

Application of FloTHERM XT to Networks Products

Scott Ren

2016 / 11 / 11

UBIQUITI

world network

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Outline



- Company Introduction
- Products
- Why Do Simulation
- Case Study
- Why Choose FloTHERM XT



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Company Introduction



- Ubiquiti Networks
- Founder: Robert J. Pera, CEO
- Founded: June 2005
- Headquarter: San Jose, California, USA
- Trade: NASDAQ UBNT
- Products: Computer Networking Devices



Robert J. Pera



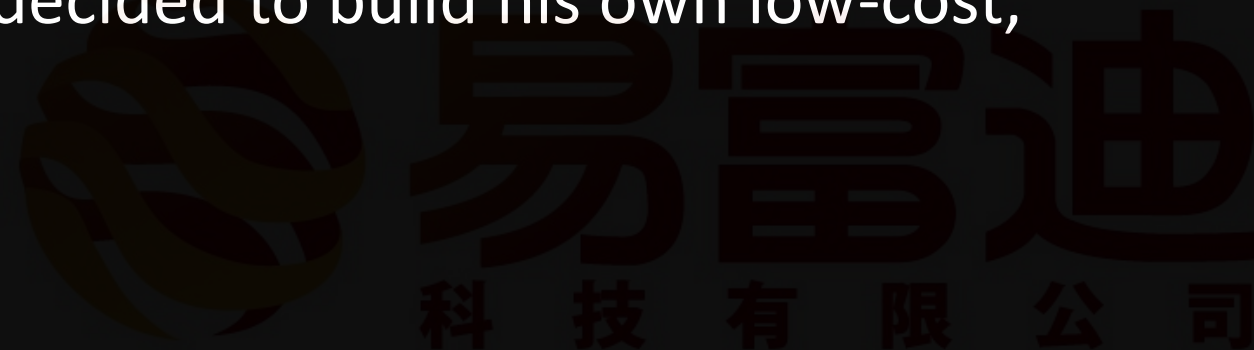
- Born: 1978
- Nationality: American
- Alma mater: University of California
- Occupation: CEO of Ubiquiti Networks
Owner of Memphis Grizzlies
- Career: Apple



Motivation



- After graduation, he secured a job at Apple, where he tested the company's Wi-Fi devices to ensure compliance with Federal Communications Commission standards.
- He noticed that the power sources Apple's WiFi devices used to throw signals were far below FCC limits.
- Boosting the power could increase the transmission range to over dozens of miles.
- His bosses ignored his idea, so he decided to build his own low-cost, high performance WiFi module.



Outline



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Products



- airFiber – Wireless Backhaul
- airMAX – Fixed Outdoor Wireless
- EdgeMAX – Carrier Routing
- UniFi – Enterprise Wifi
- UniFi VIDEO – Video Surveillance
- UniFi VoIP – Scalable Internet Telephony Network
- AmpliFi – High Density Wi-Fi System



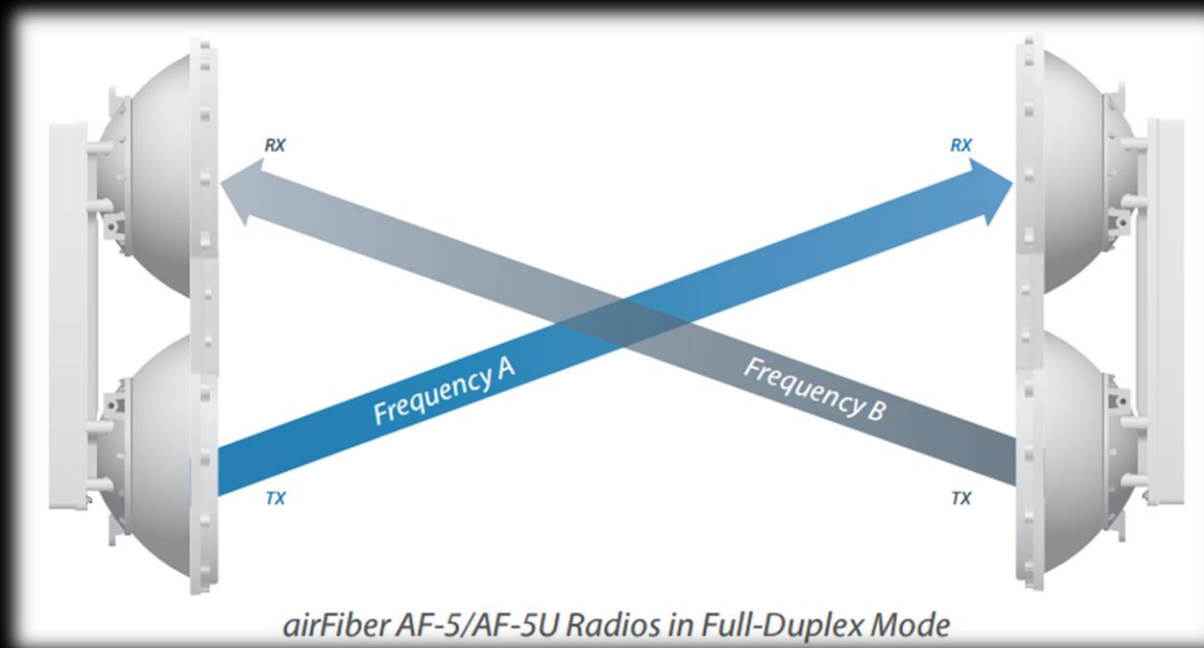
airFiber – Wireless Backhaul



- Performance: 1.2 Gbps+
- Band: 5 GHz, 24 GHz
- Range: 100 Km+
- Latency: < 1 ms
- -40° C to 70° C

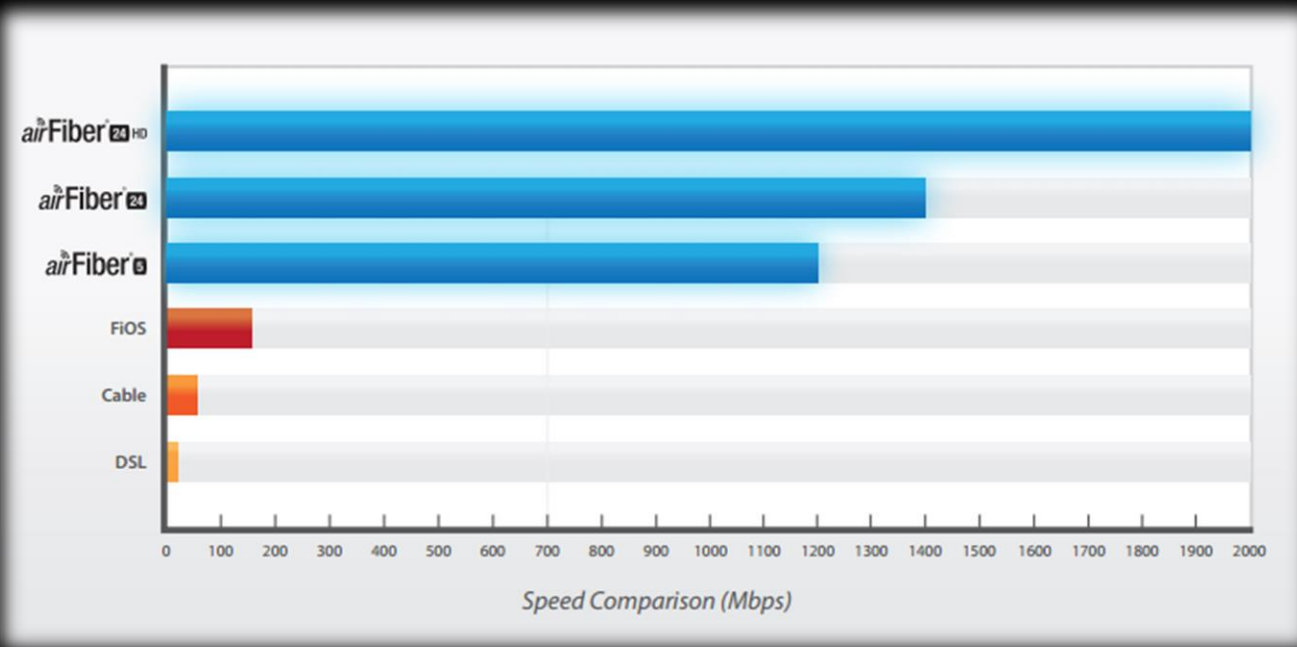


airFiber – Wireless Backhaul



- Hybrid Division Duplex (HDD)
Synchronous data transmission and reception

airFiber – Wireless Backhaul



- Built for Speed and Range
airFiber can transmit a 100 MB file in less than a second



airFiber – Wireless Backhaul



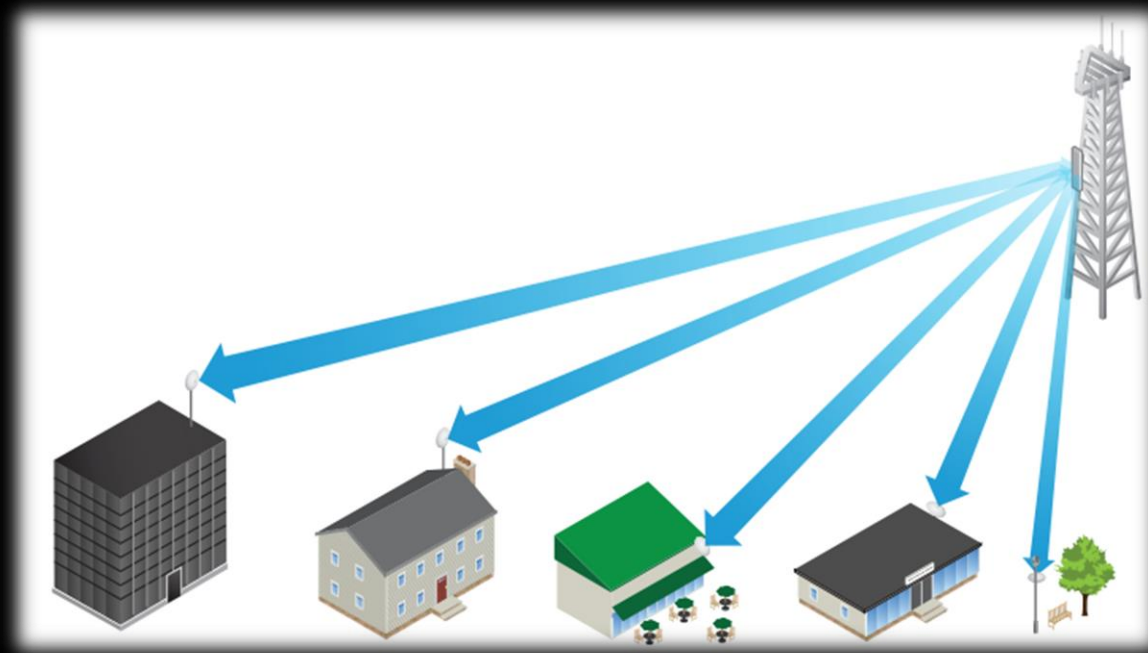
airMAX – Fixed Outdoor Wireless



- Performance: 450 Mbps+
- Band: 5 GHz
- Range: 25 Km+
- Latency: < 1 ms
- -40° C to 70° C

