

Custom Antenna Design and Manufacturing Services

The demand for antennas is growing daily as wireless communication becomes more prevalent. Special antennas are required for the development of new technologies including 5G, 6G, the internet of things (IoT), wearable electronics, and CubeSat. Custom designs should be employed to attain antenna features that are unavailable in off-the-shelf products. Custom designs can be more effective in terms of electromagnetic parameters, size, and mechanical attributes since they are designed specifically for the task. Antenna design is a complex process that necessitates simulation and laboratory research, and where experience is vital. The selection of manufacturing processes following the kind of antenna and production volume, as well as the upkeep of low unit costs, are both components of mechanical and electromagnetic design. As a result, the previous industry-specific knowledge of the company that will be collaborating on the design and manufacturing of the antenna comes into play. Antenom Antenna Technologies uses the following antenna design steps.

1. Meeting with the Customer

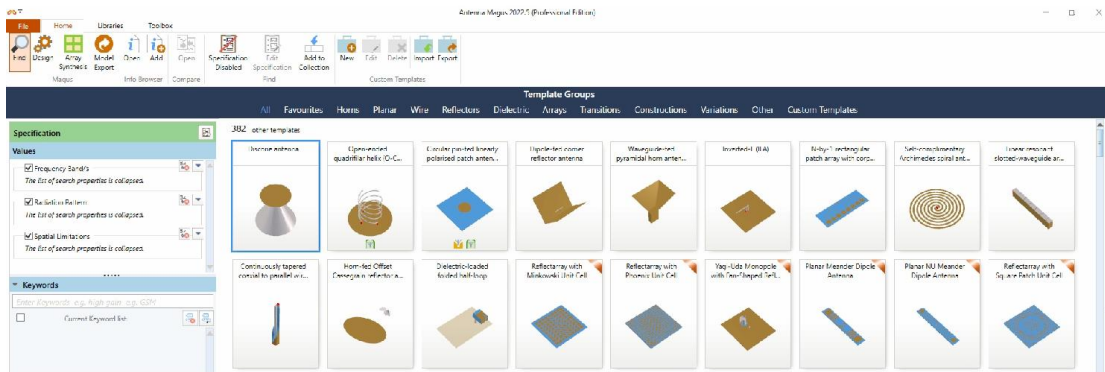
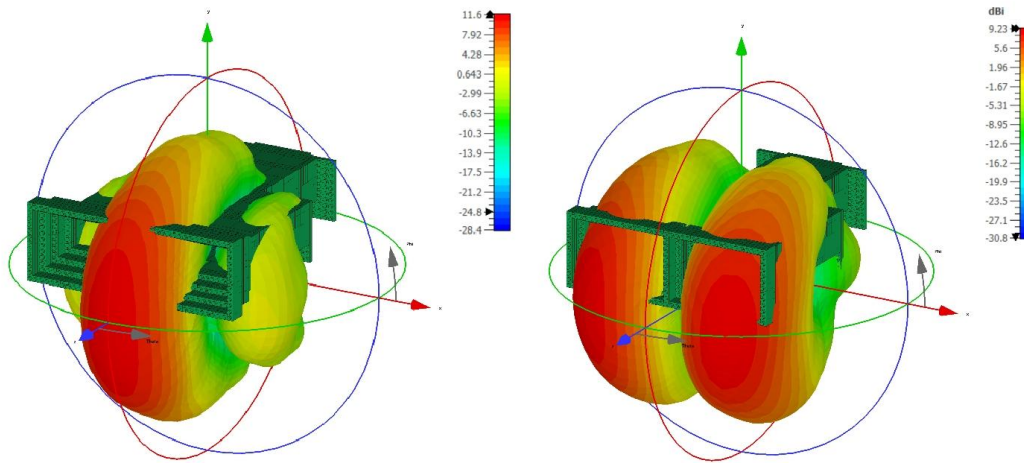
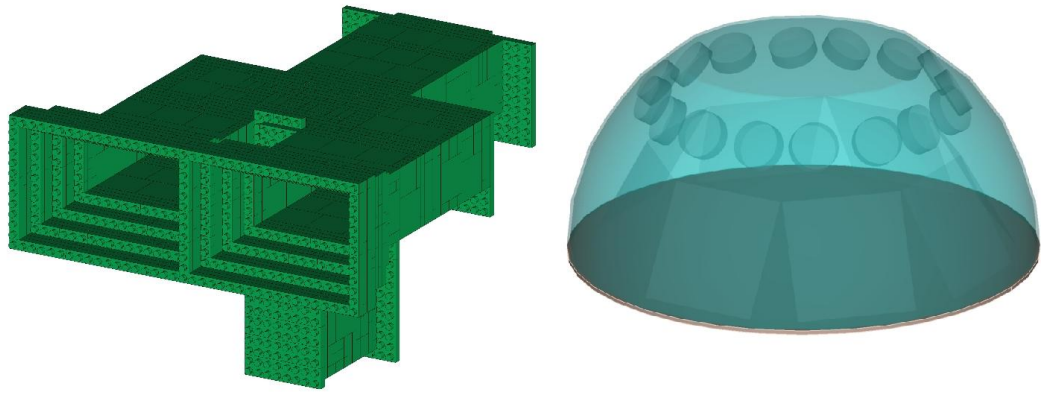
Antenom attends meetings with the customer to determine the electromagnetic and mechanical requirements for the antenna, as well as to understand the application in which the antenna will be used. In this process, if the customer wants to sign an NDA, it is mutually signed. The number of antennas to be manufactured and the manufacturing deadline are noted, and the target manufacturing price is determined if applicable. Consequently, inputs are received for preliminary evaluation, and it is assessed if an antenna can be designed based on these inputs and which aspects may be omitted if necessary.

