



# The Future of EMC Engineering

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## EMC and Functional Safety

Certain types of electronic products generate electromagnetic interference (EMI). Digital devices may emit EMI that could interfere with the operation of other electrical devices and systems. Newer technologies are in general more likely to cause an EMI disruption or induce an event that could cause functional degradation to another system with low levels of immunity protection. Mixed signal components (digital and analog) are both used on printed circuit boards, yet during the design process hardware engineers are generally more concerned with functionality per a marketing specification and not how it interacts with software or by an end user. In addition, software engineers must be knowledgeable in functional safety. However, this aspect of programming is usually not considered by those involved in code development.

EMC and safety engineers have different skill sets and in some companies may operate largely independent of each other. Years ago, most regulatory compliance engineers wore two hats on a full-time basis; safety and EMC. With advances in technology, safety and EMC engineers now specialize in a small niche without having the time to take on another task or job function, especially if not trained in various high-level aspects of someone else's area of expertise.

Companies without an integrated compliance department, including validation and test engineering, may not be aware of increased risks associated with integration of hardware, software and firmware. For example, a robot manufacturer may use a programmable logic controller (PLC). When the PLC is interfered with by an EM disturbance from a nearby radio or voltage transient on its mains supply, it is possible that the robot could make unintended movements, possibly putting nearby workers at increased risk of injury or even death as it moves in an uncontrolled, hazardous manner. Another example is a hand/cell phone in a hospital causing

functional disruption to medical support devices that places the patient in a life-threatening situation. Software must be able to detect abnormal operation and put the system into a safe condition with proper notification to the operator.

The EMC Directive does not specifically address electro/mechanical product safety. EMC engineers should be educated in Hazard Based Safety Engineering (HBSE) which addresses functional safety along with hazard and risk assessments. As of today, only a few engineers are aware of a new HSBE standard (IEC 62368-1) that may eventually replace certain UL, CSA, IEC and EN product safety standards. In addition, software engineers must also be trained to recognize foreseeable effects of EMI disturbance that may occur.

EMC, safety, hardware, software and validation engineers must work together to determine the severity of a hazard, magnitude of risk and safety integrity level of products that could cause electrical shock hazard, mechanical injury or other functional harm. Consequently, the compliance team just got larger. ■

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