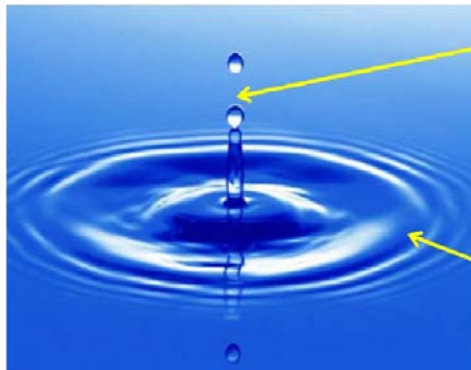


Top Four Reasons For EMC Failure

EXTERNAL FIELDS ?



ELECTRICAL
CURRENT

GENERATED
EXTERNAL
FIELD

By: Martin Best

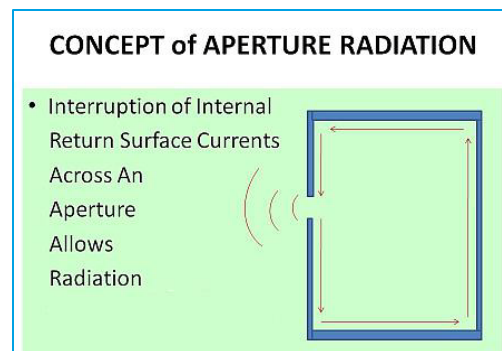
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Introduction

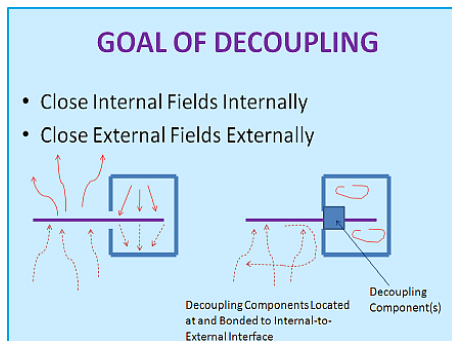
We often have companies calling in to get a price for certification with the assumption their product will pass... Sometimes the products will pass—and mostly due to having an EMC engineer on their in-house team. However, more often we get calls from companies who have gone to a lab and failed. They are closing in on their shipment date and unsure of the next step. In the discussion of EMC engineering and testing, we recommend customer engagement early in the development process where key causes for EMC failure can be identified and resolved without significant impact on schedule or budget. Many times, customers engage us late in the development process, when it is more difficult to avoid schedule and budget disruptions. What we often discover are one or more of the following items.

1. Enclosing Electronics

Electronic devices by their very nature generate and radiate electric fields. Certification requirements exist to keep this radiation within acceptable limits. One way to prevent devices from radiating energy is to enclose the electronics in a metal box, a Faraday cage. It will, however, radiate through any gaps in the box just like light can be seen through the holes of a window shade. Gaps in a metal box will radiate through causing radiate emissions. In most cases, where devices fail emissions testing, an enclosure looks like it contains the signals, but upon close inspection does not.



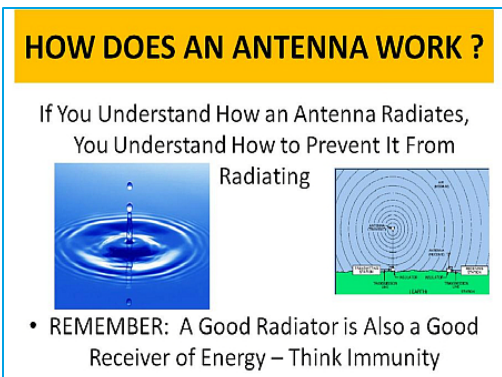
2. Using Decoupling



Most circuits require a connection to the outside world. Even though a wire coming out of an enclosure appears to block the hole, it can actually provide a path for energy to leave the enclosure and radiate to the outside. To prevent the cable from being a guide to allow radiation to escape, the cable must be decoupled. This allows wanted signals to be transmitted down the cable, without allowing the radiated energy to escape with the wanted signals.

3. Building An Antenna - Unintentionally

Broadcast antennas are radiating structures which are tuned to the wavelength of the signal driving them in order to efficiently radiate electromagnetic energy. Engineers designing broadcast systems try to produce radiant energy efficiently. Some engineers also accomplish this task unwittingly, and develop efficient radiators when they don't expect to. Wires Connecting



circuit boards and traces on circuit boards can act as antennas if they are not terminated properly or if they are routed alongside other wires carrying fast moving signals.

4. Too Little Too Late

While these technical issues are often problems in EMC certification, the main reason why companies fail EMC testing is that they fail to identify EMC issues during development. They will go through the “discovery” process during formal certification testing, rather than during development. Formal certification testing is something that should be reserved for “validation”, i.e. a test that you expect to pass rather than one you hope will pass.

In Summary

Although these are not all the issues companies can have with EMC, these are certainly at the top of the list. It's always important when going through the development process to consider these, as well as other engineering issues like verifying your product's lifetime, validating your product's performance, comparing your product with its competitor's and/or global compliance requirements. It may be an opportunity to outsource some of your development listed items, so that your in-house team can focus their expertise on the next best thing.... and you can be assured your deadlines will be met and budget considered.