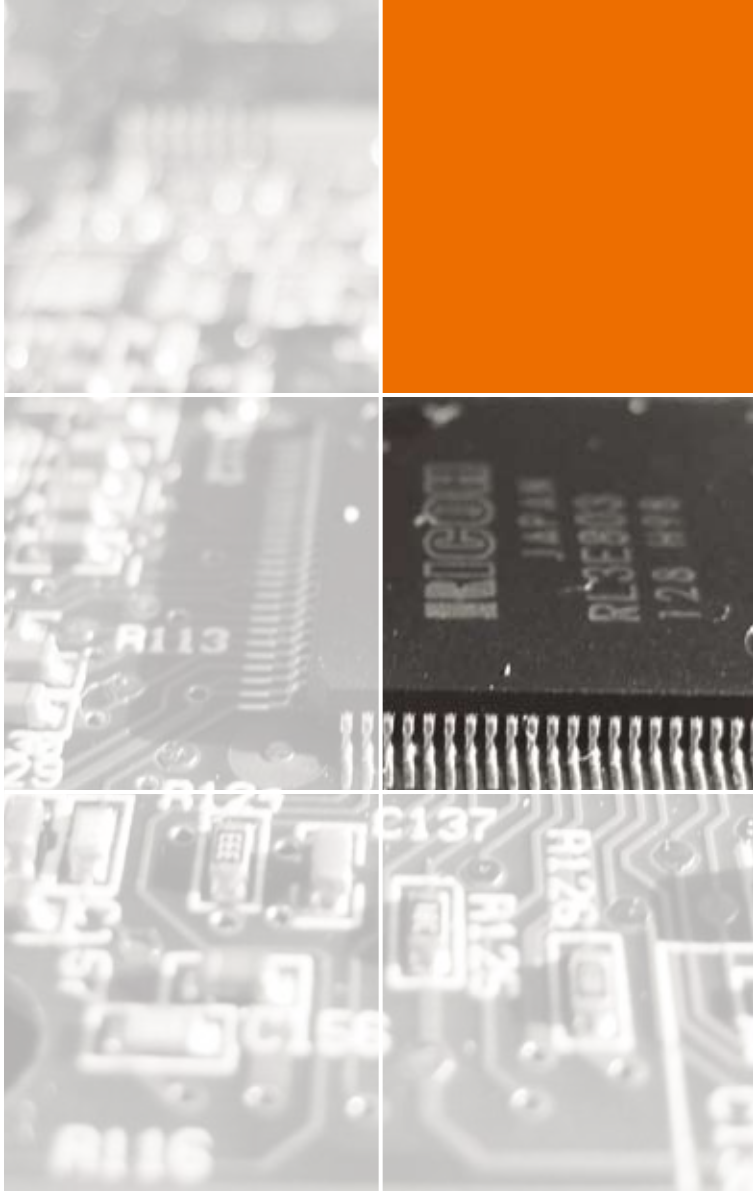
CENTER FOR QUALITY ENGINEERING

OUR KNOW-HOW FOR YOUR SUCCESS!



SGS

CENTER FOR QUALITY ENGINEERING

THE CENTER FOR QUALITY ENGINEERING IS AN INDEPENDENT TEST LAB, ACCREDITED IN ACCORDANCE WITH THE GERMAN INDUSTRIAL NORM EN ISO/IEC 17025.

The Center for Quality Engineering was founded in 1921 and has been an independent test lab within SGS Germany GmbH since the 1st of June 2008. The SGS group is rated as the leading company worldwide in the areas of Inspection, Testing, Verification and Certification.

We have a staff of more than 70 people with access to state-of-the-art technology and international experience. Our high-tech facilities, our diversity and the possibilities of our labs are unique in Europe.

Our excellent know-how and years of experience allow us to offer consulting as an additional service over and above the standard inspections.

This qualified consulting service covers the whole product life cycle and includes among others

- Engineering services during development
- Support in the fulfillment of specified quality demands
- Definition of remedial measures in case of non-compliance with quality demands
- Delivery management (definition of quality demands, drawing up specifications, etc.)

