1.Title of Experiment June 15, 2010

The induced ESD phenomena and the strong EMI effects

2. Presenter Name(s)/Company Affiliation including company/affiliation name, address, telephone number, and e-mail address

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3. Short abstract

Experiment outline:

As presented in the Symposium (day x, session y, program z), the authors have been researching the induced ESD phenomena for a long years and grasped that these phenomena are governed by the dynamic charge induction state before the discharge. By this demonstration of experiment, participants will get substantial understandings of the induced ESD phenomena as well as experience of severe EMI effects.

Exp1: Experiments of charge induction caused by fluctuating electrostatic field

Background:

Transform of Magnetism to Electricity, Electricity to Magnetism and Magnetism to Magnetism has been completely elucidated and understood, but Electricity to Electricity transformation has not been done yet. This is a completely different phenomenon from the electrostatic induction (UK, John Canton) described in the textbook.

Experiments:

i) Relation between relative motion and induced charge

ii) Relation between motion direction and polarity of the induced charge

Charged body: Teflon sheet and acryl plate

Detector: Hand made high sensitivity charge polarity meter

Exp2: Experiments to produce the induced ESD phenomena

Background:

In the advanced electronics products (such as mobile electronic products and industrial electronic system) and in the modern life environment, a lot of small gap structures exist. (Gap width some 0.1mm or less) These structures are discharged if condition is satisfied. This is the induced ESD.

Experiments:

i) A common object can be an induced ESD generator

ii) Detection method of induced ESD event

iii) Relative motion of charged body and induced ESD generator and occurrence of discharge

iv) Polarity of charged body and polarity of transient electromagnetic pulse

v) Motion direction of the charged body and polarity of transient electromagnetic pulse

Charged body: Teflon sheet and acryl plate

Detector: High-speed logic circuit, sensitive ESD detector and radio receiver

Exp3: Experiments of cable-induced noise caused by induced ESD

Background:

Unintended EMI troubles frequently occurred in the electronic control system that keeps

high-level redundancy and reliability. The cause was induced ESD by a charged human passing by it. The induced ESD occurred near the signal cable connected to the control board. Because this was not a direct discharge from the charged human, IEC ESD test (61000-4-2) cannot reproduce this problem at all.

Experiment:
i) Transient electromagnetic pulse coupling to a twisted pair cable from nearby induced ESD, transmission and receiving EMI (cable-induced noise).
Charged body: Teflon sheet and acryl plate
Detector: High-speed logic circuit

4. List of potential presenters

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