



# Antenna Thermal Mechanical

**LYNwave**

Antenna & Thermal solution provider

**Dedicated in CAE simulation empowering antenna, thermal & mechanical design.**



### **Integrated Radio & Thermal Service**

Sharing the turnkey solution by utilizing the materials cross-functionally to increase the overall performance, reducing the total cost and optimizing the space.



### **Group Overlapping Engineering**

Continuously studying new technologies and resolving the functional conflict project within a limited dimension on different applications.



### **Customized Design**

Using simulation services with robust R&D background to design customized Antenna & Thermal solutions, optimized for variable markets with fastest response at all stages.

## **Study Case :**

Indoor WiFi Device

## **Solution Target 1 :**

Control the PCB components within the Tc spec .

1. Ambient air temperature = 40°C
2. Total device power consumption = 32 watts
3. Fluid = Natural Air
4. Flow Field = No external flow

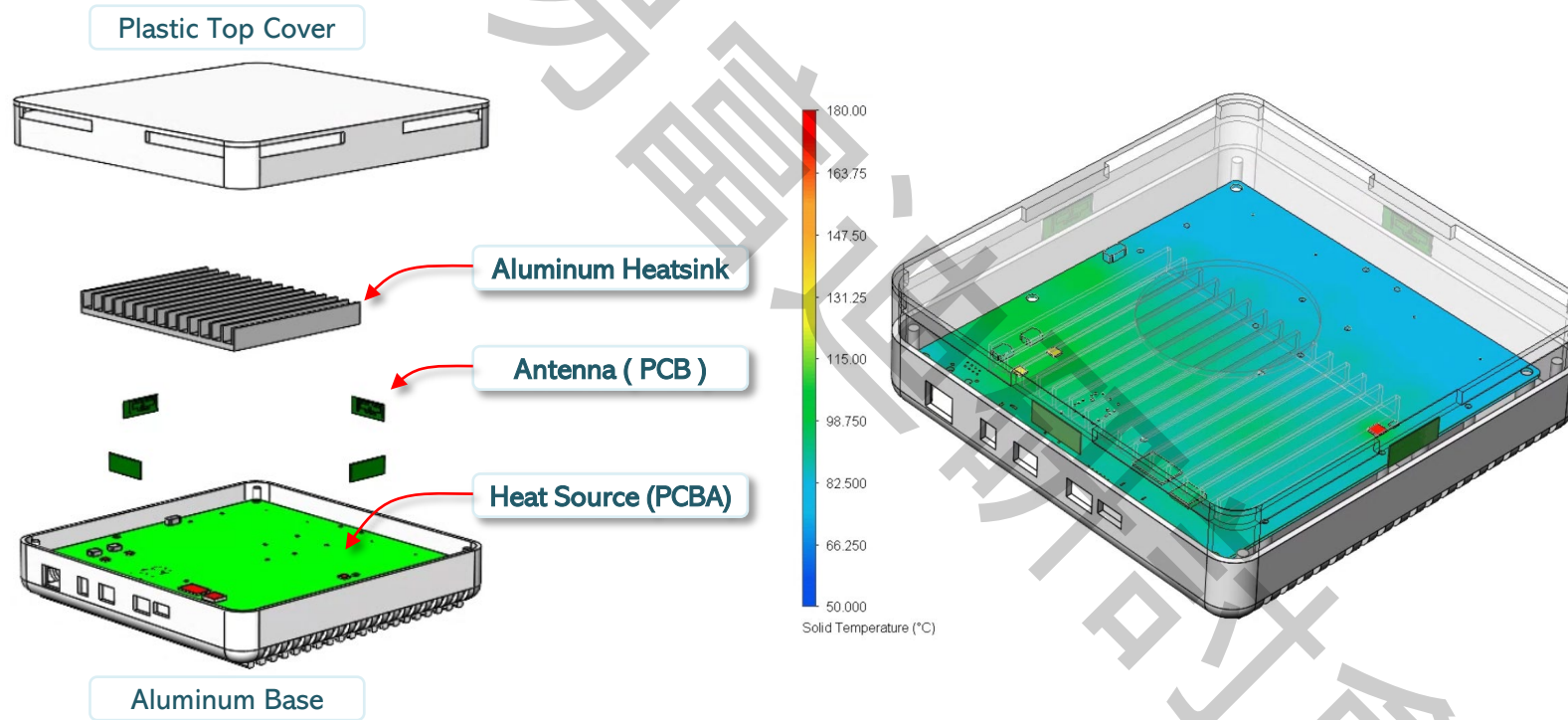
## **Solution Target 2 :**

Adding the thermal dispatch material without impact the antenna performance

## **Design Environment :**

Siemens Simcenter Flotherm XT

Simulia CST Studio Suite

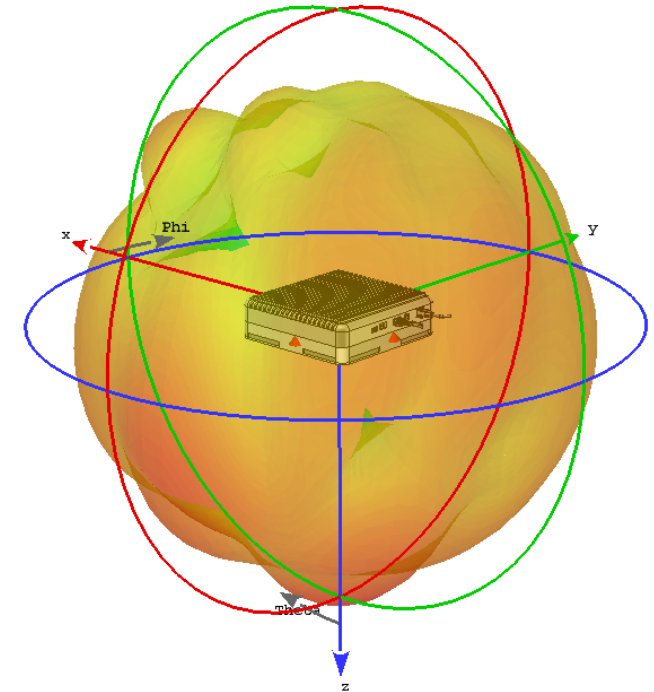


## Standard mechanism solution :

by add heatsink to direct contact the heat source to dispatch the heat .  
Attached PCB antenna on the inner wall of plastic cover .

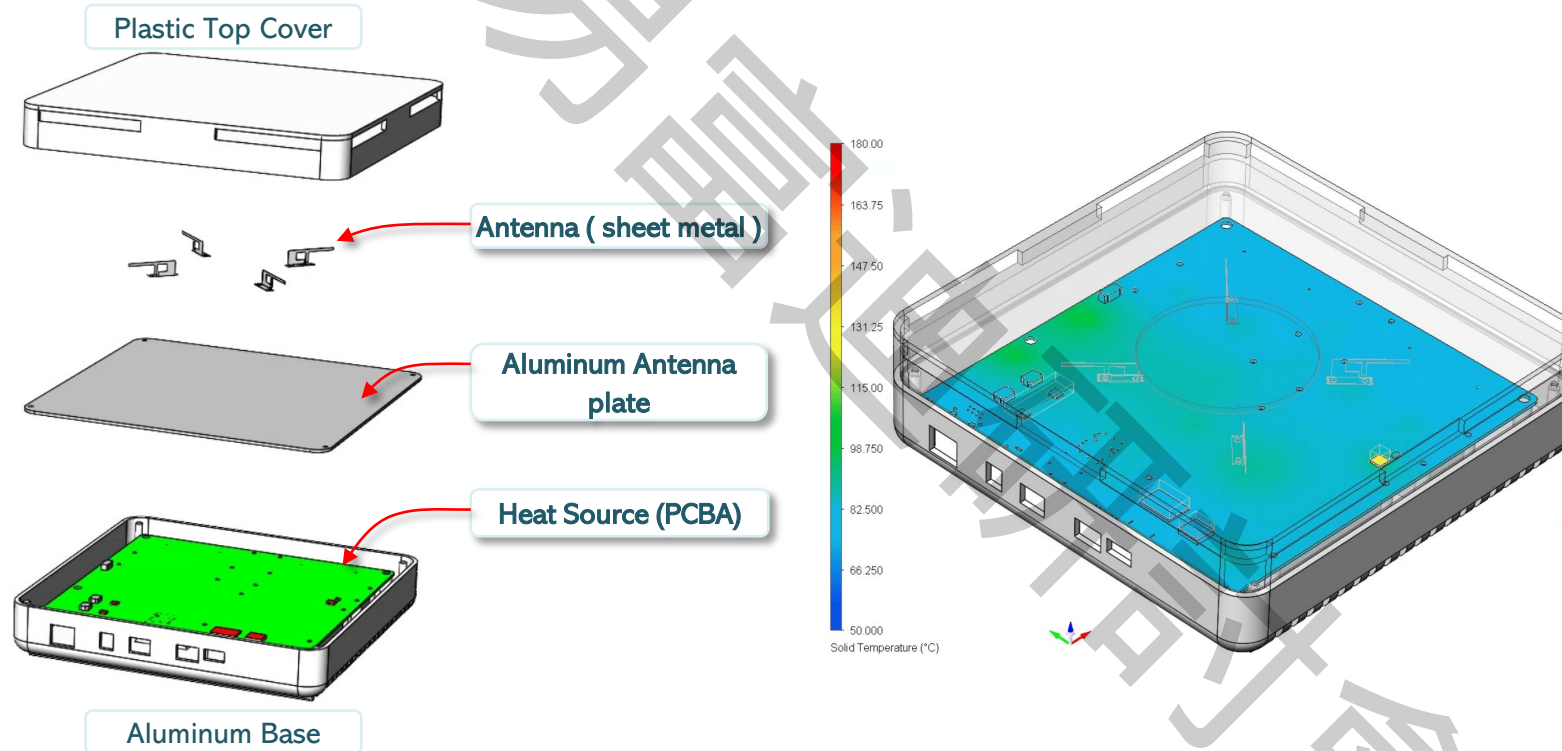
## Thermal dispatching performance:

