

1 Services

All electrical equipment and devices will generate electromagnetic interference (e.g. ignition sparks in motor vehicles) which will affect other electrical equipment and must therefore be kept to below specific limits. At the same time, all electrical equipment and devices are subjected to electromagnetic interference phenomena (e.g. interference impulses due to switching processes) which may cause malfunctions. In order to be able to operate a large number and variety of electrical devices simultaneously, the protection-oriented objective of "Electromagnetic compatibility" (EMC) must be achieved. The German EMC law and the European EMC Directive make this objective mandatory. European and national standards specify the technical requirements for equipment as well as the related measuring and testing methods. For example, they specify the mandatory limits for interference emissions and the severity of immunity tests.

We operate an extensively equipped EMC laboratory in Regensburg to support our customers in solving interference problems and for carrying out fundamental research on EMC component applications. **In this lab, the most economical interference suppression circuits for devices, equipment and machinery are determined**, so that all legally binding or recommended limit values can be complied with.

Furthermore, we cultivate partnerships with other EMC testing laboratories, so that customers can obtain competent advice and support in their vicinity.

2 EMC laboratory

2.1 Qualification

The EPCOS AG EMC laboratory in Regensburg is qualified in accordance with EN 45001 and is a member of the competent body "Zuständige Stelle der Siemens AG" (ZFE TN GR ZS, Erlangen). Certification in accordance with the guidelines of the "Deutsche Akkreditierungsrat" (DAR - German certification commission) was carried out in October 1994.

The comprehensive equipment in the laboratory (e.g. measuring equipment, test generators, anechoic chamber), the many years of experience in the entire field of EMC (first anechoic chamber in Europe, in 1963) and our active co-operation in national and international EMC standardization bodies are an excellent foundation to our ability to meet customers' demands. The test record which is compiled after successful conclusion of tests is recognized as a proof of conformity with the current EMC standards and regulations, which is a prerequisite for applying the CE mark to a device.

Our own development and production of EMC components ensure that all required interference suppression circuits can be implemented within a short period. A comprehensive stock of capacitors, chokes, filters and accessories is directly available on site.

Of course all devices, equipment and information entrusted to us by different customers will be treated with absolute discretion.

2.2 Services offered

EPCOS' EMC laboratory in Regensburg can assist electrical equipment manufacturers from the design stage right up to the market launch by providing the following services:

- Advisory and training services accompanying the development phase:
 - EMC testing of working development models
 - Recommendation of EMC protection measures such as shielding, grounding, earthing
EMC components (capacitors, chokes and filters)
customer-specific solutions
organisation measures
- EMC testing of prototypes:
 - EMC testing of equipment produced by manufacturing methods (preliminary or pilot series, prototypes)
 - recommendations for EMC measures, as above
- EMC tests to enable a declaration of conformity to be made for the CE mark:
 - test report only lists results, no recommendations or suggestions
 - EMC laboratory is certified by DAR (DATech)
 - member of the “**Zuständige Stelle**” of Siemens AG
this responsible body can be called upon at short notice, if necessary

“Zuständige Stelle” (competent body):
needed in case of
deviations from existing standards
lack of applicable product standards
reasons required for exceptions during EMC tests

- EMC tests on site:
 - equipment power supply > 200 A on 440/250V power line
 - equipment cannot be transported or transport too expensive
 - EMC environment permits on-site testing

Apart from offering the services of the EMC laboratory, EPCOS also offers direct co-operation of our development engineers on the equipment manufacturer's premises. If necessary, standard components can be adapted to customers' requirements, so that customer-specific solutions are available at very short notice. Our development engineers have comprehensive know-how in the entire field of EMC and many years of experience in EMC component applications. A close co-operation of the equipment manufacturer and EPCOS will achieve optimum and economical solutions very quickly.

- Our development engineers' services at customers' premises:
 - assistance in locating the interference sources
 - samples for interference suppression tests are specifically provided for the case at hand, the engineer brings along “experimental material”
 - optimum solutions are found quickly
 - customer-specific components can be developed faster

2.3 Equipment

The EMC laboratory has an anechoic chamber with a reflective groundplane (floor) for field strength measurements according to all corresponding measurement regulations and for measuring distances of up to 10 m. Two shielded enclosures with three measuring stations are provided for investigating conducted interference. Special facilities, such as large doors, exhaust fans, power supply up to 200 A and electrical and mechanical loads enable even very voluminous or high-powered equipment and systems to be tested here.

