Improve Electromagnetic Interference of Electronic Products with Taguchi Parametric Design

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Abstract

Impact of electromagnetic waves and fields on neighboring devices may lead to product malfunctioning and system failures, which, in turn, may result in unexpected incidents and/or even major public safety issues. This study combines measures of shielding, filtering, and grounding to design parameters at the beginning of product design by taking industrial panel PC as an example. It employs the Taguchi method to plan and conduct experiments. The control factors are PCB and mechanic design related parameters while the noise factors considered are peripherals connected to the device for its operation. The optimal parameters combination is identified as: number of grounding screw holes at 14 and with cooling aperture of casing at diameter of 3mm and of staggered layout. The aforementioned optimal design can reduce electromagnetic interference noises down to the tune of 23dB (at frequency of 406.36MHz) which is way below the 47dB limits given by international specification.

Keywords: Electronic product, Electromagnetic interference, Shielding, Grounding, Filtering, Taguchi experimental design