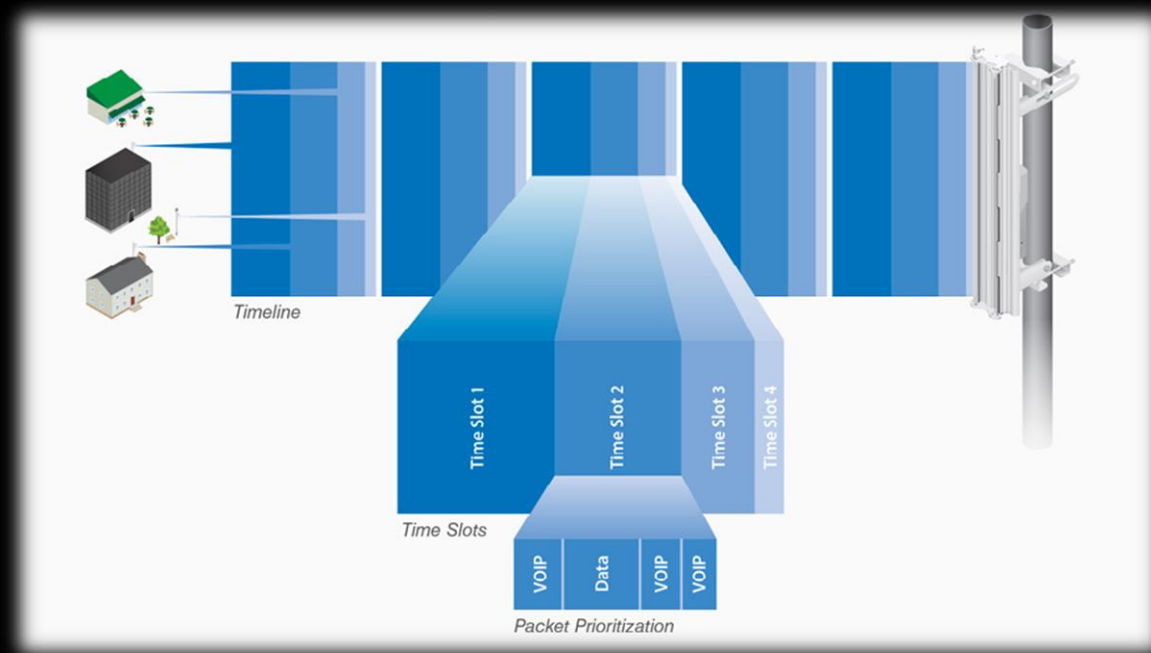


airMAX – Fixed Outdoor Wireless



- airMAX are powerful wireless client
Each client can send and receive data at same time

airMAX – Fixed Outdoor Wireless



- Time Division Multiple Access (TDMA) Technology
Allows each client to send and receive data using pre-designated timeslots

EdgeMAX – Carrier Routing

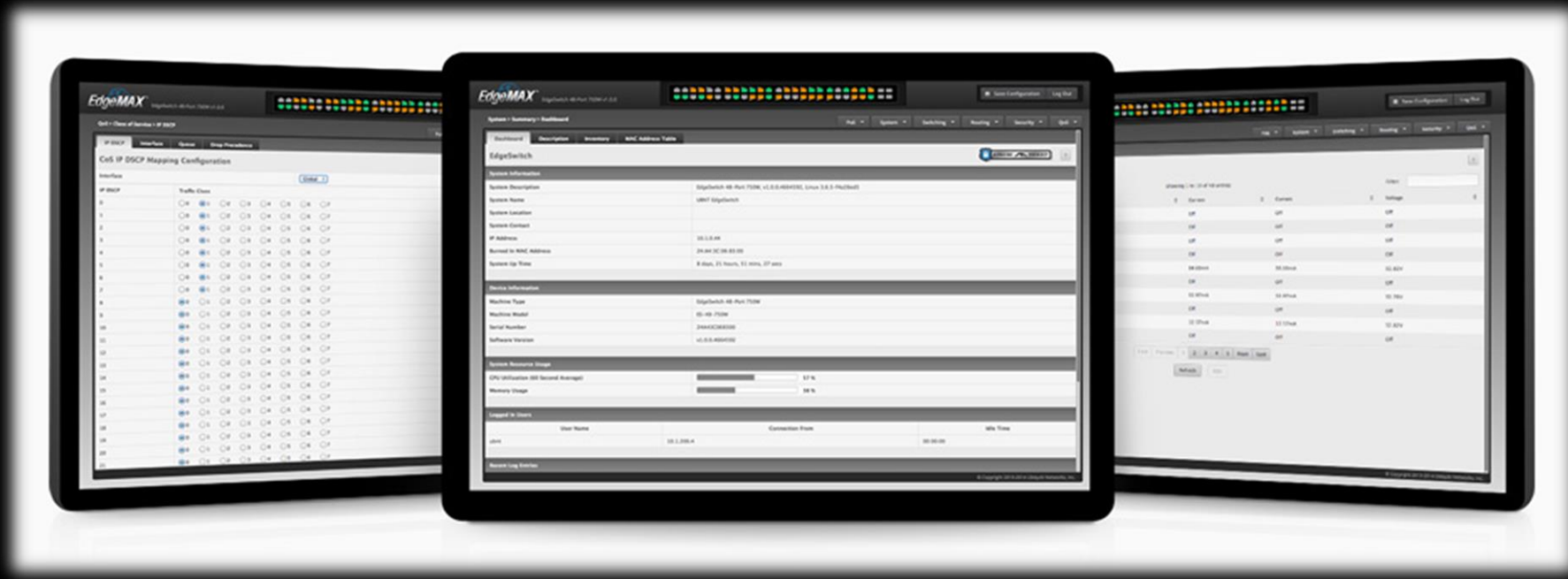


- Non-Blocking Throughput: 70 Gbps
- Switching Capacity: 140 Gbps
- Enterprise-Class Features
 - Supports Layer-2 switching features
 - Provides Layer-3 routing capability
- Optical Fiber Backhaul
 - Includes two SFP+ ports for uplinks of up to 10 Gbps
- PoE+ Support: up to 750 W



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EdgeMAX – Carrier Routing



- Features an intuitive, easy-to-use graphical user interface
Makes it simple to configure and monitor your devices

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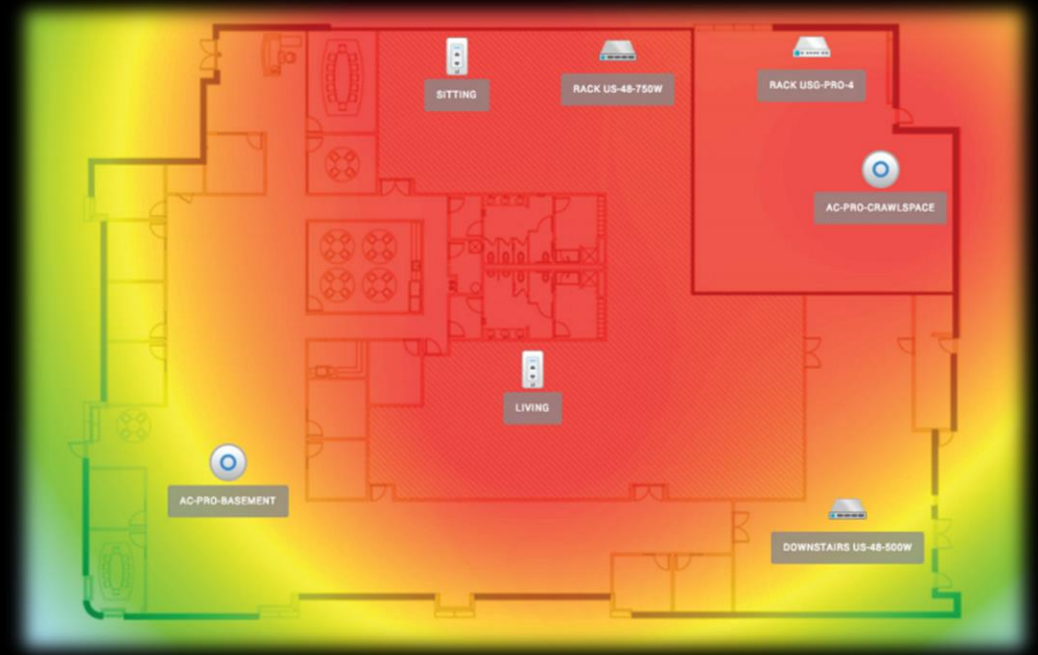
UniFi – Enterprise Wifi



- Performance: up to 1.3 Gbps
- Band: 2.4 GHz, 5 GHz
- Range: up to 183 m
- Latency: < 1 ms
- -10° C to 70° C
- Weather Resistant



UniFi – Enterprise Wifi



- Expandable unlimited scalability
Build wireless networks as big or small as needed