2. Literature Research

The second stage in antenna design involves literature research. At this step, research is conducted through books, journal papers, conference papers, patents, the Internet search, and international studies on this topic are examined. Thus, a scientific assessment is conducted to determine how the design may be created.

3. Simulation of the Different Antenna Solutions

Following literature research, the antenna with the desired specifications is designed in the simulation environment. By working on several antenna structures in the simulation environment, electromagnetic, mechanical, and unit cost criteria are evaluated. If the findings that are obtained in the simulation environment closely resemble those of the prototypes, then it will be much simpler to find a solution to the issue in the simulation environment. Using a variety of electromagnetic solution techniques ensures that simulation and prototype results are compatible.

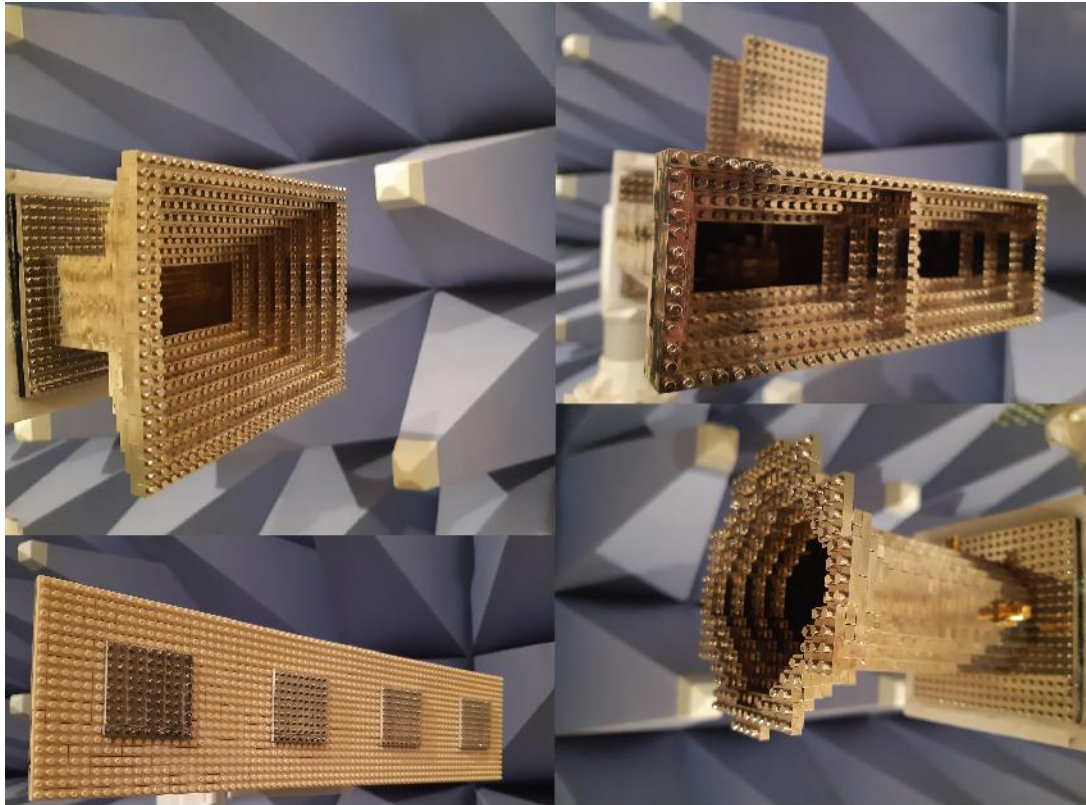


4. Antenna Prototyping

Antenna prototyping is one of the important steps in the design process. Rapid prototyping allows the results to be seen immediately, allowing for the identification of any design flaws.

At this stage, there is a unique method offered by Antenom. Thanks to the reusable blocks in the Anten'it Antenna Design and Prototyping Kit, rapid prototyping becomes possible in projects up to 7.5 GHz. After the Anten'it prototype, if needed, the prototype can also be manufactured using conventional methods. It is critical to be fast in this stage. Because it may be required to repeat the simulation phase and the prototype phase if revisions must be made to the design.

As a consequence, a prototype applicable for manufacturing is obtained and put to the test.



The simulation is repeated using the reusable blocks from the Anten'it Antenna Design and Prototyping Kit if their use is anticipated during the prototyping stage. Prototypes can also be manufactured via machining methods such as 3D printers or CNC Milling, lathe, etc. besides the Anten'it kits. Here, the project's duration and content are taken into account while choosing the prototyping method.

5. Measuring S-parameters and Radiation Patterns of the Prototypes