YOU ARE ON THE SAFE SIDE WITH OUR ACCREDITATION.

The Center for Quality Engineering is independent and accredited in accordance with the DIN EN ISO/IEC 17025. This accreditation guarantees neutrality and is led by DaTech (Deutsche Akkreditierungsstelle Technik GmbH) under the German Accreditation Council registration number DAT-P-002/91-02. The German Accreditation Council confirms that the Center for Quality Engineering has the know-how as well as the resources to carry out inspections and evaluations in accordance with a multitude of norms. The accreditation at the Federal Motor Transport Authority allows inspection and the allocation of E-respectively or e-marks.

Through additional registrations and certifications (such as FCC or VCCI) as well as our network within the SGS group, global accreditation can be achieved for following branches

- Automobile, traffic technology
- Medical technology
- Information and telecommunications technology
- Automation technology
- Parts and components
- and many more

Benefit from our know-how in simulations, consulting, design reviews, measurements during development, and much more.

Our consulting service already begins in the early phases of the product development process and accompanies the product throughout the entire development process up to the launch.

DESIGN & ENGINEERING Minimize correctional measures already in the design phase.
The quality demands on the product or its individual components flow smoothly into the planning and product design. The conformity demands are taken into account at the same time. This makes late stage redevelopment and redesigns unnecessary. However, even if this should still be necessary, we give comprehensive advice on the right remedial measures.

CONSULTING THROUGHOUT THE ENTIRE DEVELOPMENT PROCESS

DESIGN

- Support in planning and conception
- Comprehensive consulting on norms and guidelines
- Consulting on the definition of supplier requirements
- Consulting on re-design
- Consulting on the definition of quality requirements

ENGINEERING

- Consulting during development stages
- Design reviews
- Simulation
- Reliability analysis
- Failure analysis
- Definition of remedial measures

QUALIFICATION

- Creation of economic test and qualification concepts
- Consulting and implementation of conformance inspections
- Customer specific inspections
- Checking of quality requirements
- Qualification through evaluation
- Delta qualifications
- Development of remedial measures in case of conformance deviations

CERTIFICATION

- Consulting for the creation of CE conformance declarations
- Creation of CB reports
- Accreditation for national and international markets through the global network within the SGS group

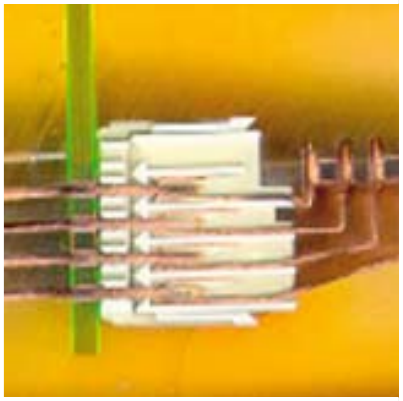
QUALIFICATION One-Stop-Testing – the most modern inspection and testing equipment covering over 5,500 square meters.

The Center for Quality Engineering in Munich houses state of the art inspection and testing equipment that covers an area of over 5,500 square meters. The variety of speciality test equipment and the knowledge of our engineers reduces inspection and testing times.

As a one-stop-shop CQE can save you the inconvenience of having to visit multiple test locations.

CERTIFICATION Worldwide conformance accreditation.

Certification marks and international accreditation can be awarded through our global partnerships and the network within the SGS group.



AN OVERVIEW OF OUR COMPETENCES

The competence matrix represents a total overview of our core themes with regard to services and customer structure. Furthermore, we also service a multitude of customers from other branches.

OUR SERVICES	OUR BUSINESS FIELDS				
	Information/Telecommunications Technology	Automotive/ Traffic Technology	Medical Technology	Automation Technology	Electronics Industry/Components Producer
EMC	■	■	■	■	■
Product Safety	■	(■)	(■)	■	■
Environment Simulation	■	■	■	■	■
Telecom Conformance Inspection	■	–	–	■	■
Reliability (Prognosis)	■	■	■	■	■

INFORMATION/TELECOMMUNICATIONS TECHNOLOGY

The roots of our business are in the area of information and telecommunications technology. This is what makes our know-how unique in this business field.

