

Various usages of anechoic box for EMI design of electronics

◇Anechoic box can help EMI design of electronics over the development period.

* Application *

Various usages of anechoic box to design EMI characteristics of electronics are introduced.

Solution

Features of typical tools for EMI design, and solutions with anechoic box are presented in the table.

Typical tool for EMI design	Advantage	Disadvantage	Solution using anechoic box for left disadvantage
EMI rule checker	<ul style="list-style-type: none"> •Front-loading design without being aware of EMI •Low need to have much EMI skill 	<ul style="list-style-type: none"> •EMI design in case of not possible to follow the rule is difficult. 	EMI characteristics of TEG that does not meet the rule can be measured with low cost.
Near field scanner	<ul style="list-style-type: none"> •Mapping of EMI noise easily •Validation of electric behavior by comparing with electromagnetic simulation 	<ul style="list-style-type: none"> •Decent EMI skill is needed to analyze correlation between far field and near field properly. •Measured near field does not necessarily match with far field. 	Correlation between far field and near field can be measured readily.
Electromagnetic field simulator	<ul style="list-style-type: none"> •EMI estimation before trial •Estimation of electromagnetic characteristics which is hard to measure(ex. inner PCB pattern) •Parametric analysis of geometry or material constant. 	<ul style="list-style-type: none"> •Modeling often takes much time and effort. •Analyzing time can be very long depending on model. •Highly specialized skill is needed to make deformation model for scale reduction. 	In recent year, there is a trend which aims to build design environment for zero trial, but it is not easy. First of all, it is considered necessary to stack a number of result comparison of the simulation and measured in the far field of primitive elements. Anechoic box with low cost is very useful.
Anechoic chamber	<ul style="list-style-type: none"> •EMI design validation with high accuracy. •Possible to carry out compliance EMI test, if certified. 	<ul style="list-style-type: none"> •High cost(construction/usage fee) •Sometimes hard to book date and time of hope, in the case of borrowing. 	Precompliance test with anechoic box minimizes the time and cost to use anechoic chamber in compliance test.

Anechoic box is one of the very useful tool for EMI design of electronics, as shown in above table.

In summary, anechoic box can:

- (1) Help to expand the rules in EMI rule checker.
- (2) Validate correlation between far field and near field.
- (3) Minimize the time and cost to use anechoic chamber in compliance test.

* System configuration *

- Example
1. Anechoic box
 2. EMI measurement antenna
 3. Jigs to mount antenna and EUT
 4. Signal analyzer [MSA538E/558E]
 5. Others(PC, I/F modules, cables, etc)



Signal analyzer
MSA538E/558E