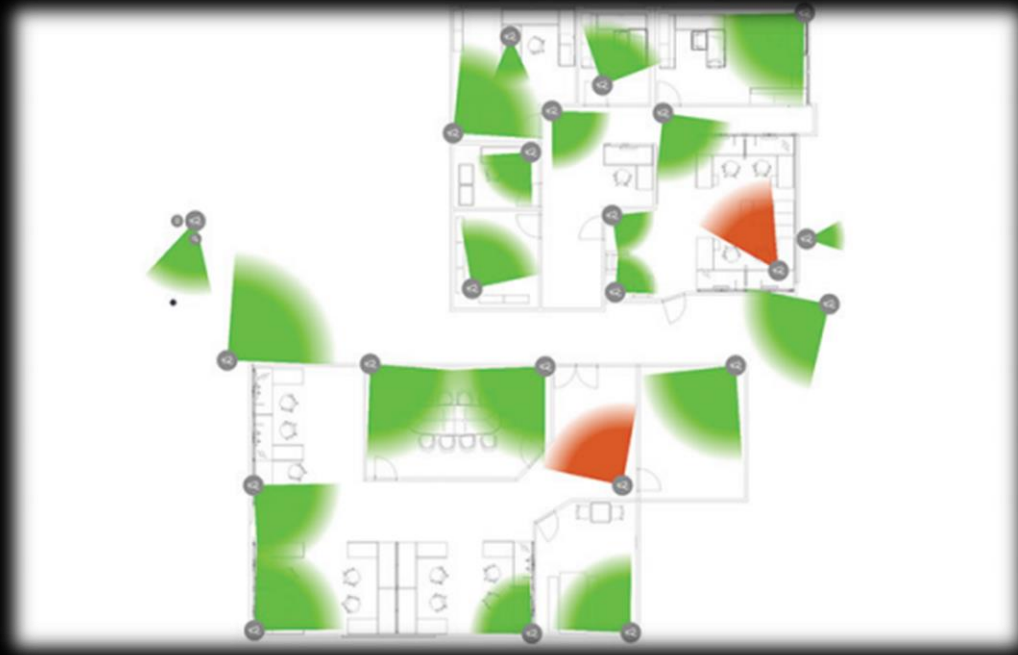
UniFi VIDEO – Video Surveillance



- FHD Image Quality
- 1 / 3" 4-Megapixel HDR Sensor
- 10 / 100 Ethernet Port
- Weather Resistant
- -30° C to 70° C



UniFi VIDEO – Video Surveillance

A screenshot of the UniFi Video web interface showing a list of recorded events. The interface includes a sidebar with camera thumbnails and a main table of event logs. The 'Entrance Normal' event is highlighted in blue.

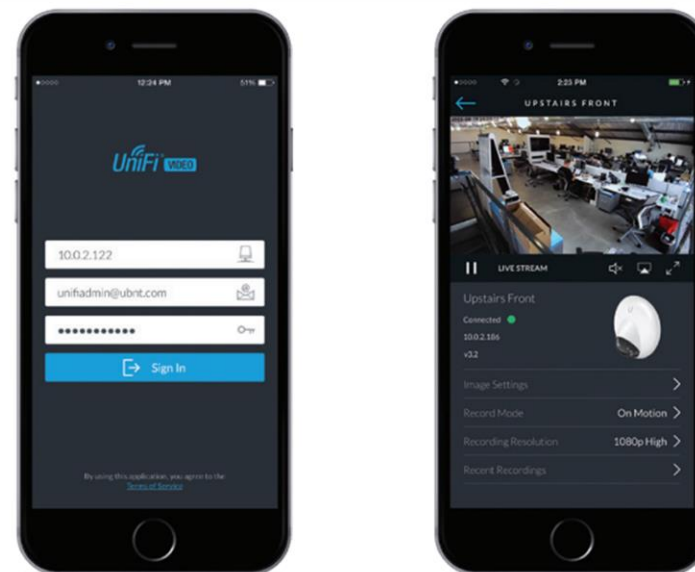
Camera	Event	Date/Time
New Office	Motion	Apr 3 2015 09:08
June and Paul Office	Motion	Apr 3 2015 09:08
Kitchenette	Motion	Apr 3 2015 09:08
New Office	Motion	Apr 3 2015 09:08
Open Office 2	Motion	Apr 3 2015 09:08
Open Office	Motion	Apr 3 2015 09:08
Entry 2	Motion	Apr 3 2015 09:08
Entry 2	Motion	Apr 3 2015 09:08
Open Office	Motion	Apr 3 2015 09:08
Open Office 2	Motion	Apr 3 2015 09:08
Open Office	Motion	Apr 3 2015 09:08
Entry 2	Motion	Apr 3 2015 09:08
Entrance Normal	Motion	Apr 3 2015 09:08
Office Entry	Motion	Apr 3 2015 09:07
New Suite Entry	Motion	Apr 3 2015 09:07
Photo Studio	Motion	Apr 3 2015 09:07
Photo Studio	Motion	Apr 3 2015 09:07



- Event Recordings
The UniFi Video cameras feature motion detection



UniFi VIDEO – Video Surveillance



- Mobile App

UniFi Video may be accessed from iOS and Android™ using the mobile app



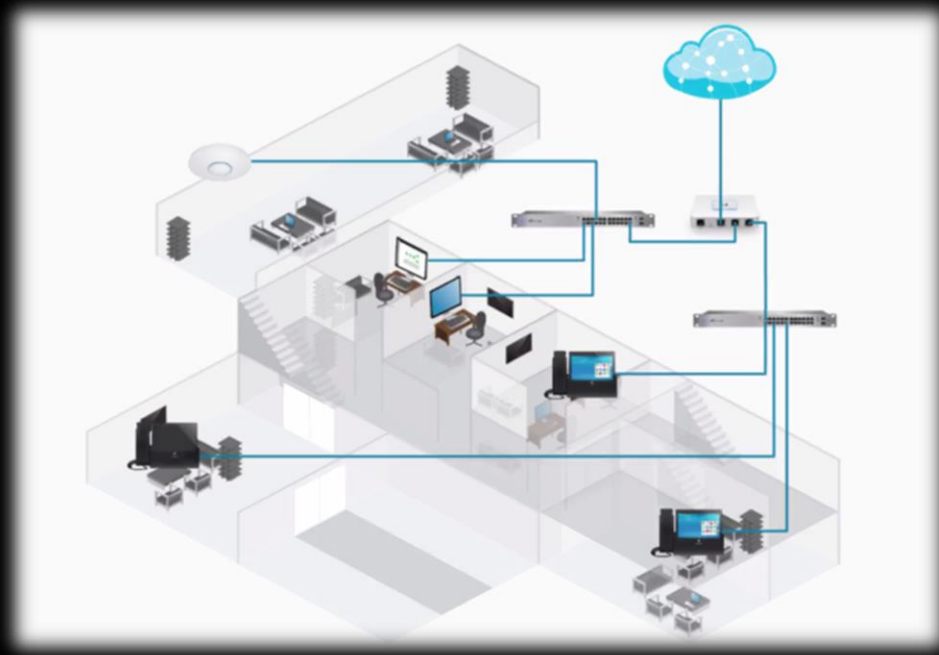
UniFi VoIP – Internet Telephony Network



- 7-Inch Multi-Touch Display
- Powered by Android
- High-Definition Camera
- Premium Stereo Sound
- Bluetooth Support



UniFi VoIP – Internet Telephony Network

A screenshot of the UniFi Controller interface, specifically the 'Devices' page. The interface shows a list of connected devices with columns for Name/Type, Address, IP Address, Status, Model, Version, Uptime, and Actions. The devices listed include UniFi AP-AC, UniFi AP-PRO, UniFi URG, and UniFi Executive. The status of most devices is 'Connected', while one is 'Pending Approval'.

Name/Type	Address	IP Address	Status	Model	Version	Uptime	Actions
28.04.01.02.02.02	10.8.2.147	Connected	UniFi AP-AC	UniFi 3.2 x 81	47d 1h 48m	LOGOFF	RESTART
Mini AP PRO	10.8.2.148	Connected (LTE-HSD)	UniFi AP-AC	UniFi 3.2 x 81	47d 1h 48m	LOGOFF	RESTART
URG	10.8.2.128	Connected	UniFi URG	UniFi 3.2 x 81	20d 8h 12m	LOGOFF	RESTART
Office 002	10.8.2.121	Connected	UniFi	UniFi 3.2 x 81	11d 1h 35m	LOGOFF	RESTART
Suite 222	10.8.2.122	Connected	UniFi Executive	UniFi 3.2 x 81	11d 1h 35m	LOGOFF	RESTART
Office 131	10.8.2.123	Connected	UniFi Executive	UniFi 3.2 x 81	11d 1h 27m	LOGOFF	RESTART
Mini Core Phone	10.8.2.124	Connected	UniFi PRO	UniFi 3.2 x 81	11d 1h 21m	LOGOFF	RESTART
Office 131	10.8.2.125	Connected	UniFi	UniFi 3.2 x 81	11d 1h 15m	LOGOFF	RESTART
Suite 222	10.8.2.122	Pending Approval	UniFi Executive	UniFi 3.2 x 81	11d 1h 35m	LOGOFF	RESTART

- Plug and Play Deployment
Includes SIP support and automatic provisioning



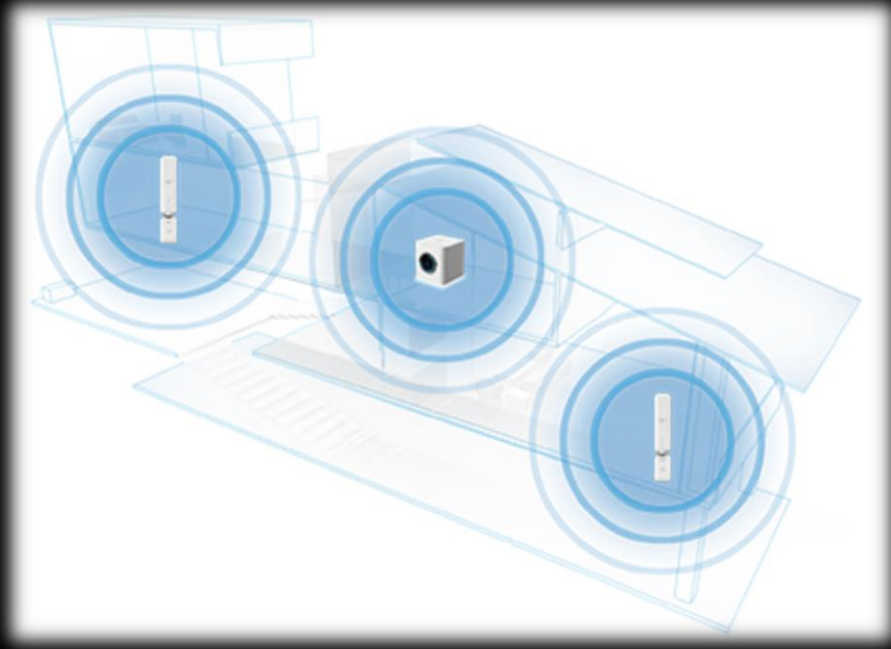
AmpliFi – High Density Wi-Fi System



- Performance: up to 1300 Mbps
- Band: 802.11b / g / a / n / ac
- Display: 212 ppi Touch Screen
- Interface: Gigabit Ethernet
- Range: 1800 m²
- Latency: < 1 ms
- -10° C to 55° C