Our service

Alongside the inspection of information and telecommunications technology in EMC, production safety and environment simulation (climate, mechanics, corrosion), we offer specific qualification of telecommunication interfaces. We verify the physical parameters of the interface for mobile networks and fixed networks. Furthermore, we carry out verification of the protocol conformance as well as failure rate and availability calculations for systems and communication networks.

Our accreditation

In addition to our accreditation in accordance with DIN EN ISO/IEC 17025 for the information and telecommunications sector, we also provide NEBS qualifications for the American market within the ITL program in cooperation with NTS Europe GmbH.

Your advantage

We offer you a one stop testing service for this sector, which encompasses all qualification requirements and consulting services. Moreover, we can carry out the testing which previously had to be done abroad, in Germany through the cooperation with NTS Europe GmbH. This reduces logistics as well as qualification time and costs.

In addition, we offer our established know-how for interface qualification and also comprehensive consulting and if necessary define the corresponding remedial measures.

AUTOMOTIVE/TRAFFIC TECHNOLOGY

In the automotive and traffic technology sector our customers are automobile manufacturers, machine producers (agricultural implements, construction machines) as well as suppliers for the automobile, rail and aviation industries. The aviation industry is in particularly notable for having placed the highest premium on quality and safety and the certification thereof.

Our service

For automotive and traffic we offer EMC (electromagnetic compatibility) and environment inspection (climate, mechanics, corrosion). We qualify components from suppliers as well as complete vehicles and machines. In addition to the inspection services, we also make our know-how in engineering and consulting available to you.

Our accreditation

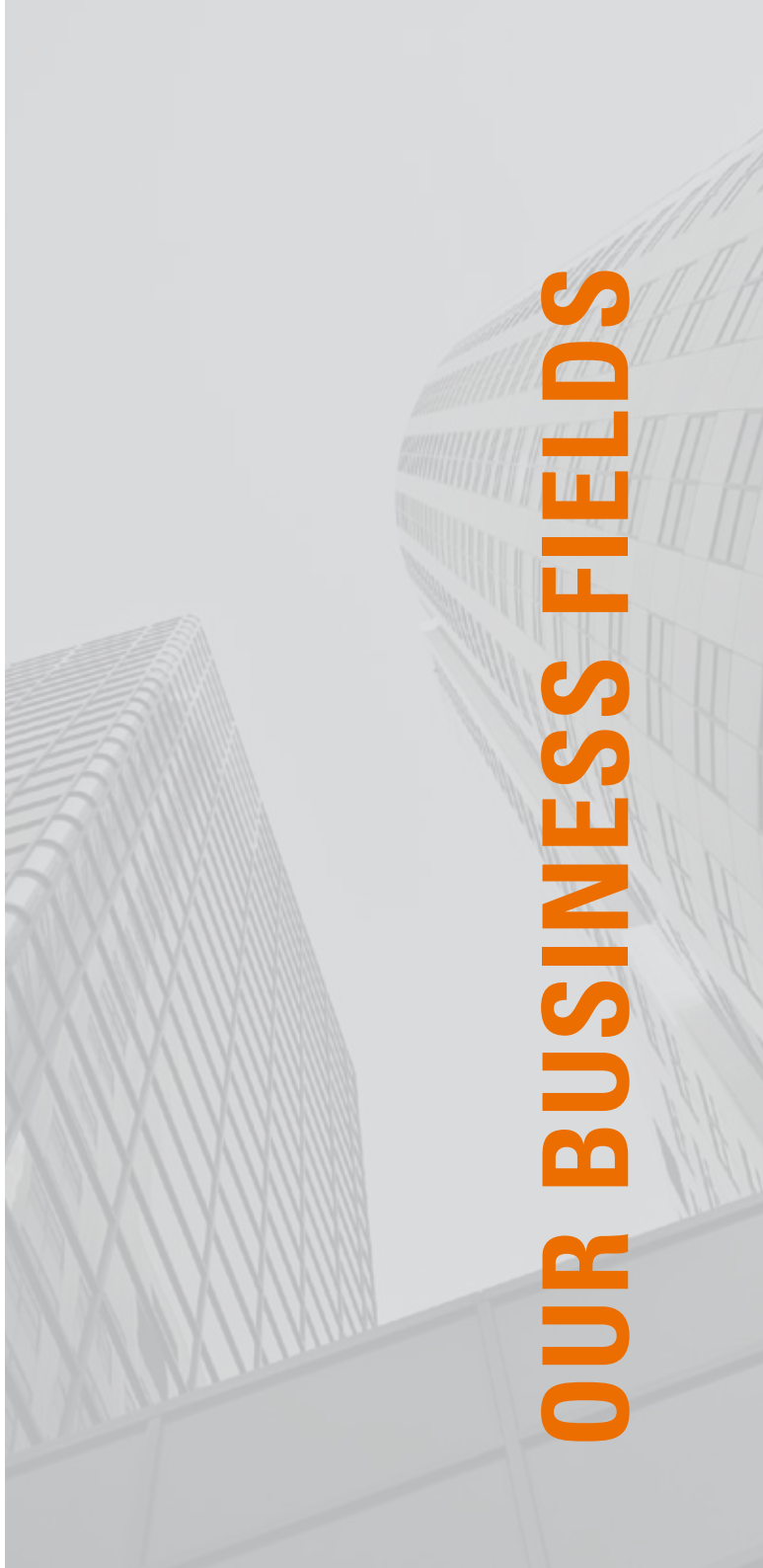
Alongside our accreditation in accordance with the DIN EN ISO/IEC 17025, we are also accredited by the Federal Motor Transport Authority for the allocation of E-marks respectively e-marks.