The basis of all EMC solutions is the reduction of conducted interference which comprises interference voltages and currents on and along the cables connected to the equipment under test. Three measuring stations enable several devices to be tested simultaneously. The measuring stations are located in shielded cabins to eliminate the possibility of interference by outside sources.

In order to have measuring and testing equipment for accurate and reproducible measurements available at all times, the respective equipment is calibrated once a year and regularly checked against our own comparative standards. Each of the three measuring stations can be used with its own measuring equipment or with the central automated measuring set-up. The results are documented using plotters and/or laser printers.

At high frequencies, parts of the equipment under test will act as antennae and interference is emitted as electromagnetic waves. The anechoic chamber guarantees a test environment that is free of external interference and in which externally low interference field strengths can be detected and very large test field strengths are permitted.

The walls and the ceiling of the anechoic chamber are partially lined with shaft absorbers to create a reflection-free measuring environment. Fields of up to 20 V/m at a distance of 2 m can be generated for immunity tests. Depending on the measurement task, additional mobile absorbers can be installed as wall or floor absorbers. The chamber is also suitable for testing larger objects, e.g. EDP systems or motor vehicles. It has a turntable with a diameter of 4,8 m and a load-bearing capacity of approximately 4 tonnes. The turntable and the antenna mast are remote-controlled and can also be controlled by the measuring computers.

Our EMC laboratory is able to carry out tests in accordance with almost all valid national and international EMC standards. The table in section 2.4 "EMC requirements and legislation" on [page 17](#) only lists the most important standards (product and measurement regulations). Of course we can carry out EMC tests in accordance with other corresponding EMC regulations.

The EMC laboratory Regensburg tests and measures (but not exclusively):

- all equipment in accordance with the generic standards for residential and industrial areas
- household appliances and similar electrical equipment
- measuring and control systems for industrial process control
- electrical production machinery and systems
- Information processing and telecommunications systems and equipment
- television and radio receivers
- installations and equipment for electrical power generation and electric railways
- motor vehicles
- Namur recommendations (chemical industry)
- MIL standards
- VG standards (defense equipment)
- FCC regulations.

For further information, refer to our brochure “EMC laboratory Regensburg”, ordering no.: B450-P5036-X-X-7400.

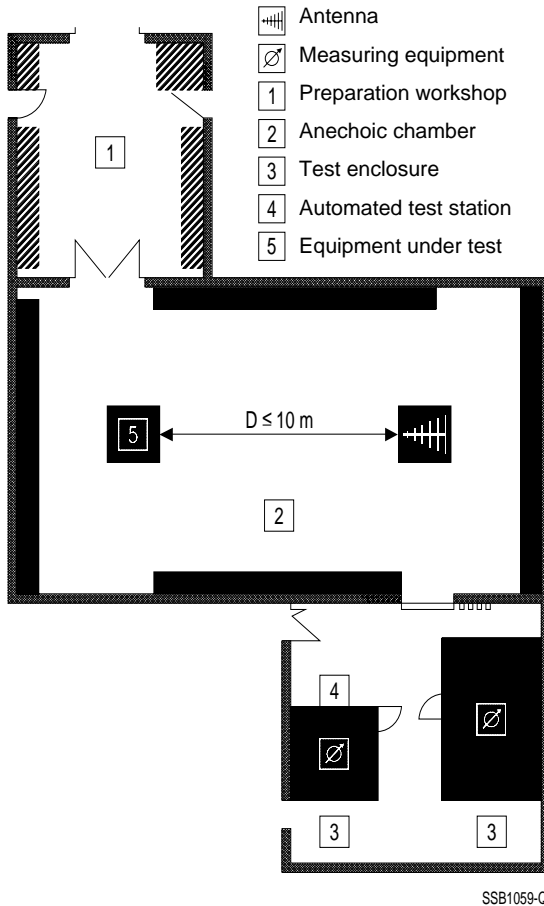


Fig. 1 Layout of the Regensburg EMC laboratory

Deutsche Akkreditierungsstelle Technik (DATech) e.V.
für die Akkreditierung verantwortliche Stelle
Deutsche Akkreditierungsstelle für Informations- und
Telekommunikationstechnik (DEKITZ)
Regulierungsbehörde für Telekommunikation und Post (Reg TP)
vertreten im