AmpliFi – High Density Wi-Fi System



- Mesh Points
Extends wifi coverage for best performance



Outline



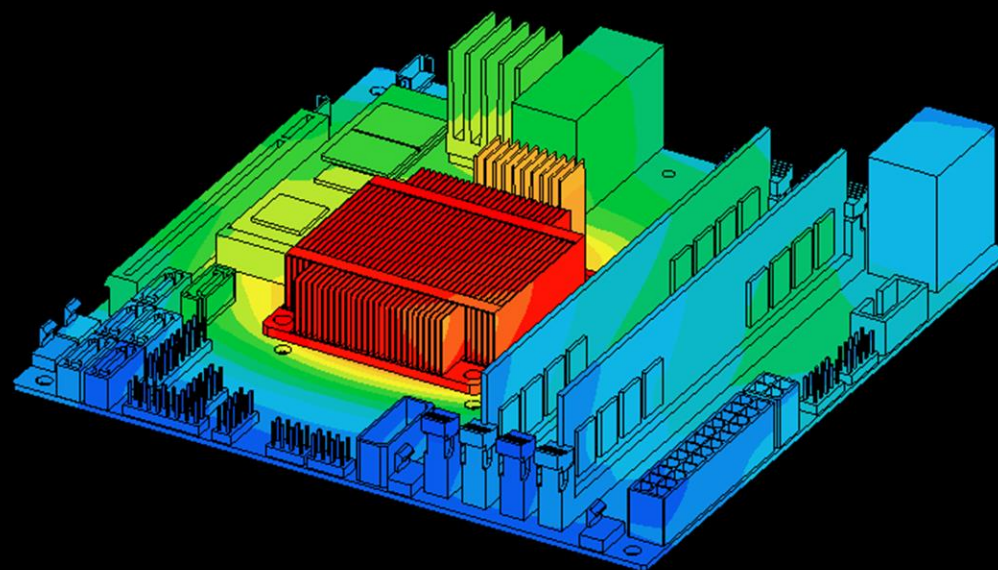
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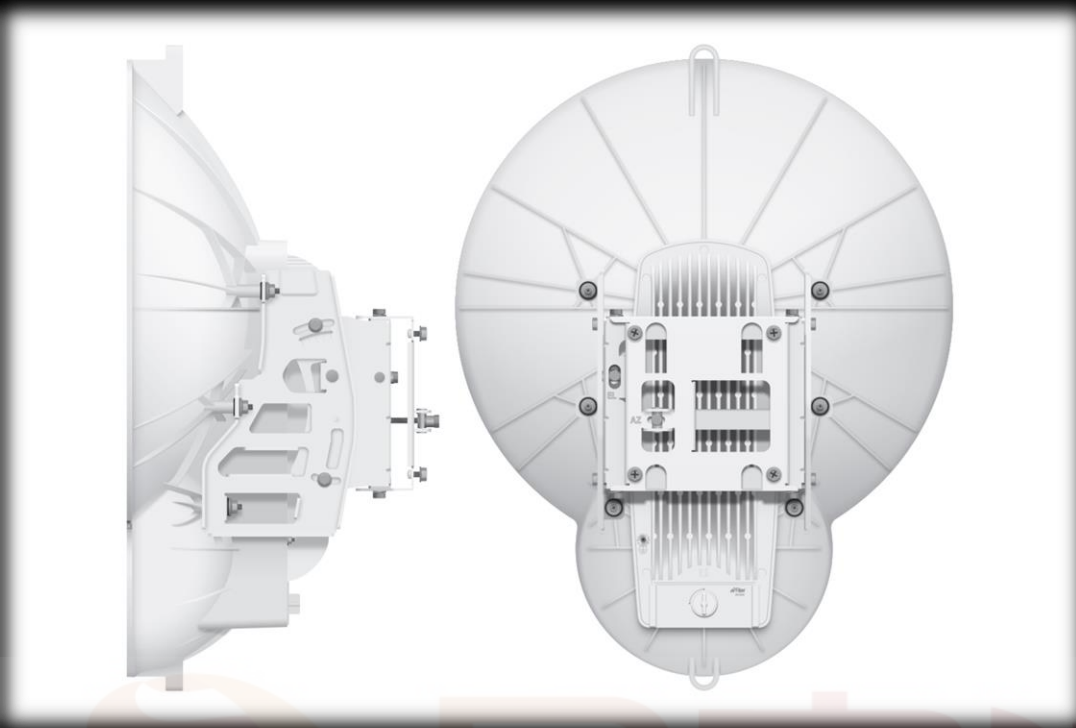
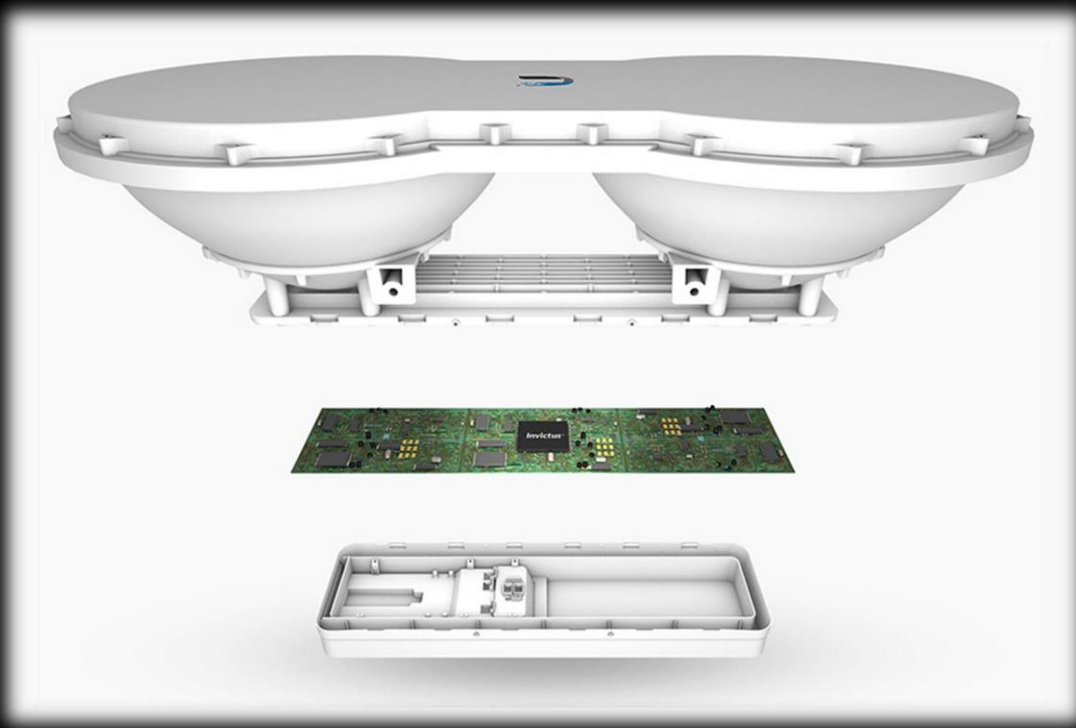
Why Do Simulation



- Shorten the development cycle
- Reduce development cost
- Improve product reliability
- Lower production cost



Why Do Simulation



Outline



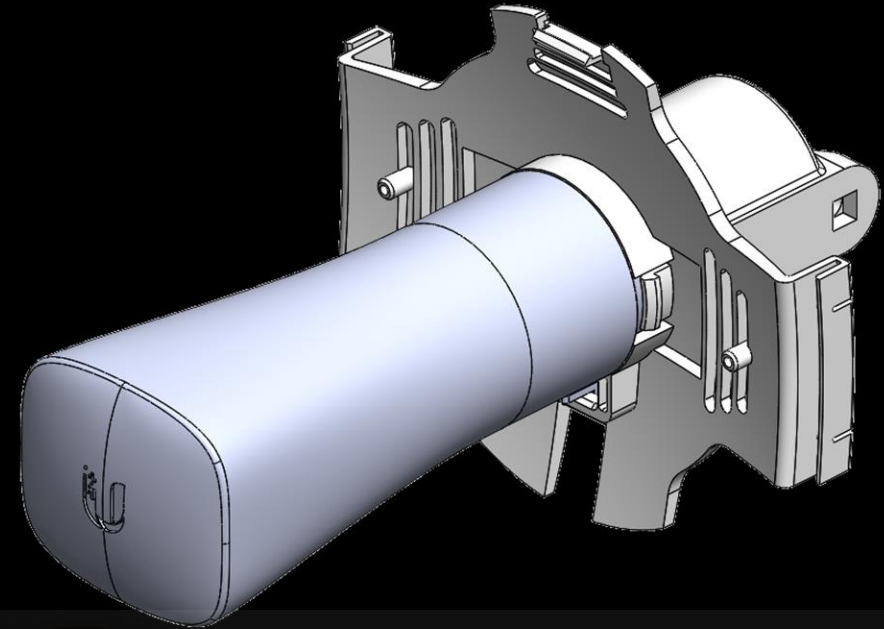
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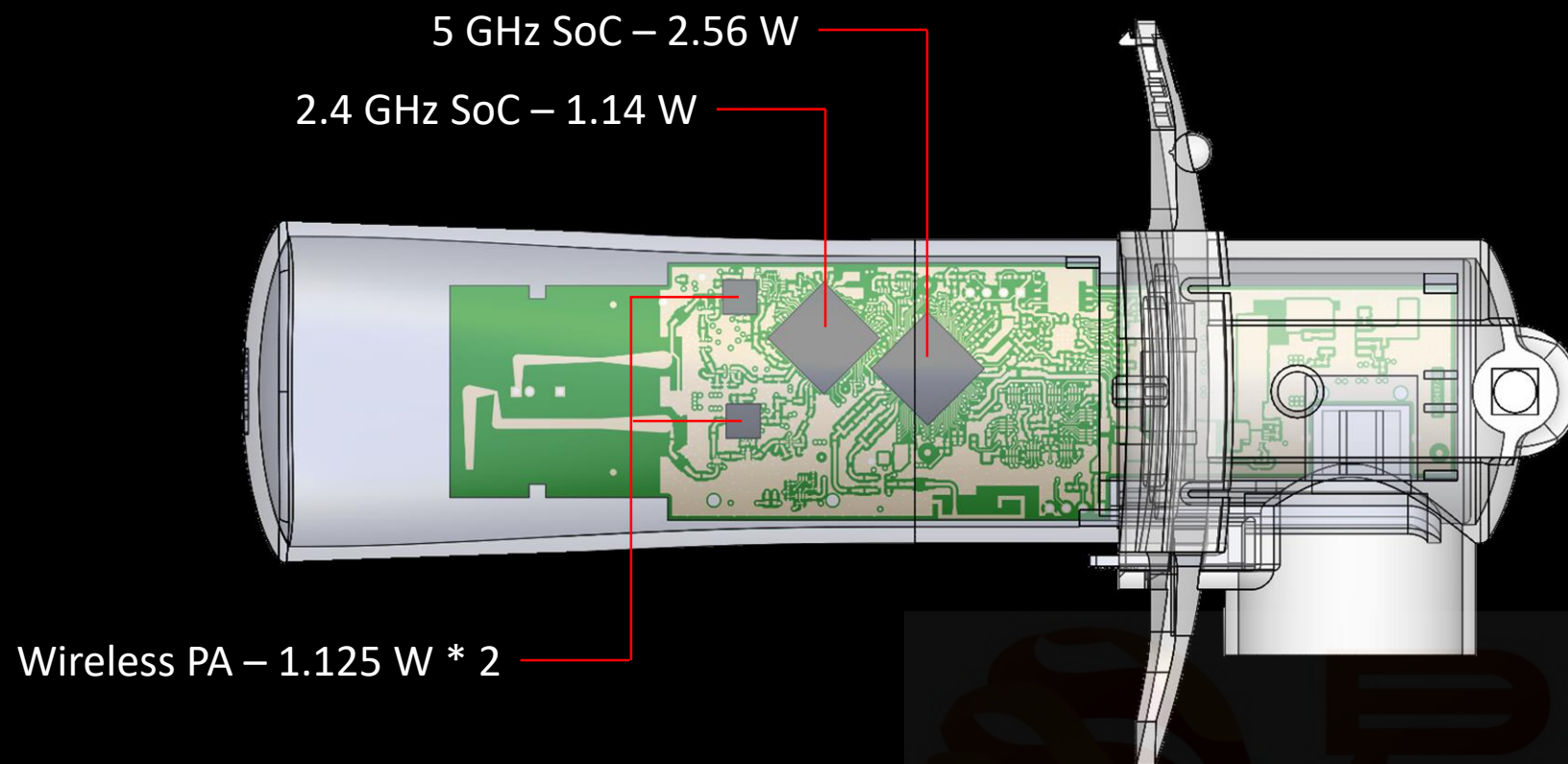
Case Study A



