



# Master's thesis



## EMC Measurement Receiver for Digital Systems: Practical Part

### Current Status and Motivation:

Modern cars are electrified, and they will be (at least partly) autonomous. Strong interferers like the 800V powertrain interact with intricate sensor systems which come to decision in safety-critical situations. Engineering needs to ensure that these decisions are 100% reliable in any electromagnetic environment.

In this thesis, you build an automotive digital link in hardware. Injecting interference waveforms of typical interferers like traction inverters, DCDC converters, or other digital communication systems, you study the Bit-Error-Ratio and link loss as a measure of system failure. You monitor the so-called amplitude probability distribution of the interferer, since theoretical works claim that this function is a very general predictor of the impact of noise on the Bit-Error-Ratio. Cooperation with the other student working on the practical part of this topic is welcome.

### Research Topic(s):

- Automotive Ethernet digital links
- Interference measurements

### Approach / Methodology:

- Build the hardware that uses Automotive Ethernet IEEE802.3
- Study system failure due to interference of known source like inverters, DCDC converters or other digital systems, using a current clamp and other injection methods. Goal is to identify characteristics of interferers that are more likely to disturb the link. You may create profiles of different interferers using an arbitrary waveform generator with sufficient amplification to be able to automatically test a broad range of possible “noise” types.

### Organisational Matters:

- Start of work: Early 2022
- Workplace: IFE/TU Graz

### Contact person / Supervisor:

IFE: David Pommerenke (david.pommerenke@tugraz.at),  
Jan Hansen (jc.hansen@ieee.org) – he will join as professor in May