

UNDERSTANDING RF EMISSIONS

and How They Can Adversely Affect Your Costs



Prepared by NanoLumens
May 2015

RF Emissions: Why Are They Important?

RF emissions are an unwanted release of electromagnetic fields that can interfere with other radio waves, causing noise and overall disturbance. Because radio waves travel across country borders, there are many rules, frequency plans and procedures that define how to use radio frequency spectrum to avoid interferences.

Electromagnetic Interference, or EMI mitigation inevitably increases the overall cost of products by adding components to a design, or requiring a more complicated and expensive design and layout. Often thought of as an unnecessary expense, EMI mitigation is often overlooked or simply disregarded when purchasing digital displays. When selecting a partner for an LED display platform and associated services, it pays to investigate manufacturing processes, testing methodologies and FCC certifications.

Considering operation and safety concerns also makes engineering a quiet design more difficult and expensive. Low quality LED display solutions will potentially be the most problematic in terms of interference because many of them do not undergo stringent manufacturing processes. Most of the interference may be caused by extremely high frequency emissions, typically in the 30 – 300 MHz range, and possibly higher.

RF Emissions From a Low-Grade Display Wall Degrade Sound Quality

Let's take a look at an example of how high RF emissions affected one of the largest manufacturers of wireless microphones and the demo area they set up in their facility.

The wireless microphone company used a lower quality LED display video wall that was configured with a microphone system that resided approximately 6-7 feet behind the video wall. RF emissions from the video wall were so high that sound quality was severely compromised and the configuration could not be used for its intended purpose. Chances are, their display wasn't manufactured for or tested using the highest criteria.



As a result, the company was faced with reconfiguring a more elaborate and costly design to deliver the quality sound they've garnered a reputation for in the wireless microphone industry. The company also knew they might have to scrap their display configuration or risk losing their state-of-the-art demo area to RF signal interference. The solution became very clear.

Already committed to the demo area, the company needed a customized solution and services that met their needs. They reached out to NanoLumens for expertise in establishing the right environment with FCC certified LED display products.

Minimizing RF Emissions with Comprehensive Manufacturing and Testing Protocols

At NanoLumens, our LED display boards, or Nixels® are manufactured, built and supported in the USA with the **FCC certified** components designed to minimize RF emissions. Grounding and shielding is an essential part of suppressing electromagnetic frequencies. NanoLumens takes great care in grounding every system component – power supply, data, AC and DC.

Many foreign manufacturers do not employ the grounding concept in their manufacturing processes. This manufacturing oversight causes a high number of RF emissions that, not only destroy quality and potentially equipment, but also makes for an abysmal user experience.



Additionally, NanoLumens' Nixel is built on a double ground plane, comprised of six layers – most boards are manufactured with only four layers. Copper layers are incorporated into the Nixel to achieve an additional level of grounding. Because of the measures implemented into the manufacturing process, NanoLumens consistently produces some of the lowest RF emission readings in the industry.



Faraday Cage used to test RF emissions.

NanoLumens products are tested at an offsite, independent facility to maintain the integrity of the evaluation. It doesn't stop there. We are continuously searching for new ways to minimize RF emissions and frequency necessary to operate display boards, yielding longer life for products. The components used in manufacturing our LED display boards are selected for operational efficiency, without compromising RF emissions.

Performance, Commitment and Integrity

Headquartered in Norcross, Georgia, NanoLumens (www.NanoLumens.com) creates engaging cost-effective, space-efficient, eco-friendly visual solutions that turn every client's dream into a Visual Reality. Serving leading Fortune 500 clients on five continents, NanoLumens' patent portfolio strategically positions it to meet the complete visualization needs of customers in the broadcast, casino, control room, DOOH/Transit, financial, higher education, hospitality retail, REIT/property, retail, and stadium/arena markets with immersive custom-specific NanoCurve™, NanoSlim™, NanoSlim™ Engage, and NanoWrap™ based solutions in any desired size, shape, or curvature. All NanoLumens solutions are designed and made in the United States of America and come backed by the industry's only Six-Year, Zero Failure Warranty.