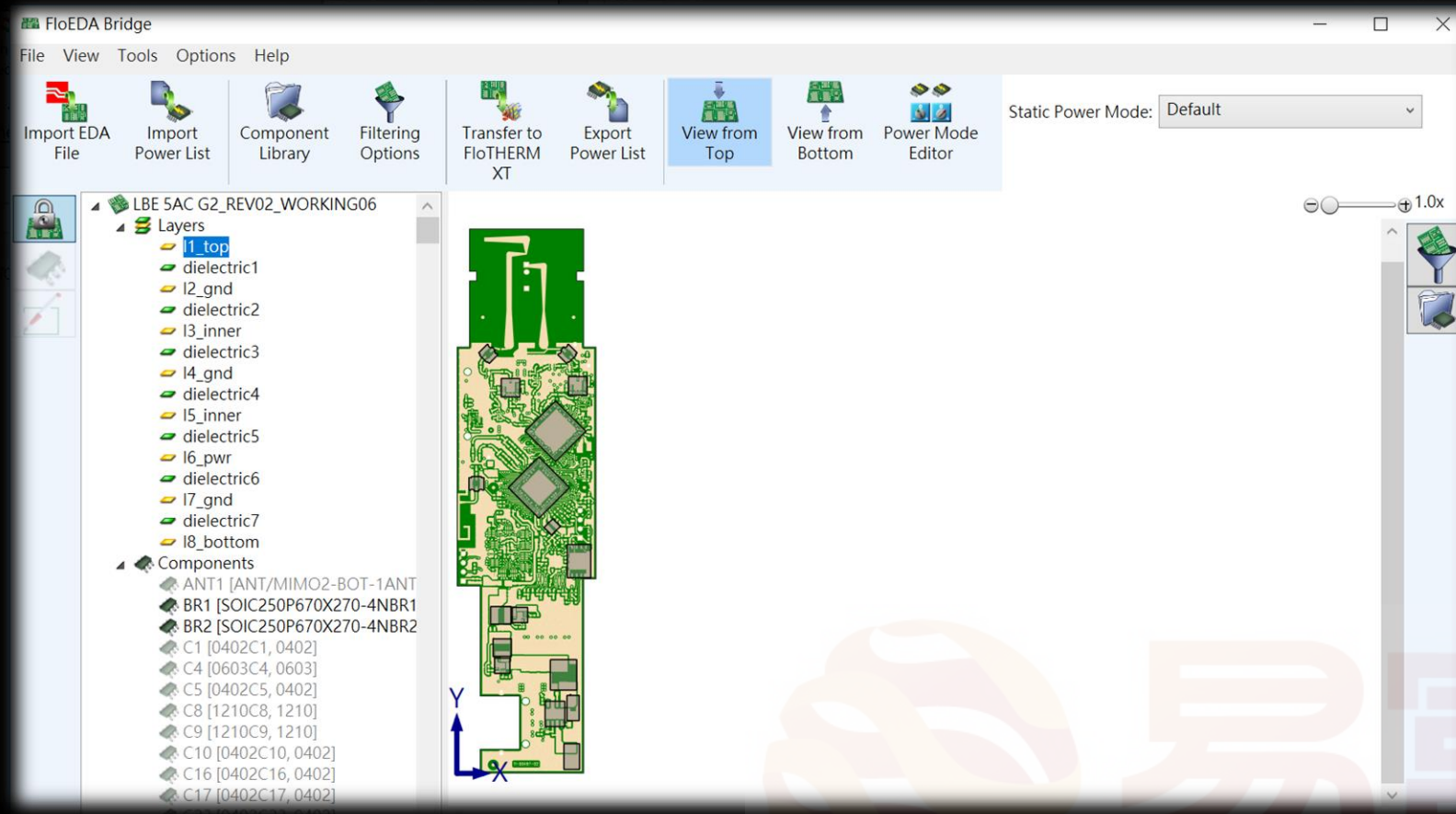
- Fixed outdoor wireless
- Under full load
- Ambient temperature 70° C
- Wind velocity 0 m/s
- Free convection



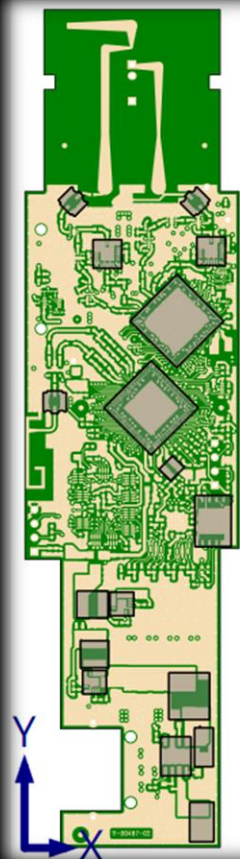
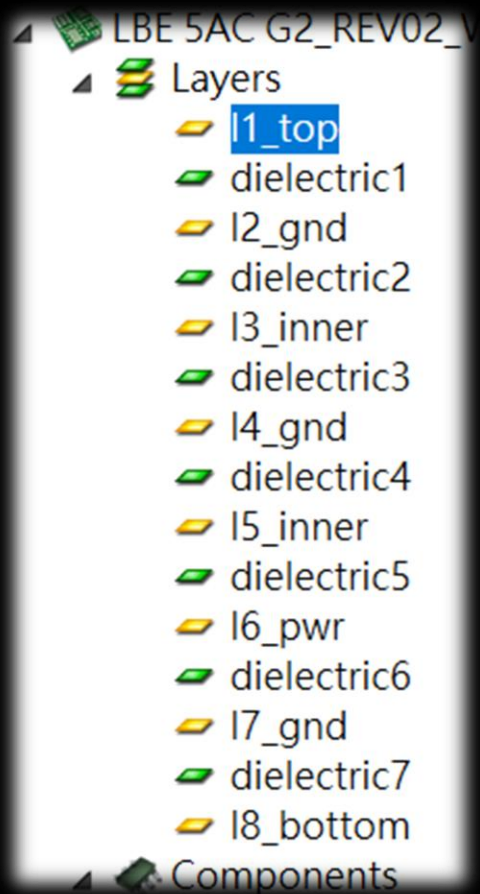
Model



