The Benefits of Antenna Testing

ANTENNA TEST LAB
Experience. Expertise. Insight.

Written for RF Cafe
By Glenn Robb Principal Engineer
Antenna Test Lab Co.

Antenna Test Lab Co. is offering antenna test services in their anechoic chamber from $450, with swept frequency and gain patterns. Consider the benefits of antenna testing to your system performance.

Success

Your product's end-to-end success dictates that your customers will rely on your antennas to perform well in their system. Most hardware and software is thoughtfully tested before sale or deployment, but why are so many antennas ignored? The risks to system functionality and your customer's trust will hang in the balance if you skip your antenna's verification. However, there is no reason to defer your antenna evaluation, help is available. We offer full verification antenna testing services and free educational articles.

The results of an anechoic chamber antenna evaluation can provide insight and confidence throughout your company: from design engineering; parts procurement; right through to field support and customer success.

PCB "Copper" Antennas

If you layout your own trace copper antennas (such as meanders, PIFAs, patches, or monopoles) then verification is a "must." Cookbook or app-note designs are only approximate, and they depend heavily on your PCB artwork, placement, and board size. Board size matters a great deal in the ISM or cellular bands, since the board's ground plane is part of the antenna. It can greatly influence radiation efficiency!

SMT/SMD Component Antennas

If you simply PCB mount component or "chip" antennas, then board-level antenna testing will allow you to understand the immediate environmental effects of placement, enclosures, ground-planes, batteries, PCBs, or cables. When you source your antenna, please beware … component antennas are often overly optimistically specified by their manufacturers to compete with each other on gain numbers. They ignore the real world compromises designers are forced to make during implementation and layout. Whether you layout your own PCB antenna, or buy a part, the same risks of non-testing apply. That usually leads to impaired wireless system performance and poor product reputations.

PCB layout "realities" such as crowding and proximity to objects like cables, batteries, or enclosures can have a dramatic impact on RF performance. Definitely follow the antenna manufacturer's PCB layout guidelines, but inevitably design constraints will compromise these guidelines. Don't be tempted to believe that your antenna implementation will perform just like the antenna's data sheet or "demo board". Many customers at our lab send several enclosures with different "proposed antenna locations" for flex-antennas that are adhesively affixed to various locations on their enclosure walls. Our 3D testing will reveal the best location for favorable radiation pattern and efficiency.

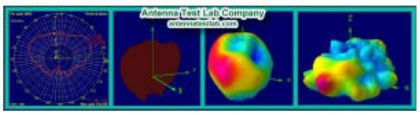
Also, please remember, when shopping for an omni-directional antenna, more gain is not always better.

Purchased Antennas

Stand-alone antennas that attach to U.FL or SMA connectors are also popular. However, they are typically sourced from very low cost offshore sources. They too tend to have misleading data-sheets (sometimes based only on simulations) that overestimate gain and efficiency for the sake of sales. An independent evaluation of a sample antenna is a prudent (and cost-effective) step.

Matching

The feeding and matching of small embedded antennas can be tricky to optimize. Virtually all reference designs will note that these components need to be "tuned" for your PCB. Wishful thinking is not a good system test practice, so why not



verify your antenna implementation? It is all too common that poor antenna performance goes ignored and untested. However, your customers will always notice poor performance! Master and optimize your design early in its product cycle with an in-situ antenna evaluation. An iteration or two of anechoic chamber testing can verify your antenna and your RF link just as you always verify your other design elements. "Bench checks" conveniently generate false confidence, while test laboratory far-field testing ensures success. Tuning or matching networks may appear to offer great broadband return loss to your VNA, while often yielding poor radiation efficiency (under 10%). Get the facts !

Services

A 3D far-field antenna evaluation will reveal your complete product's antenna patterns, gains, radiation efficiency, circularity, axial ratio, and many other quantified performance parameters swept over frequency. You can go well beyond that "sales pitch" gain number from an antenna part's spec sheet or design formulas, and realize operational insight. Only then, can you have confidence in your wireless link.

If you import finished antennas, chamber testing allows you to verify their quality and specification compliance, especially on those large buys from low cost offshore sources. If you design antennas, then realize their final verification through chamber testing. Go beyond those simulations and bench checks on all new antennas or out-sourced contract designs. Your customers trust test results, not simulations and promises.

Evaluations

Your antenna will ultimately cripple or enhance your wireless product's success, so why leave it all to chance? Expert antenna testing services are easily available, cost effective and timely. Antenna Test Lab Co will work hard to give you the insight you need for a successful wireless product.

Actual antenna testing can be complex, and definitely requires elaborate equipment, facilities, and specialized knowledge. However, the task is easily handed off to our specialized laboratory, and our engineers evaluate a wide variety of antennas daily. Antenna Test Laboratory Co can evaluate your antenna within days and provide full performance data, as well as boost your understanding and confidence. Full evaluations are available from only $450.

Author Biography

Glenn Robb is a Founder and Principal Engineer at Antenna Test Lab Co www.AntennaTestLab.com

Glenn is an EE who has been working professionally with antennas for 30 years. He has a passion for testing antennas and providing customer insights. Day to day, he runs the anechoic chamber at Antenna Test Lab Co and is responsible for hundreds of customer antenna evaluations. Glenn also designed all of the lab's custom software and test hardware configurations for accuracy, speed, and cost-effectiveness.

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About Antenna Test Lab Co.

We are specialists in giving customers unparalleled insights into their antenna performance. By offering quick-turn cost effective antenna (and live transmitter) patterning and analysis, we remove the risks from antenna design, procurement, and deployment. It does not matter whether you are an expert antenna designer, wireless product developer, or simply purchaser of antennas, we can arm you with a full electromagnetic performance evaluation. Antenna Test Lab Co has been in operation since 2001, evaluating countless antennas and RF transmitter products.

Quotes and Inquiries

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