Your advantage

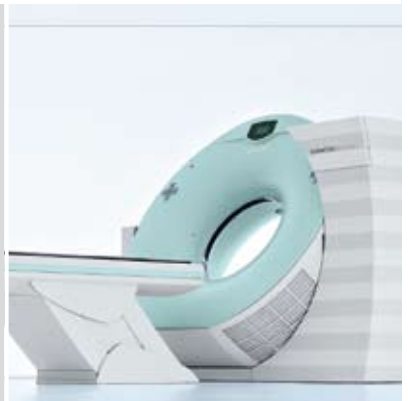
You receive our inspection services in a one-stop-shop fashion. Lengthy distances between various labs and subject matter experts are not necessary, as all required inspections can be carried out on site. We take care of the complexities of processing the accreditation formalities in line with the E-mark or e-mark.

MEDICAL TECHNOLOGY

The protection of human life is at the forefront of medical technology. Particularly high demand is therefore placed upon safety, quality and reliability.



OUR BUSINESS FIELDS



Our services
In the area of medical technology and medical lab technology we offer EMC inspection, mechanical inspection (transport tests) and risk analysis. Along with these inspections, comprehensive consulting for EMC, reliability analysis and risk analysis make up our scope of services.

Our accreditation
The accreditation in accordance with the DIN EN ISO/IEC 17025 allows us to carry out inspections in the areas of EMC and environment simulation for medical technology and lab equipment. In addition, we are able to perform product safety tests on lab apparatus.

Your advantage
We already advise you in the development phase of medical equipment in order to adhere to the required quality standards. If needed we define, with you, the necessary remedial measures.

AUTOMATION TECHNOLOGY

Automation technology is one of the strongest growth segments in German mechanical engineering. There is also an increasing influx of technology from telecommunications, e.g. Ethernet. The safe networking of machines with the facility is one of the greatest challenges in this area.

Through the increasing use of telecommunications, new demands are also being placed on the inspection and certification of facilities with regard to automation technology. To ensure competitiveness and exportability, it is becoming more and more important to be aware of international demands. These can already be taken into account at the product development stage in order to obtain the required accreditation in timely and economical manner. The goal here is to protect the people, the facility and the envrionment.

Our services
We offer up-to-date know-how on the norms and regulations. Alongside testing for electromagnetic compatibility (EMC) we also carry out inspections for electrical and mechanical safety as well as evaluations of software safety.

Our accreditation
In addition to the standard accreditation in accordance with DIN EN ISO/IEC 17025, we are also accredited for the functional saftey of software in accordance with IEC 61508-3.