FloEDA Bridge – ODB++



FloEDA Bridge – ODB++



Layer Details

Name l1_top

Thickness 0.50385 Oz

Dielectric Material

FR4

Conductor Details

Conducting Material

Copper

% Cover

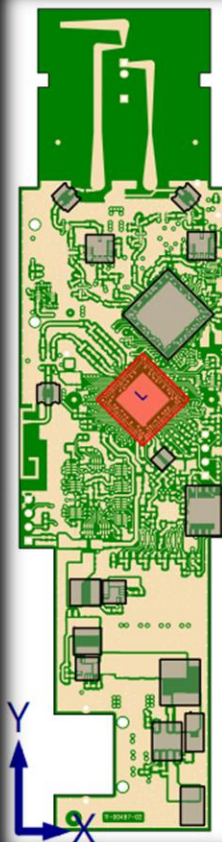
52.06078

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FloEDA Bridge – ODB++



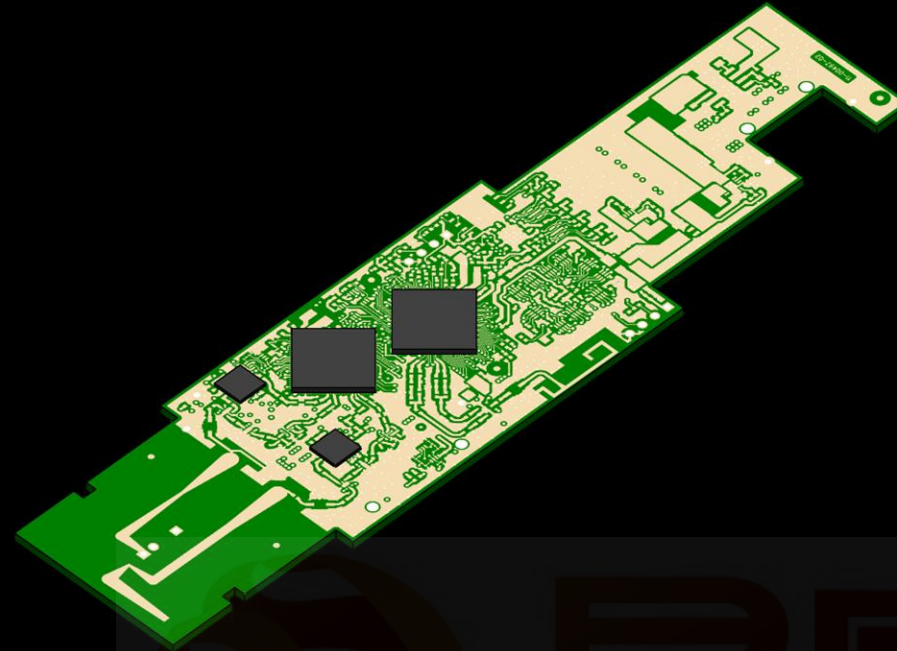
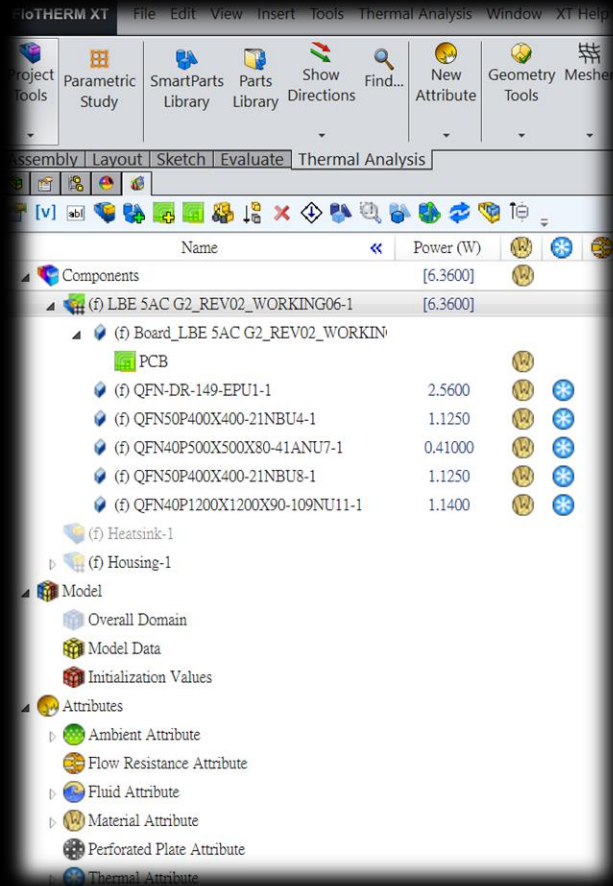
	TP21 [TP1TP21, TP1]
	U1 [QFN-DR-149-EPU1, C
	U4 [QFN50P400X400-21
	U7 [QFN40P500X500X80
	U8 [QFN50P400X400-21
	U11 [QFN40P1200X1200
	U12 [SOIC127P680X239-
	U13 [US8U13, US8]
	U14 [US8U14, US8]
	U15 [US8U15, US8]
	U22 [QFN50P150X150X5
	U23 [SOT65P210X110-5
	U24 [QFN50P150X150X5
	U25 [SOT65P210X110-5
	U27 [SOT65P210X110-5
	U28 [SOT65P210X110-5



Component Details	
Reference Designator	U1
Package Name	QFN-DR-149-EPU1
Part Number	QFN-DR-149-EP
Board side	Top
X Location	22.94738 mm
Y Location	79.92011 mm
Z Offset	0 mm
Rotation	45 deg
Length	12.1206 mm
Width	12.1206 mm
Height	2 mm

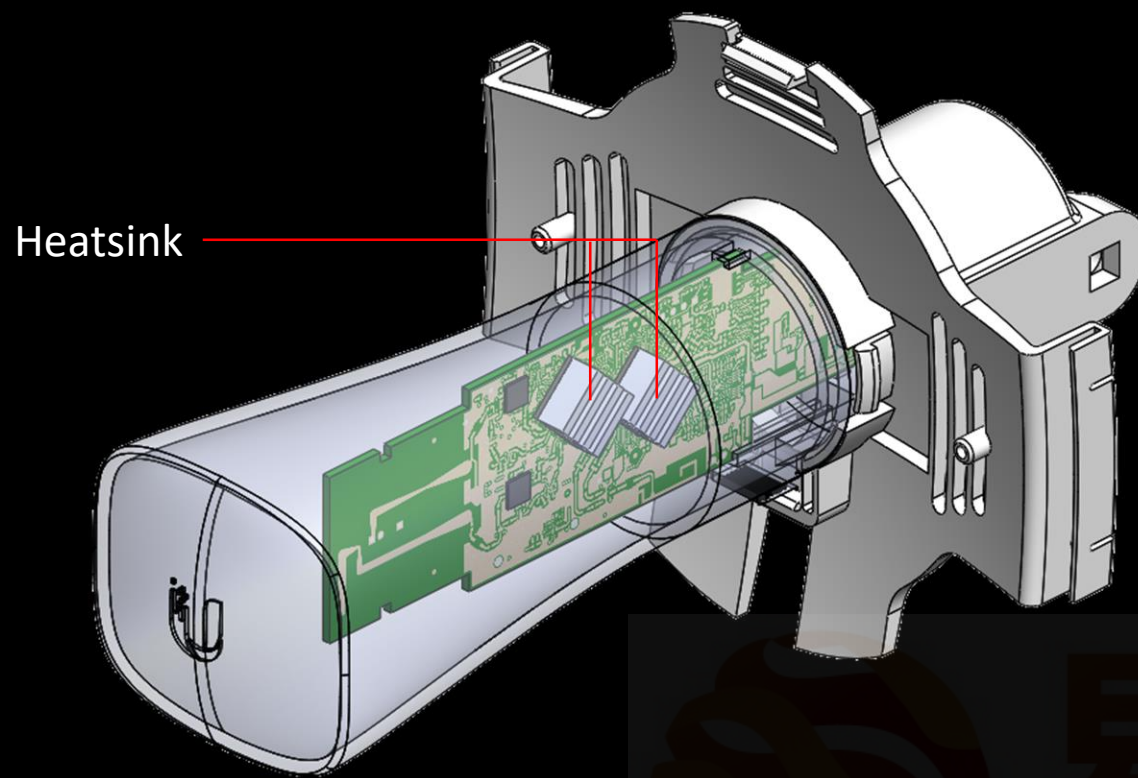
Thermal Details	
Model Type	Simple
Power	0 W
Max. T Junction	90 degC
Max. T Case	75 degC
Material	Typical Plastic Package

FloEDA Bridge – ODB++



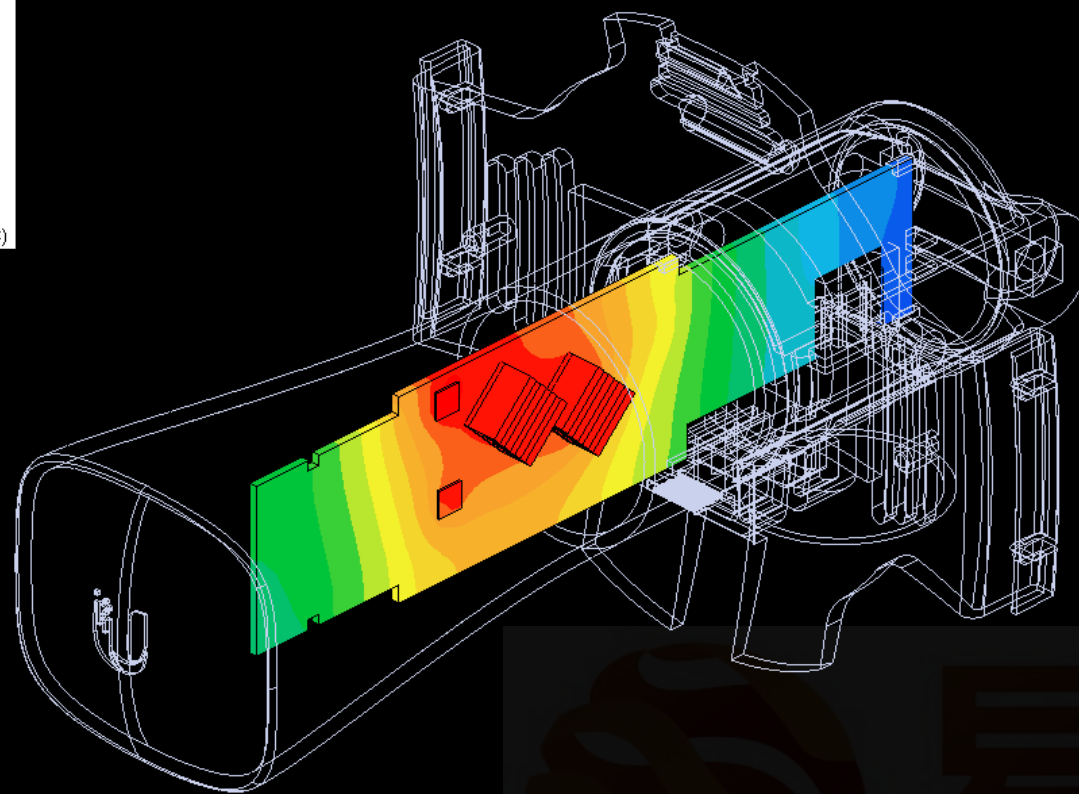
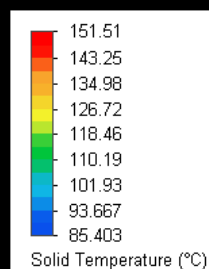
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Preliminary Design