Deutschen AkkreditierungsRat



Akkreditierung

Hiermit wird bestätigt, daß das Prüflaboratorium der

EPCOS AG
Wernerwerkstraße 2
93049 Regensburg

die Kompetenz nach DIN EN 45001 besitzt, Prüfungen in den Bereichen

Elektromagnetische Verträglichkeit

auszuführen.

Die Akkreditierung ist gültig bis: **06.10.2004**

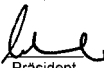
Die Anlage ist Bestandteil der Urkunde und besteht aus **9** Seiten.

DAR-Registriernummer: **TTI-P-G092/94-01**

Regulierungsbehörde für
Telekommunikation und Post
(Reg TP)
Bonn, 07.10.1999

Deutsche Akkreditierungsstelle
Technik e.V.
(DATech)
Frankfurt/M., 07.10.1999

Deutsche Akkreditierungsstelle für
Informations- und Telekommunikations-
technik (DEKITZ)
Frankfurt/M., 07.10.1999



Präsident



Ltr. d. Akkr.-
stelle



Geschäftsführer
Ltr. d. Akkr.-stelle



Geschäftsführer
Ltr. d. Akkr.-stelle



Vorsitzender

DATech, DEKITZ - Akkreditierungsstellen in der TGA - Trägergemeinschaft für Akkreditierung GmbH

2.4 Partnerships with other EMC testing laboratories

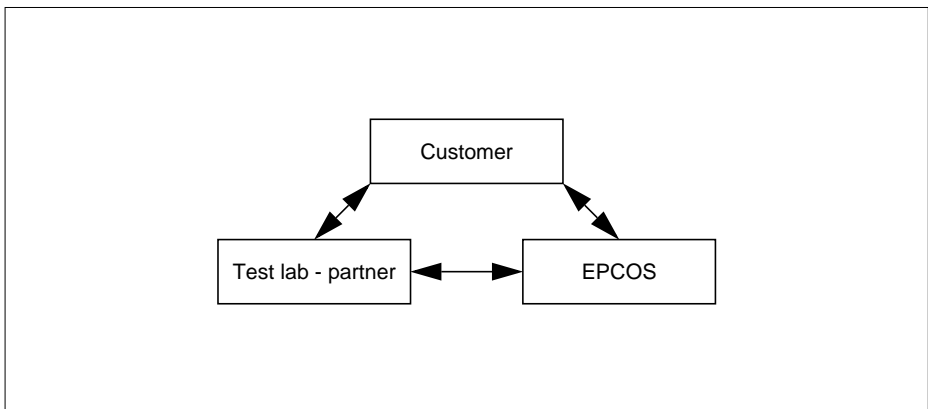
Close co-operation with our customers is indispensable, particularly in the field of EMC, if economically sound and technically optimized solutions are to be found. In order to ensure this, we have developed a concept based on partnerships with EMC testing laboratories. This enables competent EMC advice and problem-solving to be carried out in the vicinity of our customers, parallel to their on-going development work.

This concept encompasses:

- Faster design-in.
The selected EMC testing laboratories have a stock of samples of our EMC components. This facilitates interference suppression measurements and enables EMC solutions to be found more quickly.
- We are closer to our customers.
The fact that our partner testing laboratories are highly competent and are located close to our customers is an ideal way of facilitating EMC support for on-going development work.
- Competent EMC advice.
A regular flow of information, support and mutual EMC training measures and seminars ensure constant high quality.

Upon request, EPCOS can also provide material and personal assistance.

Concept for partnerships with EMC testing laboratories:



Our contract partners

You will find the up-to-date list of our contract partners in the internet under:

<http://www.epcos.com/inf/30/testhaus/e0000000.htm>