The Study of Countermeasure Components of Electromagnetic Interference

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ABSTRACT

In thesis, we investigated the transients occurred from electrostatic discharge (ESD), switching of machines, or the effects of lighting to electronic facilities. To make sure the electronic equipment can operate normally in the environment of high-frequency radiation coupled noise caused by transients, some appropriate protection components, such as choke, varistor, transient voltage suppressor, should be used. However, it is hard to forecast the effects of the protection components on the equipment under consideration without suitable circuit models. We have aimed at the equivalent circuits of common-mode chokes and varistor to analyze the characteristic of suppressing high-frequency noise and transient noise. Besides, to produce the transients which can be used in immunity tests, such as IEC 61000-4-2, IEC 61000-4-4, and IEC 61000-4-5, we also designed a pulse waveform generator. This generator, essentially an energy storage element, can produce pulse with very fast rise time and very high maximum voltage so as to be used as transient generator. Two protection components, choke and varistor, were studied to see how they can make the electronic equipment pass EMI tests.

Keywords : Electromagnetic Interference, Common-mode Choke, Varistor, Immunity Tests, Pulse Waveform Generator.

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