Your advantage
Our many years of know-how mean that we can competently support you in the process of automation of machines and facilities. In doing so, we keep company specific requirements in mind.

As a result, you receive a confirmation of the norm conformity of your process to guarantee compliance with legal requirements.

ELECTRONIC INDUSTRY/COMPONENT MANUFACTURER

Often the smallest component or part is essential for the success of the entire sytem! This is why today so much emphasis is put on the qualification of connectors, chips and other parts and components.

Our services
Our range of services encompasses the qualification of electrical connectors and press-fit sections. In addition to this we offer shield attenuation (shield impairment) measurements, ESD inspection, flammability tests as well as mechanical and climatic testing.

Our accreditation
We conduct qualifications for connectors in compliance with our DIN EN ISO/IEC 17025 accreditation in accordance with to international norms such as IEC 60512 and GR-1217-CORE. Furthermore, we test connectors according to the standards set by automobile manufacturers, e.g. Volvo, General Motors, etc.

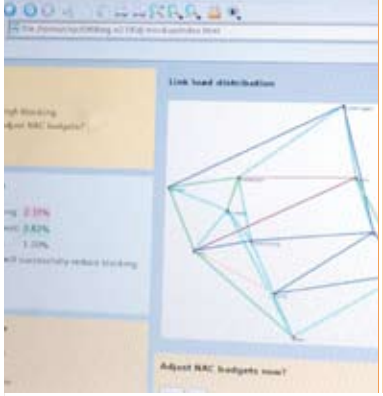
Your advantage
The correct qualification of components and parts helps to avoid future system failures. In cases of quality problems, e.g. disruption through corrosion, we identify the cause and define remedial measures.

ADDITIONAL SECTORS OF INDUSTRY

Our inspection and consulting services are also in demand in a variety of other sectors of industry. Many times similar qualification requirements apply.

Our customers in other sectors of industry include
- Electricity producers
- Producers of consumer electronics
- Producers of batteries

Have you been unable to find your product so far? Contact us. We can definitely help.



OUR SERVICES

We offer the services described below for all aforementioned business fields.

EMC – ELECTROMAGNETIC COMPATIBILITY

The requirements for EMC are laid down by law and must be fulfilled. It must be ensured that the product is neither disrupted by its electromagnetic environment nor influences other electronic products.

Our services

We have one of the largest EMC labs in Europe with a variety of test chambers. Our lab has, among others, three absorber chambers with two 3 m and one 10 m section measurement length. All three chambers fulfill the ANSI NSA free-space path loss requirements in the whole frequency range. These measuring stations are complemented by several large shielded rooms, striplines, TEM measuring cells, near-field scanners and much more. This equipment allows us to carry out inspections from the smallest components to large industrial machines (such as bulldozers).

Our inspection services encompass

- Field and line related emissions measurement up to 40 GHz
- Field and line related disruption measurements with a field strength of up to 600 V/m
- ESD inspection
- Emissions measurement in time domain
- Surge and burst inspection
- Overvoltage and lightning protection inspection
- EMC inspection on one and three phase cord connectors up to 70 A/Phase
- Attenuation of shielding measurement
- EMC measurement on the circuit board (near-field measurement)
- Vehicle impulse measurement
- On site measurement (EMC and EMF)

Alongside these inspections, we also give comprehensive advice on the requirements for safety in electromagnetic fields (EMF) and EMC. The EMC consulting already begins at the product development stage, e.g. with a layout review or inspection during the development. If and when necessary, our engineers can advise on the launch readiness of the finished product, e.g. with acceptance controls.

Inspections during the development cycle make possible an early determination of remedial measures and minimize costs. All inspections are carried out in accordance with national and international standards, such as

- CE inspections
- FCC measurements
- VCCI measurements
- E/e inspections

Your advantage

The Center for Quality Engineering is accredited for almost all areas of EMC. You benefit not only from our optimal measurement equipment, but also from the comprehensive know-how of our engineers. Using our consulting services right at the concept and design phase of your product development cycle means that cutbacks on prototyping can be avoided, development times shortened and costs optimized. Your product can then enter the market more rapidly.

