Techniques Analysis for Probe Calibration and Sensitivity Improvement in IC-EMI Detection

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ABSTRACT

Electromagnetic interferences have become more severe due to the rapid development of digital technology. Electromagnetic interferences have been regulated by every developed nation in the world. In order to comply with the regulations of EMI requirement, the concept of EMI must be introduced from the beginning stage of the product designs. The manufacturers of electronic components must also take into consideration the regulations of EMC requirements in the component design. Though the present of EMI are not clear cut in IC due to its small-scale dimension, IC will expect to be a major EMI source for the electronic component system. Further, the fast switching of digital signals is also one of main cause for generating emission. In view of the extensive usage of IC lay-out in the modern day products, electromagnetic emission generated from IC will increase exponentially. Therefore, the design of components and semi-finished goods must incorporate with the solutions for EMC. It is generally recognized internationally that the EMC management processes and history for all products can be categorized into 3 stages. The 1st stage is for system part (products like information, home appliances…..etc). The 2nd stage is for module certification (components like network card, optical disk…etc) and the 3rd stage is for single electronic component, SoC, SiP and IC. Hence, International Electrotechnical Commission (IEC) issues and introduces a series of standard guidelines IEC 61967 for the monitor and measurement of conductive and radiative emission from IC. This work designed, analyzed and calibrated a magnetic probe based on section 6 (Magnetic Probe Method) of the standard guidelines IEC 61967. The designed probe was used to detect the signals from the component ’ s IC input/output ends, power input source, and RF current of grounding pin. The information will then be utilized to predict the EMI characteristics of the electronic components so that shielding and suppression against IC ’ s radiactive emission can be incorporated in the initial stage of the IC design.

Keywords : Electromagnetic interference (EMI) ; Magnetic-field probe ; Integrated circuit (IC)

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