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Towards new Engineering Standards Accounting for Uncertainty in Electromagnetic Compatibility

Every new electric device has to be submitted to various tests to ensure that it does function even when exposed to an interfering external electromagnetic field. The parameters of these tests are defined by standards on national and international level, which prescribe tests under normal external fields for every operation mode of the device.

Yet, a couple of problems have occurred in the last years that should be discussed:

- In recent years, a number of research areas provided the industry with various methods to check if a shipment of items meets the prescribed specification for its items by testing a sample, e.g. acceptance sampling or hypothesis tests and confidence intervals. When one applies these methods to EMC testing, the result is very unfavorable - in the worst case, EMC testing yields results with a confidence level of less than 50 %.

- Many of the test standards were written in a time when devices did only have a small number of operation states, whereas modern digital devices show many more. Thus, the complexity of the digital world is not accounted for in the standards.

The only way around this problem is to employ statistical evaluations and to redesign the test standards.

- Aging effects, especially in semiconductors, never were discussed in EMC. Yet, since devices deteriorate during their lifetime, their emissions and their susceptibility to interference must influence their EMC characteristics even before the device breaks down.