Through our alignment to worldwide EMC requirements, we are able to carry out the acceptance control and at the same time the qualifying examination for other countries. This also optimizes time and costs.

PRODUCT SAFETY

New legal requirements shape the liability risk of manufacturers and distributors. This has pushed production safety into the forefront. Only through prevention and consistent verification of compliance with legal requirements product recalls, image damage, high liability risks or even legal consequences can be avoided!

In Germany, the appliance and product safety law (das Geräte- und Produktsicherheitsgesetz – GPSG) is the legal foundation. This law regulates the distribution and issuance of products in Germany and the foundation and running of facilities in need of supervision, which serve a commercial use or by which personnel could be endangered. It is intended to give the manufacturers, distributors or agents comprehensive obligations.

Meanwhile, more and more safety functions for electronic control are being performed by software. Consequently, increasingly high demands are also being placed on the functional safety of the control software and the application software.

Our services

Depending regulatory standards of each product, the safety standards are evaluated and inspected in light of all national and international deviations. The sheer diversity can make this a very complex undertaking.

The focus of the product safety inspections includes are in the areas

- Electrical safety
- Mechanical safety
- Functional safety of software
- Laser safety

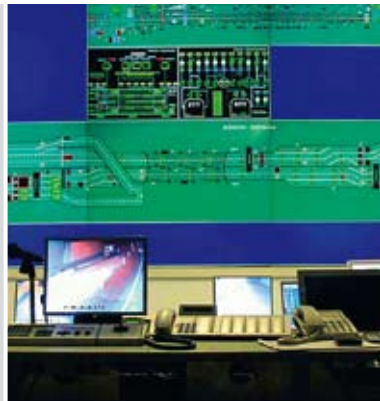
These include the inspections

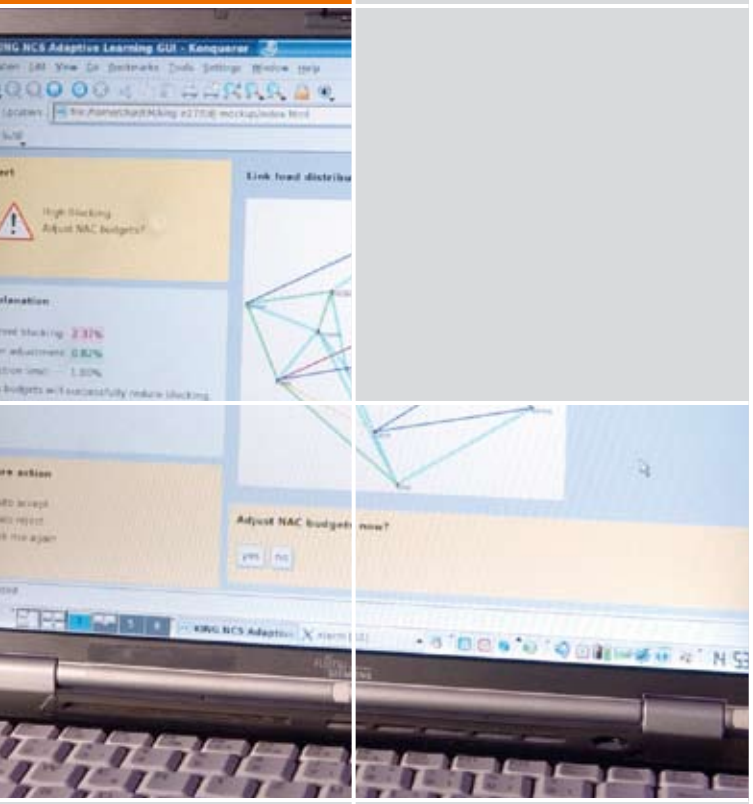
- Protection conductor test
- Inspection of the insulation resistance
- Inspection of the leakage current
- Heating inspection
- Inflammability inspection
- Risk analysis
- Software safety inspection

In the area of functional safety, we offer you additional consulting for software requirements, documentation and processes. In doing so, we consider the requirements of branch specific norms, e.g. the processing industry, machine safety, furnaces and communications technology. In the context of product safety, we can support our customers with international product certification through our global network within the SGS group.