The heat from PCBA components has been dispatch to the heatsink , how ever some of the component still working on high peak of the spec .



## Antenna performance:

The standard antenna installation on the inner side of the plastic cover wall produce the workable efficiency and poor coverage pattern .

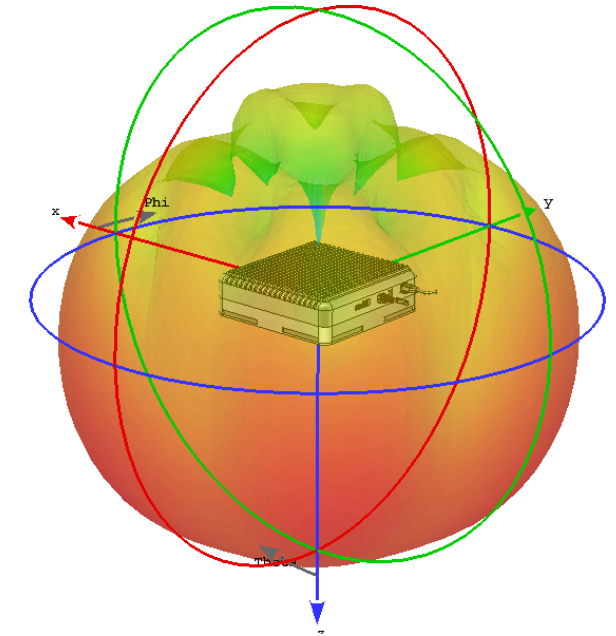


## Mechanism solution :

- 1) Replace the heat dispatching element from heat sink to antenna grounding plate .
- 2) Replace the antenna material from PCB to sheet metal .

