Press release

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newsroom

DEKRA demonstrates EMC expertise at LAPP trade press days

Interference under control

Tracking EMC interference: the DEKRA electromagnetic compatibility (EMC) laboratory in Stuttgart provides the right support. As part of the LAPP trade press days 2022, a public experiment in the DEKRA high-tech laboratory demonstrated the possibilities of minimizing EMC interference through a new cable design and measuring the successes in accordance with the standards.

The DEKRA EMC laboratory is part of the DEKRA laboratory association at the Group headquarters in Stuttgart. The laboratory has three test chambers, three pulse test sites, a climate chamber and numerous measurement methods. The range covers all processes and specifications in the industrial and automotive sectors. At the site, DEKRA tests high-voltage components up to 1000 V, 12 V to 48 V components in the automotive sector, e-micro mobility vehicles such as electric bikes, electric scooters and hoverboards, as well as industrial and medical devices.

DEKRA laboratory network

Around 100 highly specialised experts work in over 6000 m² of laboratory space and in offices in Stuttgart at the various accredited DEKRA laboratories: the laboratory for environmental and product analysis, the DEKRA laboratory for technical textiles and foils, and the laboratory for product testing and product certification. DEKRA also boasts an accredited calibration laboratory for measuring devices in motor vehicles. An authorised testing laboratory (ATL) has been set up in Stuttgart for the Wi-Fi Alliance certification program. The DEKRA laboratories in Stuttgart are part of the global DEKRA laboratory network.

Test and measurement setup at the LAPP Trade Press Days 2022

DEKRA provided expertise to support a demonstration for an EMC-optimized drive technology system consisting of a motor, frequency converter and a newly developed servo cable in the EMC laboratory in front of numerous media representatives on October 14, 2022. The setup was demonstrated by LAPP, a global leading supplier of innovative connection solutions, and SEW Eurodrive, a global expert in drive technology, representative of the partners in the "PEPA" joint research project funded by the German Federal Ministry of

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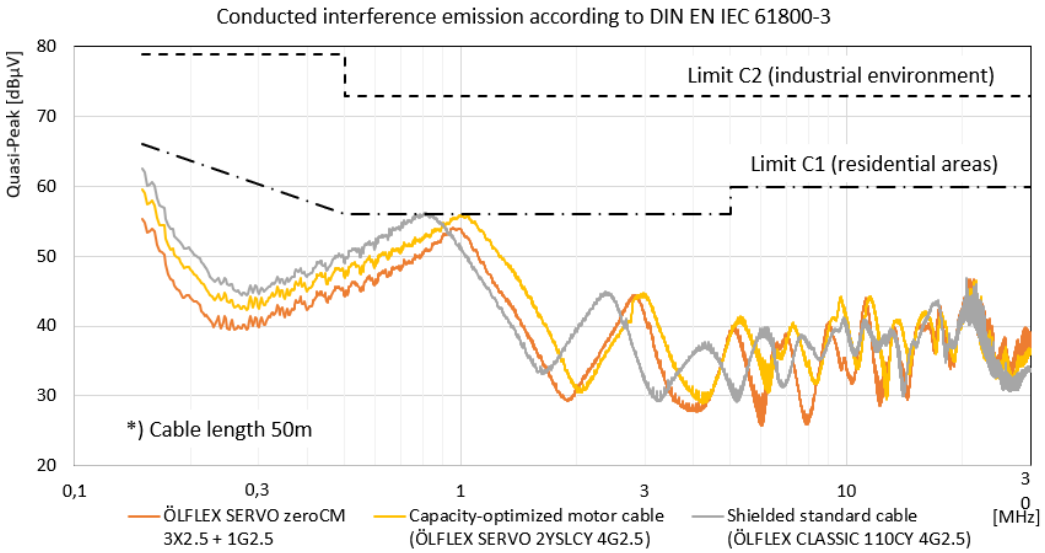
Economics and Climate Protection, and validated using DEKRA measurement technology. Electromagnetic interference, which can arise in highly dynamic clocked drive technology systems and generate so-called leakage currents, was measured using three different cable configurations between the frequency converter and the motor.

“During setup, high-frequency interference, which is propagated via the supply cables, should be measured at the unavoidable source of interference, a frequency converter,” explains Alexander Babi, Head of the DEKRA EMC laboratory in Stuttgart. The method is known as conducted disturbance measurements. Specifications for the frequency range, limit value, design and the special aspects to be considered are based on the product standard DIN EN IEC 61800-3 for variable-speed electric drive systems and the standards referred to therein, for example DIN EN IEC 55011.

When comparing the conducted interference emission according to DIN EN IEC 61800-3 between two classic cable designs and the optimized cable design, the before-and-after comparison showed a significant improvement, which the research engineers were able to achieve through joint development work in the research project. Especially in the range between 150 kHz and 1 MHz, the conducted interference emission is reduced by up to 8 dB compared to the standard cable often used. For long cable lengths or when using components that are less optimized in terms of EMC, this can actually bring about the improvement needed to comply with the limit values. Behind this optimization is an electrically symmetrical cable design, which simultaneously reduces the capacitive interference coupling between the phase conductors.



Experiment process

- The measurement setup consists of the EMC measurement technology and the system to be measured, including peripheral equipment and accessories. In addition to high-frequency cables (HF cables), EMC measurement technology for radio interference voltage measurement essentially consists of a radio interference measuring receiver (EMI receiver) and an artificial network.
- The measuring receiver is a highly sensitive measuring device that is used to measure the high-frequency signals or interference of the test item over a defined frequency range.
- To cover the very large occurring measuring range and make it graphically clear, the values are represented logarithmically in dBµV (decibel microvolts, pronounced dB microvolts). Emissions in the range of 0 – 60 dBµV and beyond are not unusual. This corresponds to a voltage of 0.001 mV to approx. 1 mV, meaning that a range with a factor of 1000 can be clearly represented.
- The aforementioned artificial network forms the second key link in the measurement chain. The test item is connected to the supply network via the artificial network, which has two functions. Firstly, it is used to provide the test item with a defined terminating resistor and thus guarantee the reproducibility of the results. Secondly, the artificial network enables the decoupling of the HF signal and thus the detection of the interference on the supply lines.
- In the demonstration, the system to be measured consisted of a frequency converter as a technically unavoidable source of interference, a three-phase motor as a load for the converter, and the connecting cables (servo

cable) between the two components. In addition, the converter was supplied with voltage via a supply cable with the aforementioned artificial network.

Image caption

DEKRA operates a global network of accredited testing laboratories. In addition to testing for sectors such as the electronics, communication, consumer goods and automotive industries, there is a particular focus on electric mobility (image: DEKRA)

About DEKRA

For almost 100 years, DEKRA has been working toward ensuring safety: founded in Berlin in 1925, Deutscher Kraftfahrzeug-Überwachungs-Verein e.V. has become one of the world's leading expert organisations. DEKRA SE is a wholly owned subsidiary of DEKRA e.V. and manages the Group's operating business. DEKRA generated revenues totaling more than €3.5 billion in 2021. The company currently employs almost 48,000 people in over 60 countries across all five continents. With qualified and independent expert services, they provide increased safety on the road, at work and at home. The portfolio ranges from vehicle inspection and appraisals to claims services, industrial and building inspections, safety consultancy, testing and certification of products and systems, as well as training courses and temporary work. The vision for the company's 100th birthday in 2025 is to see DEKRA as the global partner for a safe and sustainable world. With the Platinum rating from EcoVadis, DEKRA is already among the top 1 percent of sustainable companies in the ranking.