Your advantage

- Rapid and global access to the market is ensured through international partnerships.
- The use of the relevant norms is supported by our consulting competence.
- You can deepen your specialist knowledge with our experts' individual workshops.
- Through our years of experience, we are able to support you whilst taking into account your company specific requirements and processes.





ENVIRONMENT SIMULATION

In real life, products are exposed to various environmental influences such as cold, heat, humidity, vibration etc. In order to ensure that the products can withstand these demands without the functionality being impaired, appropriate environmental inspections are necessary.

Our services

The facilities at our environment lab enable qualification in the areas of climatical and mechanical testing.

The qualification service encompasses

- Climate inspection from -100 °C to +150 °C and humidity from 10 % to 98 %
- Vibration inspection for specimens with a weight of up to 1,000 kg
- Vibration inspection with climate interaction
- Salt fog test
- Flowing mixed gas corrosion test
- IP protection class inspection

Alongside the inspections mentioned, we also offer services within the context of heat management and thermography.

For example

- Thermal simulation
- Thermographic analysis using thermal cameras
- Creation of heat reduction concepts

Classic environment inspections are complemented by the HALT process (Highly Accelerated Life Test). HALT pushes products beyond the specification limits in order to identify and remove potential weak points at an early stage. Find out more about the HALT process at **www.sgs-cqe.de/halt-test**

Would you like to ensure from the start that your product will be able to stand up to all environmental demands at the product development stage? Then we offer established consulting services.

Your advantage

- You can improve the quality of your product with our environment inspection and our know-how. This means minimizing service and optimizing costs later in practice.
- The improved product quality increases customer satisfaction.

TELECOM CONFORMANCE INSPECTIONS

The increasing worldwide use of valuable radio frequency resources for the parallel use of various mobil telephony technology such as GSM, UMTS or WiMAX demands an increasingly systematic verification of the standardized parameters to prevent radio network operators from disrupting each other. We are accredited to measure all CE and FCC related requirements and also flexibly to accurately verify local and operator specific requirements.

The increasing IT-networking of our society makes high demands on the interoperability of the systems of various producers. To ensure these, we offer the opportunity to verify the conformance of the physical network interface parameters as well as to check various communication protocols.

Our services

We offer testing services in the area of telecommunications for the following technologies

- Qualification of the wireless interface of GSM/EDGE, UMTS and WiMAX mobile telephone system base stations
- Inspection of electrical and optical broadcast interfaces such as PDH_D, PDH_{AVG}, SDH, xDSL, Ethernet/ Gigabit Ethernet.

- Conformance inspections of broadcast protocols such as CCS7, SIGTRAN und SIP

Your advantage

- Through years of experience and our origin in telecommunications technology, we are able to offer our established know-how, also as a consulting service. The requirements for the conformance and interoperability of systems are thereby ensured at an early stage.
- These days, the test activities are mostly automated in order to optimize duration and costs.

RELIABILITY (PROGNOSIS)

More and more end customers demand advanced information on reliability and availability from manufacturers. This is true for individual electronic assembly groups as well as for complete systems and facilities. Standardized methods of calculation are deployed for the provision of this information.

Our services

We offer MTBF/downtime rate calculations for electronic and electrical assembly groups in accordance with the following standards

- SN 29500
- DIN EN/IEC 61708
- MIL-HDBK-217F
- SR-332

In addition, we offer the calculation and correlation of PFHD/PFDAVG values for safety related functions using the relevant norms (e.g. IEC 62061) and the company specific system requirements. Our EXAR software enables us to carry out our own MTBF/downtime rate calculations.