## Thermal dispatching performance:

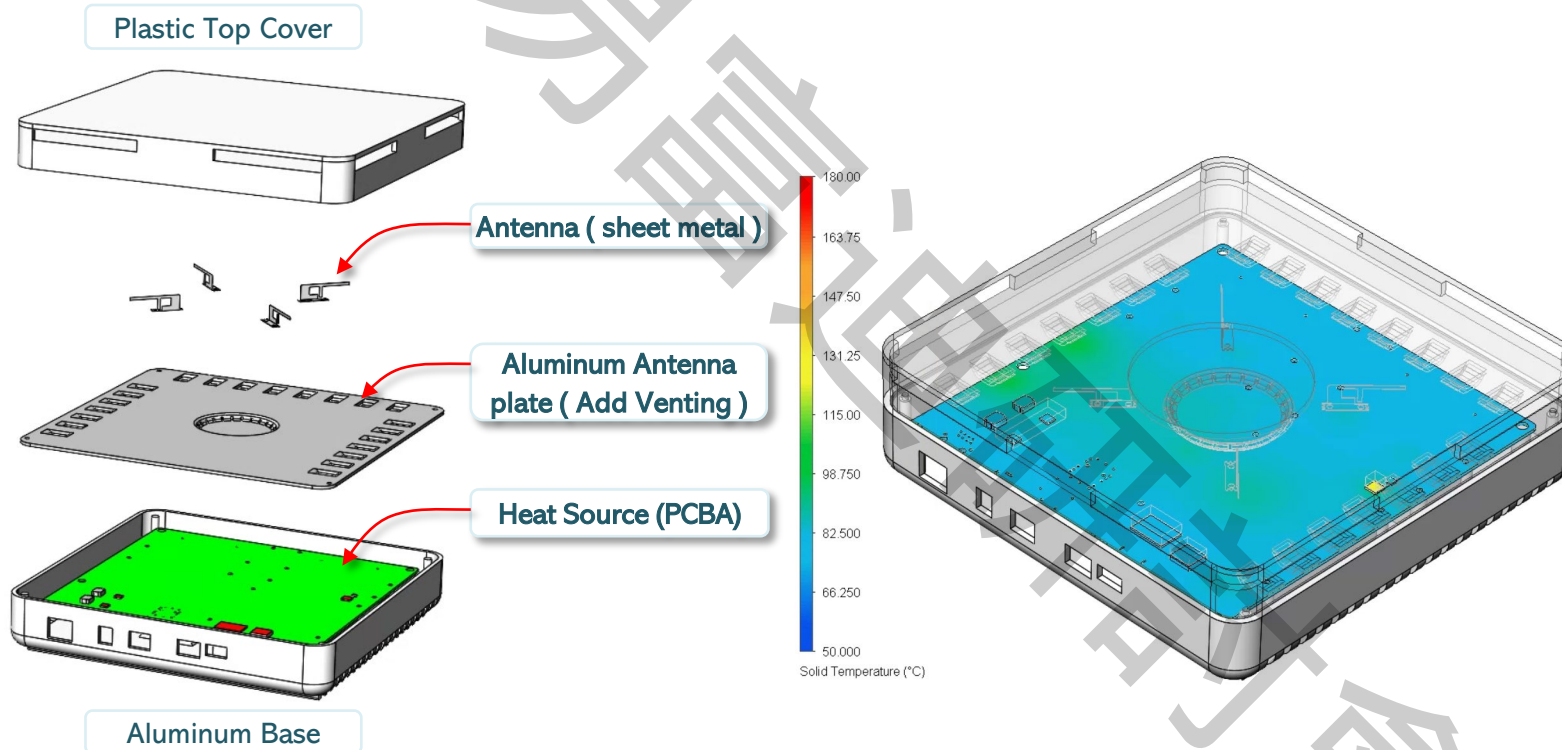
By enlarge the heat dispatching element surface, can increase more contact point to the heat source . And the heat dispatching can be more efficiently increase convective and radioactive.



## Antenna performance:

Radio emission with grounding plate also increase the antenna efficient and pattern. Which gain more average round shape of coverage .



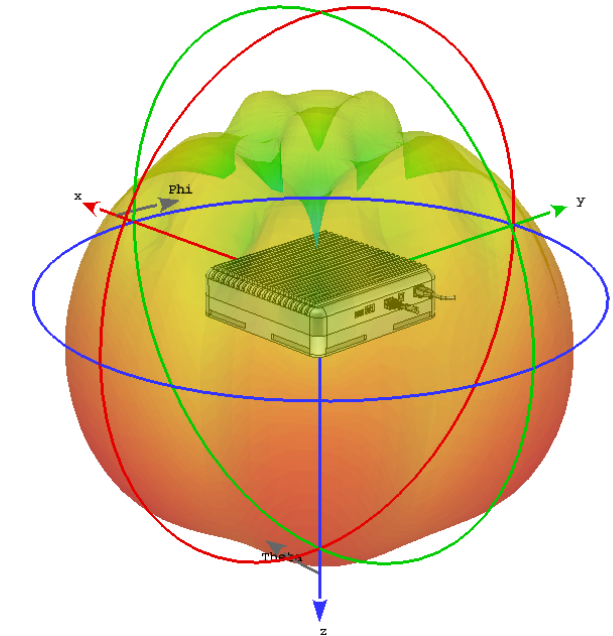


## Mechanism solution :

- 1) Add venting hole on the antenna plate .
- 2) To increase the internal air flow.

