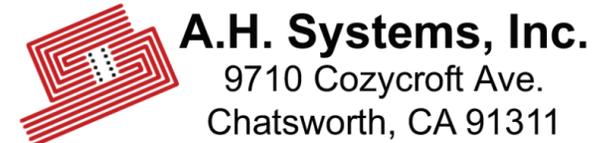


4 Reasons To Get A Biological Antenna First For Device Testing



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Given consumer and corporate trends, products of all types are increasingly likely to incorporate electronics in the form of processors, memory chips, and various types of wireless communications. Any such product—whether a car, toaster oven, programmable logic controller, or cell phone—might generate radio frequency (RF) interference, whether it intentionally transmits and receives RF signals as part of its functions or not. According to governments all over the world, that is a problem.

Product designs incorporating electronics frequently fall subject to governmental regulations and so more companies must conduct compliance testing. For efficiency and cost-effectiveness, this often involves internal testing. Antennas are one piece of necessary testing equipment. Making the right choice can speed internal testing and save significant money.

The Need For Compliance Testing

RF emissions are governed by regulations that vary by geography. The intent is to ensure varying types of communications coexist without interference. In part, regulations work by allotting parts of the available radio spectrum to specific uses. The regulations also specify how much RF devices can emit. However, regulations wouldn't matter without examination of products.

To ensure devices adhere to emissions limits, regulatory bodies authorize organizations to examine samples from companies. If a product passes, its manufacturer gets official permission to mark units as compliant and can

then legally sell them in the specific geographic area. A company may require multiple rounds of testing by different organizations to ensure compliance with regulations in all the territories in which it will sell the product.

The emissions testing process can be expensive and time-consuming. If a product fails, which roughly half do at least once during development, the company must make appropriate changes and resubmit the product for another test. To save time and avoid needless spending, companies create their own internal precompliance testing. Such examination isn't a substitute for official testing and may not always indicate problems official tests will find. But precompliance testing can identify many problems in advance, allowing correction before submission to an official testing organization.

Companies in consumer electronics, industrial controls, embedded computers, and similar areas are typically experienced in such testing and know how to incorporate it into their R&D activities. However, companies that are new to compliance testing need to learn effective testing methods and acquire equipment, including antennas. There are many types of antennas, but for most companies, the first investment should be in a biological antenna for the following reasons.

Reason 1: Biological Flexibility

Computer processors embedded into a device often work at such high frequencies that they can generate RF signals. In addition, communications

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features that have become popular in many products—Wi-Fi, Bluetooth, cellular, and radio frequency identification (RFID)—all use RF. The types of potential emissions can be wavelengths that run over a wide range.

And yet, 80 percent of testing needs fall between 30 megahertz and 1 gigahertz. Because biological antennas cover roughly between 20 megahertz and 7 gigahertz, they can frequently satisfy a company's precompliance testing needs. The antennas can also be used in both emissions and immunity testing. Under the latter, a transmitter attached to an antenna is used to direct RF signals at the product to see if shielding will prevent interference with the product's operations.

Reason 2: Compliance Standards Have Come To Accept Biological Antennas

Antennas not only vary by the wavelengths they can receive, but also whether individual regulatory agencies will consider their use. For many years, regulators insisted on half-wave dipole antennas for frequencies above 80 megahertz. Technicians needed multiple antennas, each covering a different range, and had to adjust them for each wavelength. The approach increased testing time and expense.

Over the years, many regulators began to accept some antennas that were broadband and could cover wider wavelength ranges with minimum adjustment. Two popular types were the biconical (Image 1), which operates between 20 megahertz and 18 gigahertz, and the log periodic (Image 2), which works well between roughly 80 megahertz and 7 gigahertz. Many regulators used to require measurements between 30 and 300 megahertz be performed with a biconical antenna, while log periodic antennas were used between 300 megahertz and 1 gigahertz.

In recent years, many regulators have accepted use of the biological antenna, which is a hybrid (Image 3) between a biconical and log periodic antenna. Not all standards will accept the use of biological antennas in all types of testing, but, depending on a company's particular products and geographic areas of sales, a biological can be a single antenna that will adequately cover its required frequency range.

Reason 3: Biological Antennas Are Convenient And Efficient

Because biological antennas can frequently act as the only antenna a company needs for precompliance testing, their use can simplify the testing process. There is also only one antenna to set up and calibrate, decreasing the time needed for technicians to prepare and take readings.

Biological antennas are convenient for other reasons as well. They are easy to set up and adjust, which further speeds in-house testing. Biological antennas are good for use either in a lab or an open-area test site.

Another advantage of biological antennas is the range of sizes and portability. Some units can be disassembled to fit into a carrying case. Many are small and light enough for easy transportation, which is useful for traveling consultants or when moving a testing setup from one location to another.



Image 1



Image 2

Reason 4: Reduction Of Test Costs

Testing costs won't equal the full costs of development, manufacturing, or marketing. But they can be significant with multiple official tests to get all the necessary compliance ratings, as well as the expense of precompliance testing, including investment in equipment, maintenance, and the time required by personnel to conduct the tests.

Biological antennas can reduce these costs. Precompliance testing will find



many problems and reduce the rounds of official compliance testing, lowering external costs.

Internally, biological antennas can reduce the amount of equipment necessary for many companies and simplify the testing process. By using only one antenna setup, no time is needed to take one antenna down and put another up.

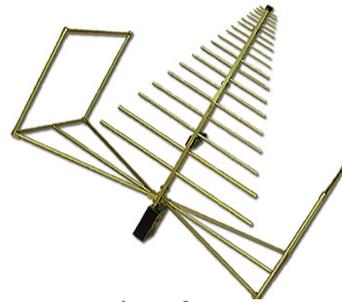


Image 3

The Next Steps

Preparing a precompliance testing program takes more than purchasing a single antenna. Technicians and engineers should research the types of compliance testing their products might require. Then, they should research the test specifications themselves to see the expectations and the types of equipment, like antennas, that may be explicitly required.

In addition to the antenna, a company will need other equipment. A receiver is a must for any sort of emissions testing to detect any signal from the device. If the signal is low enough, a preamp will be necessary to boost the received signal above the noise floor so it can be detected.

In some cases, immunity testing may be necessary to ensure the product's internal shielding will prevent strong external RF signals from interfering with operations. A transmitter connected to the antenna will deliver the signal. (A biological antenna can serve a transmitter as well as a receiver.)

A company might find it useful to contact an expert vendor to discuss testing plans and for further assistance on how to approach them in the most effective manner. For more information, here are links to material on [biological antenna systems](#) and [how to use preamps in RF testing](#).



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About Us

A.H. Systems has been established since 1974 and manufactures a complete line of affordable, reliable, EMI test antennas. Our individually calibrated EMI Test Antennas, Preamplifiers, Current Probes and Low-Loss Cables satisfy many test standards including CISPR, MIL-STD, FCC, EN, VDE, IEC and SAE. With a wide variety of mounting configurations, we can also offer tripods and accessories that complement other EMI testing equipment used to complete your testing requirements. We are also committed to providing all of our clients with no cost prompt and professional technical support. Manufacturing high quality products at competitive prices with immediate shipment plus prompt technical support are our goals to improve the quality of your testing requirements.

