SOME RECOMMENDATIONS

For a person entering this field, I would like to share a few recommendations for success. As with all things, there are many ways to be successful, and my opinions may not be for every person or situation, but I have seen them work many times.

BE METHODICAL

Accept there are more variables in the system than you can know. Predict them as best as possible, but also expect to figure them out as you go. Set expectations accordingly. There is no magic, and there is always a logical explanation that obeys the laws of physics. Debug a system with a strict application of the scientific method. Create a theory, generate experiments to test the theory (and make sure it's reproducible), update the theory, and repeat. Drawing conclusions too quickly will lead to contradictory findings, delays, and a loss of trust.

USE EVERY TOOL YOU HAVE

Don't limit your design with false ideals. Prototyping, simulation, matching circuits, deep integration, and dynamic tuners are all useful. While none are silver bullets, neither are any of them "shortcuts." Use everything you can to produce a functioning design on time, and ship it.

BE HANDS-ON

Especially when you are starting out, do all your own prototyping, measurements, and manufacturing support. The act of prototyping forces you to focus on the problem at hand, and you will better control all the variables at play. Spend time on an assembly line and in a factory's repair room, and understand what is possible and what is not. Instead of getting others (who don't understand the design) to do experiments for you, conduct the trials yourself, and short-circuit inefficient investigations. Understand how your test equipment works, and operate it on your own. Test systems have nuances that will constrain you if you're not careful.

BEWARE RULES OF THUMB

Design rules of thumb can be useful starting points, but don't let them constrain you. Chances are the rules were developed in a different design, technology, or requirements context than yours. Small changes in context can make a rule irrelevant. This holds for manufacturing, too. There are many "best practices" that will be different among teams and factories and that will unnecessarily hamper a design. Understanding what is possible enables you to push for viable changes to these rules.

GET INVOLVED

Participate in cross-functional challenges. Problems such as radio coexistence and unintentional desensitization from noisy components have coupling mechanisms at their heart. You will understand these, and the methodical approach you take to antenna design will enable you to quickly find and fix these issues. These are fun detective problems that can be quite rewarding to solve.

APPRECIATE YOUR IMPACT

Complex systems that have a large impact and that are produced at a massive scale require large, experienced teams. There is no way around it. You can either think you are a small cog in a large machine or recognize that you are, in fact, a critical cog. You play a role few others could, and every time someone uses the product to connect wirelessly, you know you helped make it possible.

AUTHOR INFORMATION

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ERRATA

In the "Historical Corner" column article "A Polarization Basics Diagram" [1], which was published in the February 2019 issue of *IEEE Antennas and Propagation Magazine*, there was a production error in the "Referred to Secondary V.P. Primes" legend in Figure 1. The second equation from the bottom appeared as $\tau' = 180^\circ - \pi$. The correct equation is $\tau' = 180^\circ - \tau$. We sincerely apologize for any confusion this may have caused.

REFERENCE

[1] M. J. Maybell, "A polarization basics diagram," *IEEE Antennas Propag. Mag.*, vol. 61, no. 1, pp. 130–135, Feb. 2019. doi: 10.1109/MAP.2018.2883054.

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