A network analyzer is used to measure the S-parameters of the developed prototypes, and then the findings are compared to the simulation to determine whether or not there is a difference. After that, the radiation pattern of the antenna is measured, and a comparison is made with the simulation to see whether these patterns coincide. It is evaluated by whether the differences can meet the desired specs.

If the results of simulation and prototype manufacturing differ, laboratory expertise becomes crucial. In this situation, there can be a need for several iterations throughout the design and prototype process.

6. Sending the Prototype to the Customer if possible / Customers test the prototype in their system

If the prototype is created using Anten'it kits, it may be sent to the customer if they wish to test the prototypes in their system. The prototype created using Anten'it blocks is converted from a reusable structure to a fixed structure before being handed to the customer. This allows the customer to test their antenna requirements at this stage. After the customer's test and approval of the prototype within their system, the following stage starts.

7. Measuring the Final Product and Preparing the Documentation

After prototype testing, if the relevant requirements are met, the final product is manufactured and the desired outcome is attained. The final product's S-parameters and radiation pattern are measured, and design documentation is provided.

8. Selection of the Manufacturing Method and Mass Production

The manufacturing method for the antenna is identified, and the steps required for mass production are taken. There are several methods for mass production. During the design stage, it is determined which of these methods will be employed, and the antenna is designed accordingly. CNC Machining, metal moldings, metal spinning, composite techniques, plastic injection, metalizing, thermoforming are some of the techniques used in antenna manufacturing.

Antenom has a high manufacturing capability and a quality control system. The competitive price is one of the inputs in the antenna design phase and an important parameter in the manufacturing.

If you have any needs regarding the design of a custom antenna or antenna system, you can send an e-mail to sales@antenom.com.