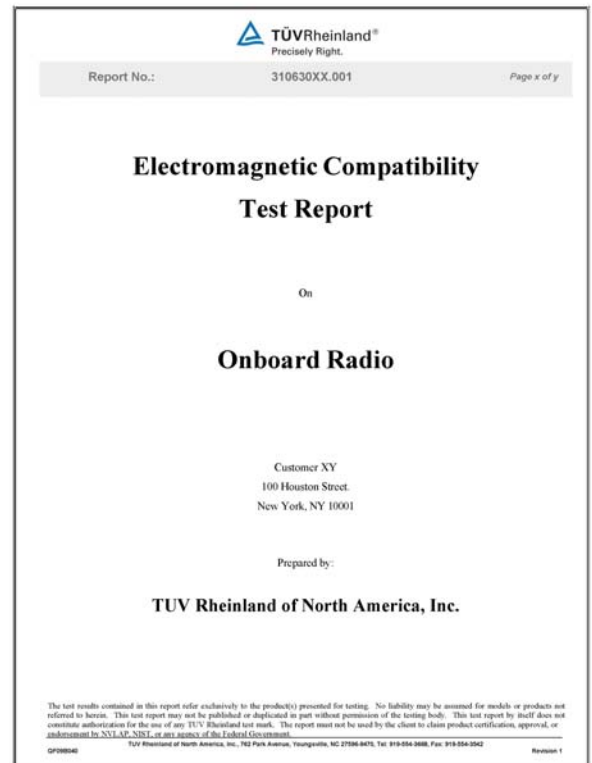
Our EMC test labs are ISO 17025 accredited by the U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). TÜV Rheinland® is also a Notified Body for EMC Directive 2004/108/EC.

Our Testing Capabilities

Customers can choose from convenient 10, 5, or 3 meter **anechoic and semi-anechoic laboratories** throughout North America.

Our dedicated **mobile labs** with specialized equipment can test at the customer’s location – outdoors, indoors, or right on the factory floor. Mobile labs can provide service in any of the contiguous 48 states. Among others we have done on-site EMC testing of rolling stock, large control systems and large rail installations. We also do EMI field surveys. The mobile labs are designed as independent, complete test facilities to maximize efficiency and minimize customer down time. Some advantages of our mobile EMC testing labs:

- Measurement equipment is transported in a shock mounted, controlled environment by our own driver, no shipping



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TÜVRheinland®

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TÜV Rheinland is the world leader in independent testing and assessment services. The \$1.5 billion corporation is comprised of an international network of 13,300 employees at over 490 locations in 61 countries and serves most industry sectors and markets worldwide. With North American headquarters in Boston, Mass., TUV Rheinland North America Holding, Inc. has additional offices throughout North America.

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