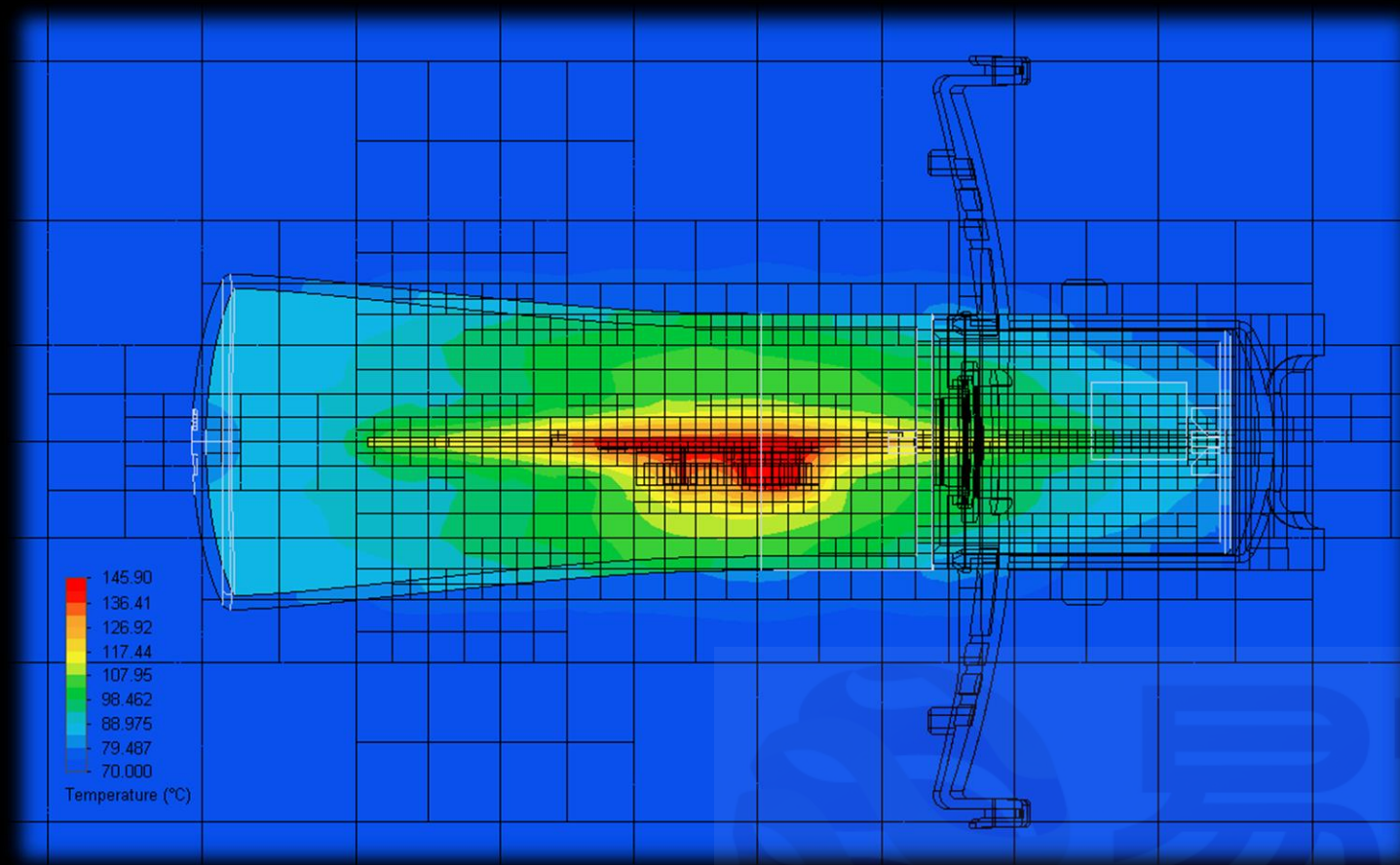
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Preliminary Result



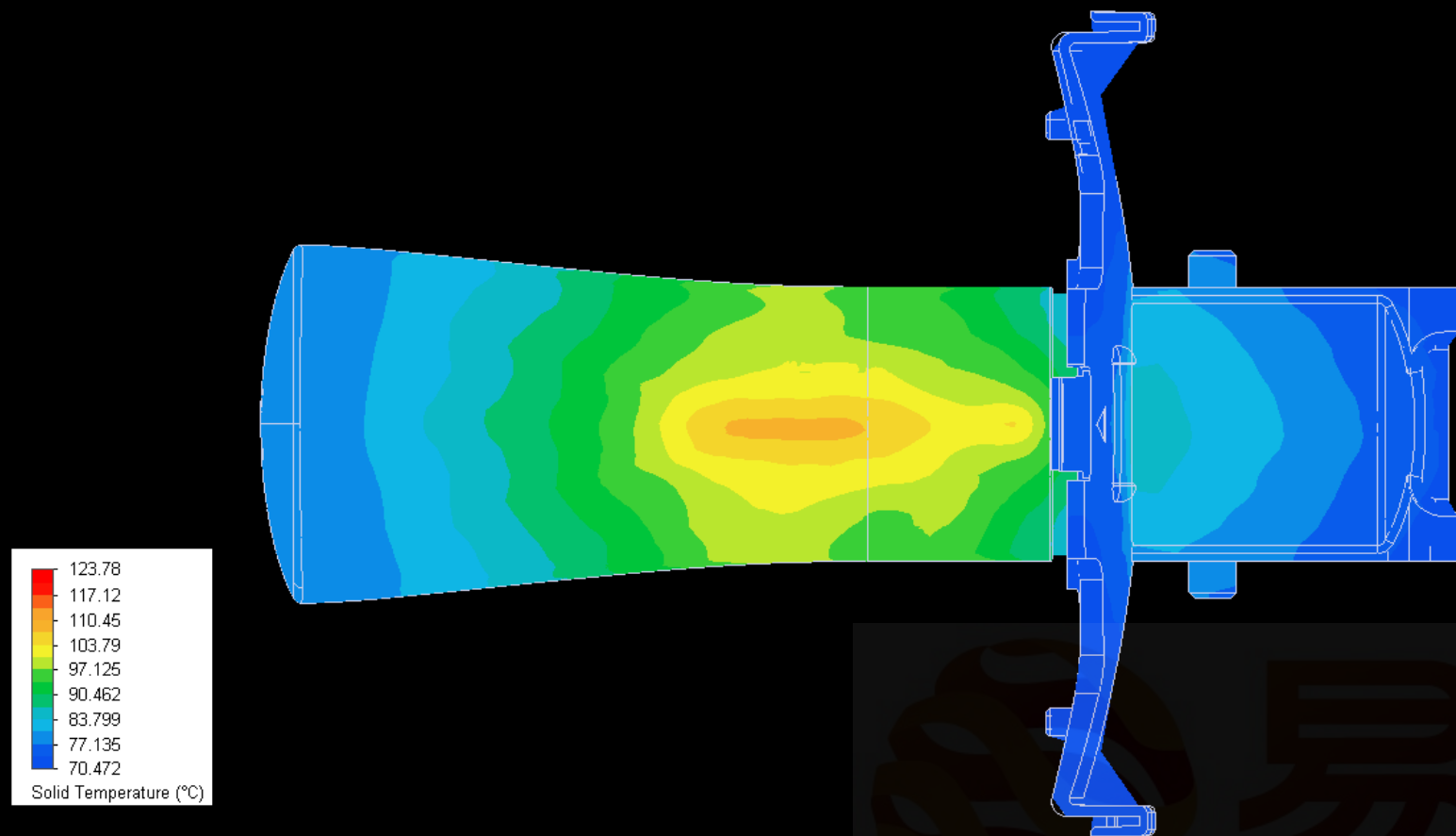
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Preliminary Result

