Success Story

Fractus Antennas Technology Innovates a New Class of Miniature Chip Antenna Components

Company
Fractus Antennas SL designs, manufactures, and commercializes miniature, off-the-shelf antennas for smartphones, short-range wireless, and connected internet of things (IoT) devices. Founded as an independent antenna product business in 2015, Fractus Antennas was born out of the main Fractus operation and combines a respected R&D team with proven manufacturing capabilities and scale to bring to market a new generation of antenna products to meet the mobile and wireless connectivity needs of original equipment manufacturers (OEMs).

Challenge
Fractus Antennas designs matching networks for a new class of off-the-shelf, surface-mount technology (SMT) chip antenna components called antenna boosters based on the company’s proprietary Virtual Antenna antennaless technology. The challenge faced by Fractus Antennas designers is that the antenna booster component, which fits within any application, mobile/IoT, and/or device, needs a matching network that is more sophisticated than the typical T or Pi network needed for a conventional antenna. Figure 1 is a picture of the new antenna booster.

Figure 1: Fractus Antennas antenna boosters fit seamlessly within any application, mobile/IoT band, and/or device.

At-A-Glance

- Application
  - Antenna
- Software
  - NI AWR Design Environment
  - Microwave Office
- Benefits
  - 10x reduction in design time
  - Highly accurate solutions

“Microwave Office circuit design software is the ideal complement to the new generation of Virtual Antenna™ products. The combination of the standard nature of our chip antenna components with the power and intuitiveness of Microwave Office makes going wireless fast, easy, and very cost effective.”

Dr. Carles Puente, Fractus Antennas

ni.com/awr
Solution
The design team chose the NI AWR Design Environment platform, specifically Microwave Office software, as the ideal complement for Virtual Antenna, describing it as “a smart software with great optimization and tolerance analysis features that helps to complete the design from concept to production in a fast and effective way.”

Microwave Office software provides a number of optimization and tolerance analysis tools that helped the team design the sophisticated matching networks needed for Virtual Antenna, as shown in Figure 2. The matching response became “live” with the smart tuning elements, providing key insights on the role of each component in the network and providing the exact values for the optimal design. In addition, tolerance analysis enabled the team to assess and tune the final and production-ready designs, making the whole design process productive, reliable, and effective.

Figure 2: Microwave Office provides optimization and tolerance analysis tools that were useful for designing the matching networks for Virtual Antenna.

Conclusion
The key benefits of using NI AWR software together with Virtual Antenna technology are twofold: the reduction of design time and the accuracy of the solution. The powerful tools such as the smart tuning and optimization function significantly reduced the time for simulating the most appropriate matching network for each particular design. Once the proper matching network topology is selected, NI AWR Design Environment software enabled the team to reduce the simulation time by a factor of 10 over a manual design, while at the same time providing highly accurate solutions.

The combination of live tuners for the network components, the ability to integrate real, commercial, off-the-shelf components from NI AWR software libraries, and the tolerance analysis and optimization tools were the most beneficial features of the software.

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