Electromagnetic Shielding and Isolation for a High-Speed Powerline Channel Emulator

Motivation
In the research project "High-Speed Powerline Channel Emulator 0.15-10 MHz", a channel emulator is implemented to feature the powerline channel characteristics, including the channel transfer function and the noises. With help of this equipment, PLC communication devices can be tested and evaluated in laboratory environments with full reproducibility.

However, environmental noises and cross-talks inside the emulator may interfere the emulation, lower the emulation performance and reduce the test confidence. A well-designed shell for the emulator is therefore needed, to accomplish the following tasks:

1) protecting the emulator from environmental narrow-band noises e.g. radio signals;
2) isolating the FPGA and AFE modules from the power-supply module, which generates unwanted noises;
3) reducing the crosstalk between the receiving and sending sides of the emulator.

Tasks
This work should be done in three steps:
1) building up a simulation model for the existing shell with the CST Studio software, and verifying the model with real measurements;
2) designing and optimizing a new shell with help of CST Studio;
3) fabricating a prototype of the new design and measuring it for verification.

Preknowledge
− Knowledge in electromagnetic field theory and microwave engineering
− First experience with CST Studio is optional but optimal

Research Topics
− Powerline communication
− Electromagnetic compatibility
− Microwave engineering

Course of Studies
x Elektro- und Informationstechnik
□ Maschinenbau
□ Informatik

Start
Immediately
Duration
6 months

Links
Supervisor’s page

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