

# MAXTENA'S THREE-PHASE PROCESS FOR EMBEDDED PATCH ANTENNA

As the name suggests, this kind of antenna consists of a metal patch on top of a suitable substrate. This simple design gives it unique abilities in transmitting or receiving RF signals, and a physical form that can fit where other antenna types fail to.



At the most basic level, patch antenna exploits the bending of electrical field around a conductive strip (metal patch). Current passed through the patch will induce electrical field which radiates from the patch into the space above and bends to intersect the conductive surface at the right angle. Looking from the side, the electrical field resembles water emanating from the fountain. A part of that field will not radiate upwards, but

sideways, parallel to the antenna plane, and this part is responsible for the useful radiation of energy.

Main advantages of these antennas are its dimensions, weight and profile which makes them perfect for applications with strict space limitations. However, trade off to their small dimensions are lower radiation efficiencies, impure polarization, and emissions out of the designed frequency band. These problems can be solved or minimized by properly integrating and matching the patch antenna for its intended application.

Maxtena offers support with the integration process of the patch antenna into customer's enclosure. Maxtena has utilized this process to ensure the customer receives the highest performing, best quality antennas with the quickest time to market. The process takes place in three phases.



## PHASE 1

Upon agreement between Maxtena and the customer that an embedded antenna is the best solution a two-way Non-Disclosure Agreement is executed so both parties can share design information. After the NDA is executed, a Maxtena Program Manager will schedule a call between Maxtena's engineering team and the Customer.

Prior to the meeting the customer should provide CAD data in a suitable exchange format (such as STEP) for review by the Maxtena engineering team. The purpose of the meeting is for Maxtena to understand the customer's requirements and to provide the customer with design guidance for their housing to ensure the final design will achieve the best overall antenna performance. A wide range of housing design elements can and will affect the performance of an embedded antenna and addressing these items early in the design phase can reduce the overall time required for development. Antenna placement, PCB spacing, material thickness, resin selection and resin additives are just some of the design elements where Maxtena will provide guidance.

At the conclusion of the meeting Maxtena will develop and submit a proposal detailing the breakdown of tasks, the schedule, Maxtena and customer deliverables, required engineering resources, and the total project cost. Upon review and acceptance of this proposal by the customer, and submission of a Non-Recurring Engineering (NRE) Purchase Order, Maxtena will assign resources to undertake the project.

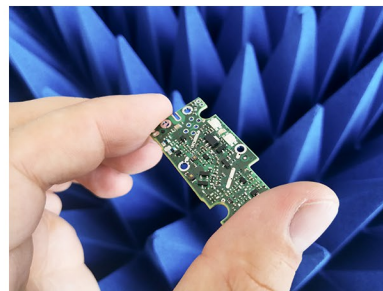
## PHASE 2

Once the customer incorporates any modifications into its design, they send the prototype assemblies to Maxtena. Maxtena integrates patch antenna into prototype assemblies and then the whole system is tested by Maxtena's engineers using Maxtena's in-house near-field anechoic chamber to verify the design achieves the expected results. Maxtena's engineers provide proper tuning and matching to achieve the best antenna performances. In rare cases, minor changes are required to the housing design before the tooling can be ordered.

Once the initial chamber testing is completed, Maxtena will provide a written report documenting the results. Maxtena will also schedule the manufacture of a small number of antennas, usually 20 to 30, to be used for testing when the final housings are available.



Anechoic chamber



Positioning Controller

## PHASE 3

Once final housing arrives to Maxtena, Maxtena's engineers do static test using receiver. Test is performed in open sky for 24. After test is completed, Maxtena provide detailed test report.

## THE BUSINESS RESULT

As a result of Maxtena's embedded antenna design process, companies are rapidly deploying products with consistent and reliable performance. This process involves substantial communication and collaboration between Maxtena and the customer and serves to cement a strong working relationship on both a business and technical basis. This interchange also serves to educate the customer on key characteristics that affect antenna performance and avoid making future design changes. Maxtena's Program Manager continues to be the customer's advocate within Maxtena to ensure a smooth transition to manufacturing and to respond to any issues that may arise.



Maxtena Inc.  
7361 Calhoun Place, Suite 102  
Rockville, MD 20855  
1-877-629-8362  
info@maxtena.com  
[www.maxtena.com](http://www.maxtena.com)