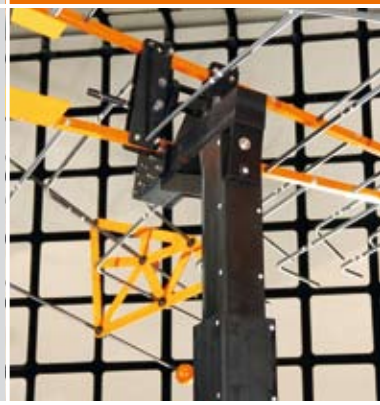
Find out more at **www.sgs-cqe.de/exar**

Often reliability which exceeds the simple sum of the individual downtime rates is demanded. Here the focus is particularly on broadcast and signal path redundancy. In order to calculate the availability of a complex system, among others the following methods are being employed

- Fault tree analysis
- Markov processes
- Boolean probability calculation
- FMEA
- Reliability block diagrams

Your advantage

- MTBF calculations improve the planning of service personnel and spare parts in storage.
- Through the use of calculation programs, the availability of products and systems can be calculated rapidly.



INSPECTION, TESTING, VERIFICATION AND CERTIFICATION – THE SGS GROUP IS THE LEADING COMPANY IN THIS AREA WORLDWIDE. FOUNDED IN 1878, TODAY SGS SETS WORLDWIDE RECOGNIZED BENCHMARKS FOR THE HIGHEST STANDARDS AND STANDS FOR QUALITY AND INTEGRITY. WITH OVER 55,000 EMPLOYEES, SGS HAS A GLOBAL NETWORK OF ALMOST 1,000 SUBSIDIARIES AND LABORATORIES.

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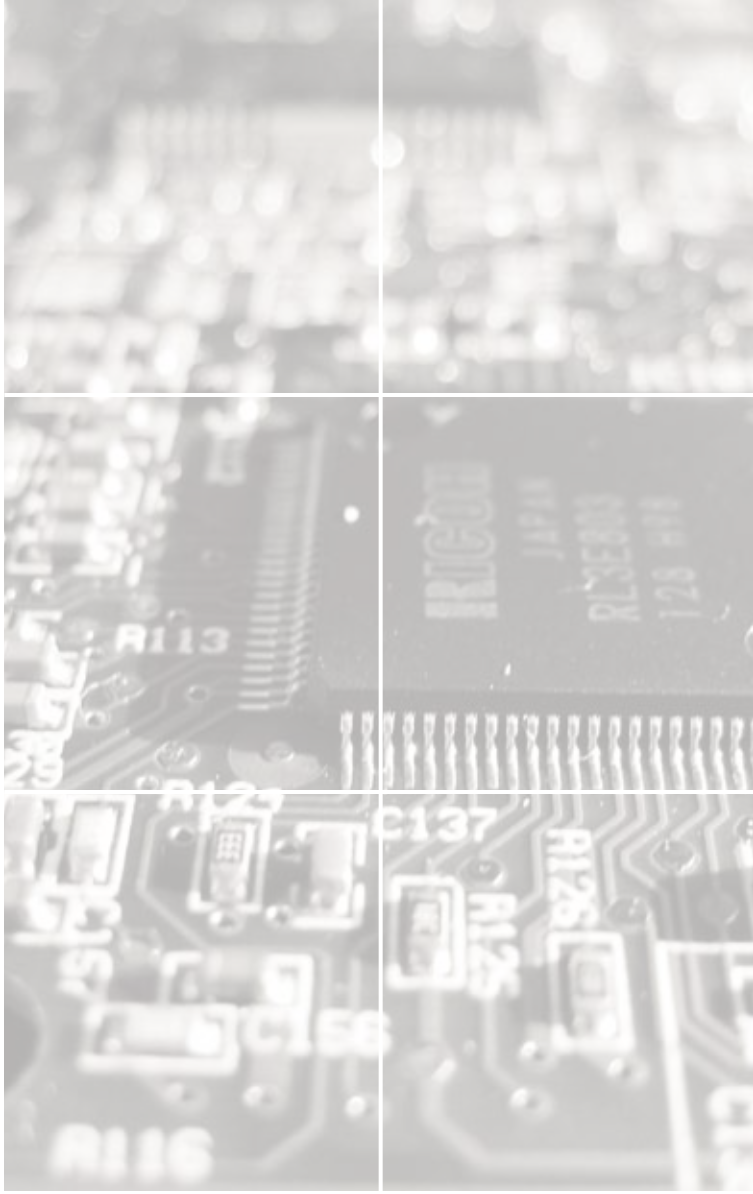

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WHEN YOU NEED TO BE SURE

SGS