## Thermal dispatching performance:

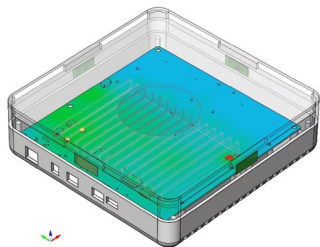
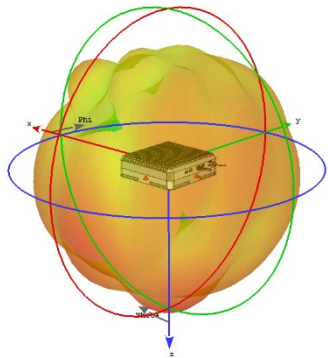
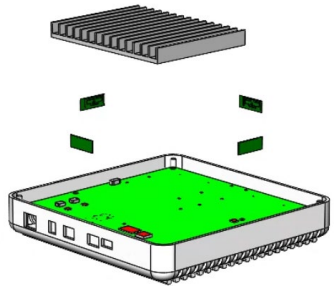
Adding the venting on the antenna plate can increase the heat convective , as result to drop down the over all internal temperature, but we need to make sure the radio emission from the PCBA will not impact the antenna performance .



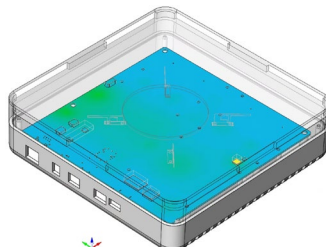
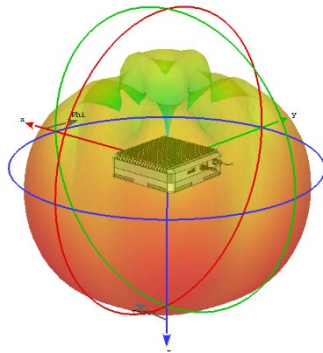
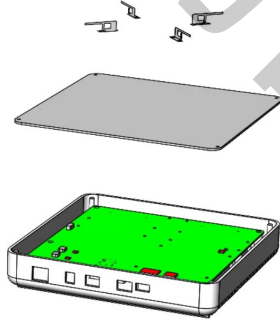
## Antenna performance:

The vent hole need to be design and calculate with radio frequency length . Adding the vent hole without impact the existed antenna performance .

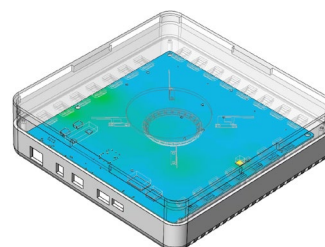
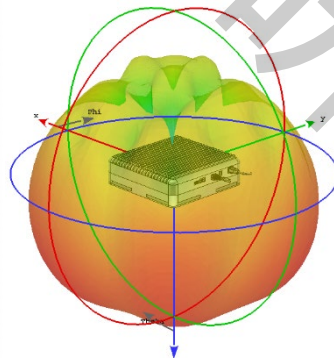
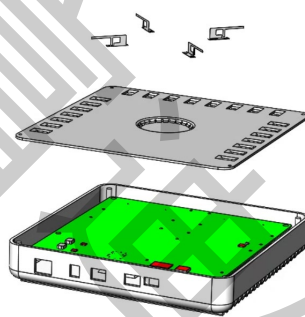
## Study 1



## Study 2



## Study 3

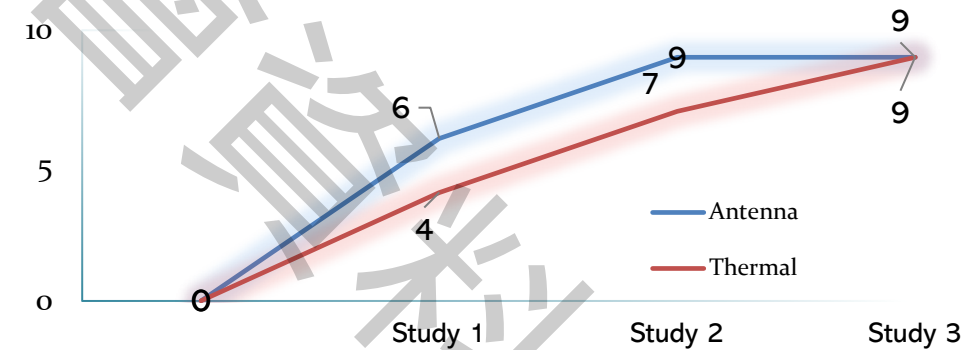


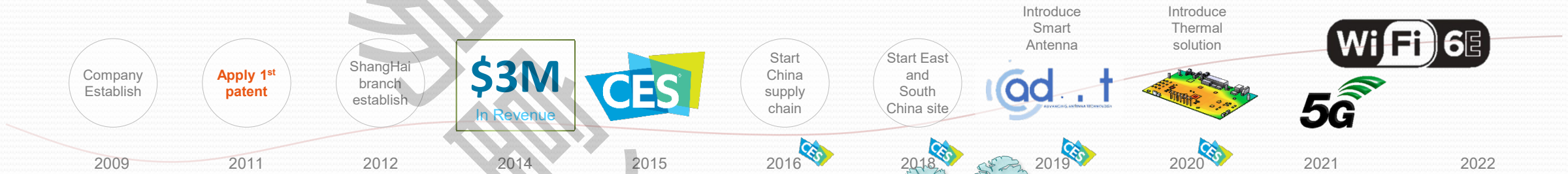
Both thermal solution and antenna performance work best by adding metal element in the device to achieve the design target in most of cases .

However , the metal element from thermal solution will block and impact the antenna performance , and the other way around the antenna requirement of space clearance will limited the thermal solution surface .

Since both thermal and antenna need metal to increase the performance , this cross functional simulation result as win-win solution .

## Performance Score



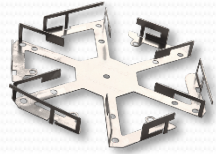


## Cross strait facility:

With multiple facility location cross-strait between Taiwan and China . We can ship materials according to the assembly co-operating warehouse require by the clients. And we can have the flexibility for financial trade routes as well.

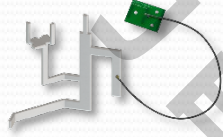






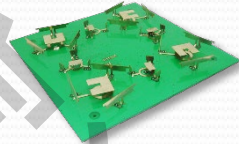
**Module  
Antenna**

4x4 / 8x8 + 4x4 concurrent



**Embedded  
Antenna**

PiFA / Dipol / FPCB /  
PCB / Custom design



**Smart  
Antenna**

With Adant technology



**USB dongle PiFA  
Antenna**

Netgear N150 (1x1) / Netgear  
WNA4100M (3x3) / Netgear  
WNA3100M (2x2)

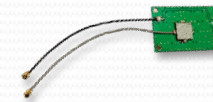


**Patch  
High gain Antenna**

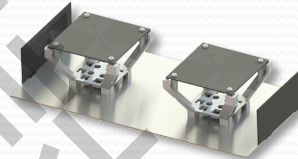
2x2 18dBi / 2x2 15dBi  
/ 2x2 12dBi



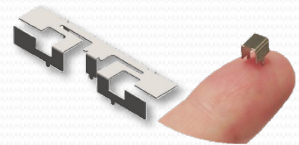
**Weather-proof  
Antenna**



**GPS  
Antenna**

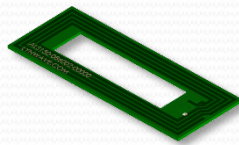


**Sub 6G  
LTE Antenna**



**SMD  
Antenna**

With shielding cover



**NFC  
Antenna**



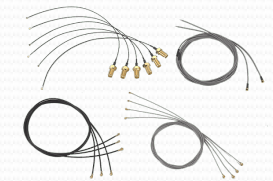
**Dipole Antenna**



**Chip  
Antenna**



**Surge arrestor**



**RF cable**  
SMA / iPeX / MMCX

## Advantage:

- Computational add design with CST for rapid design response
- High gain patch antenna solution
- High performance embedded antenna solution
- Innovative antenna design
- Combining the antenna and thermal solution
- Performance and design optimized for embedded applications
- Extensive Lab and field testing support





High heat dispatching requires highly conductive materials such as metal , which will block and impact the RF characteristics . However , with LYNwave grouping design discussion , we implement suitable and proper materials with identical manufacturing process to achieve cross function requirement .

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