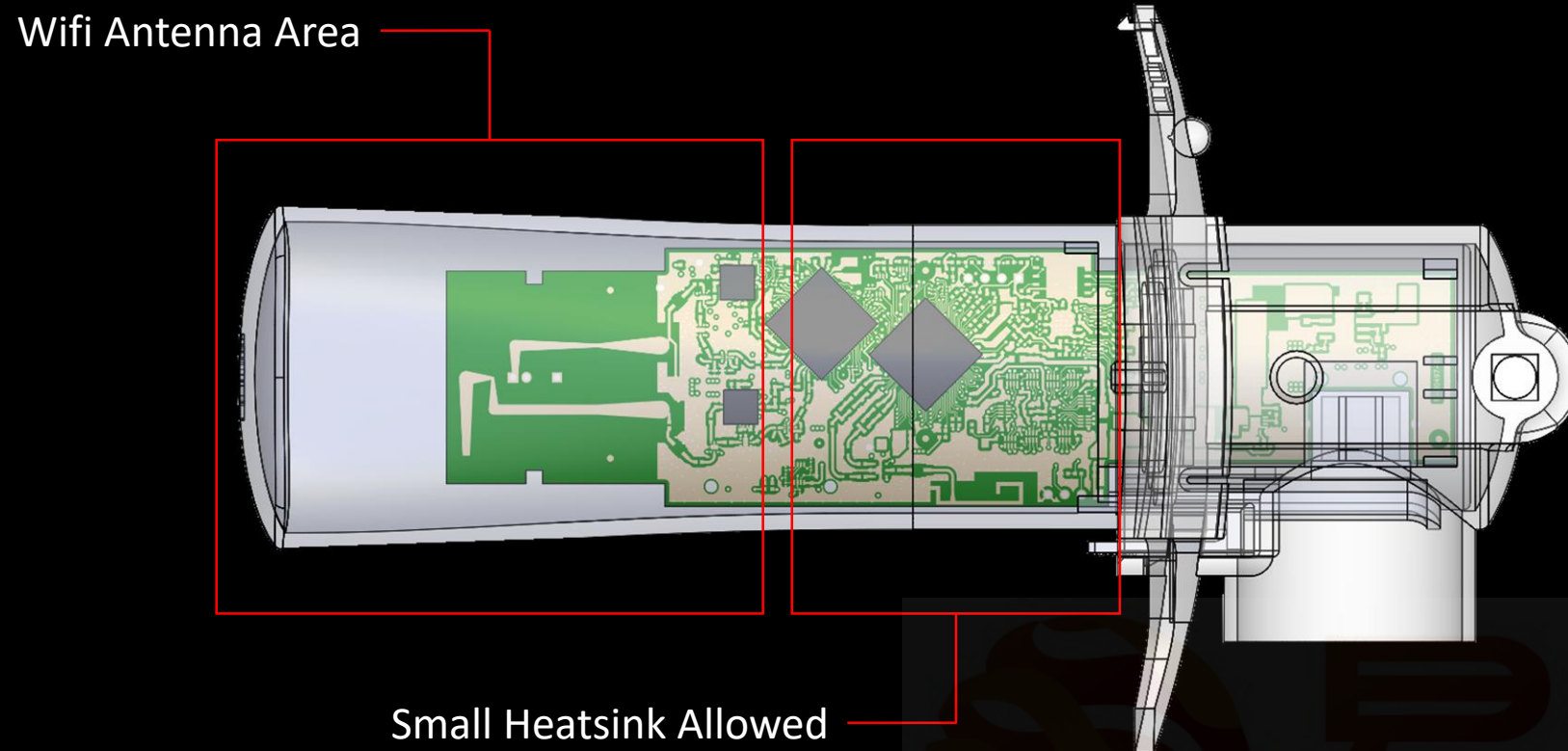


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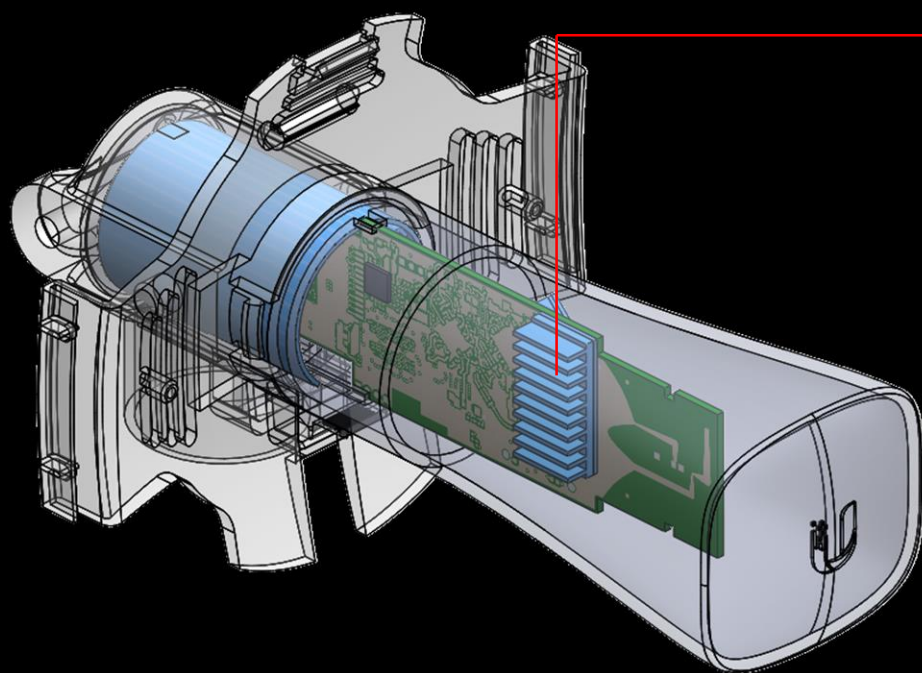
Preliminary Result



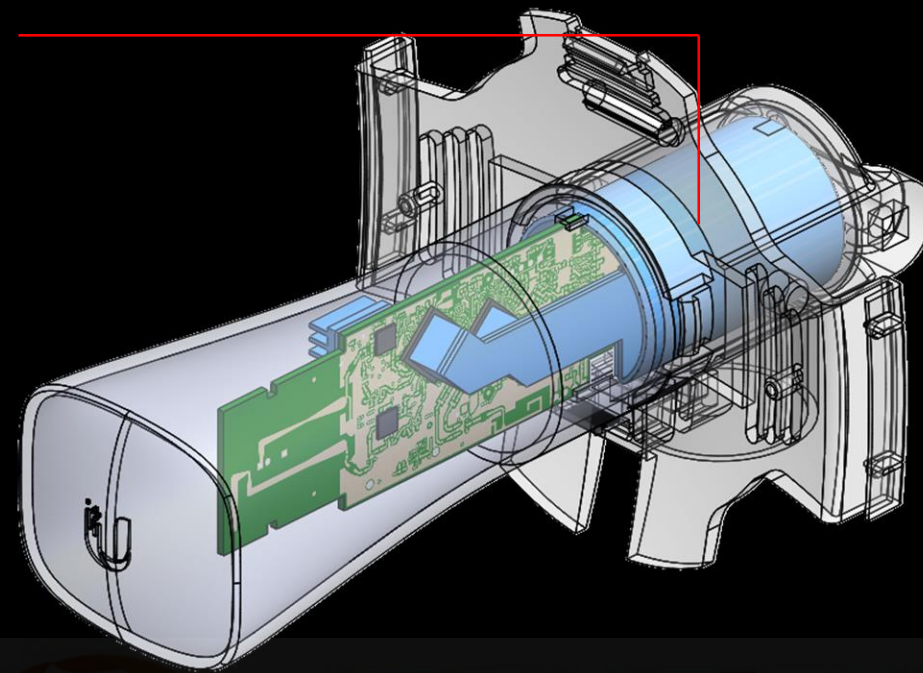
Design Limitation



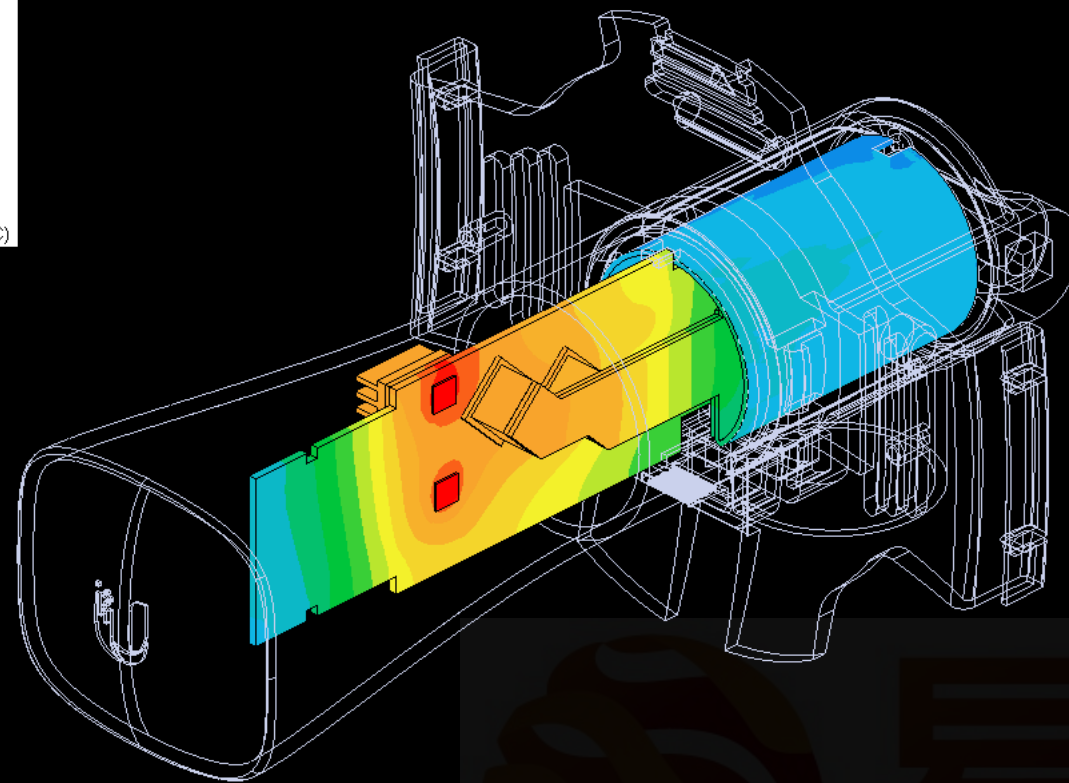
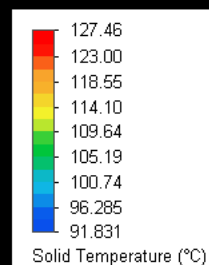
Improved Design



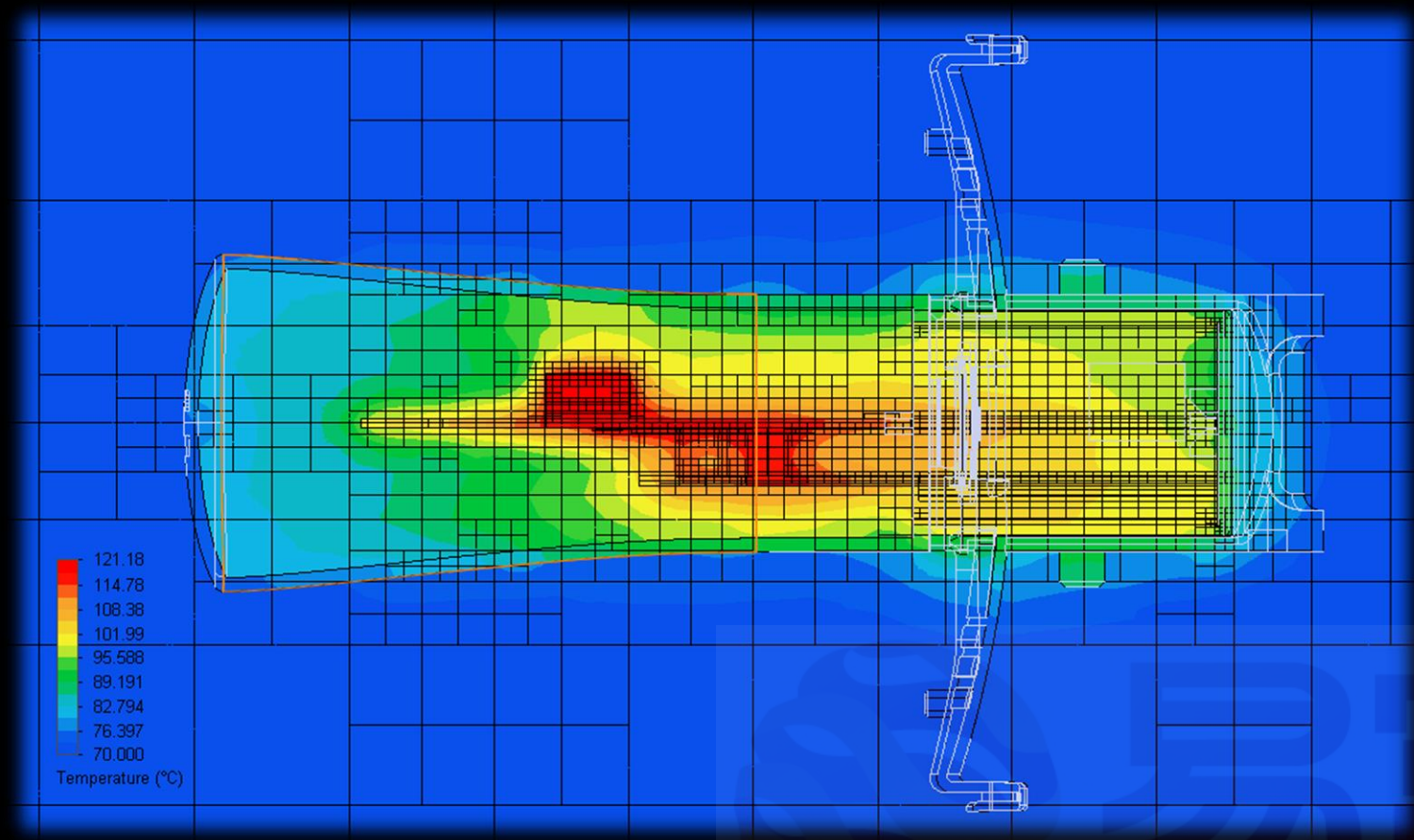
Heatsink



Improved Result

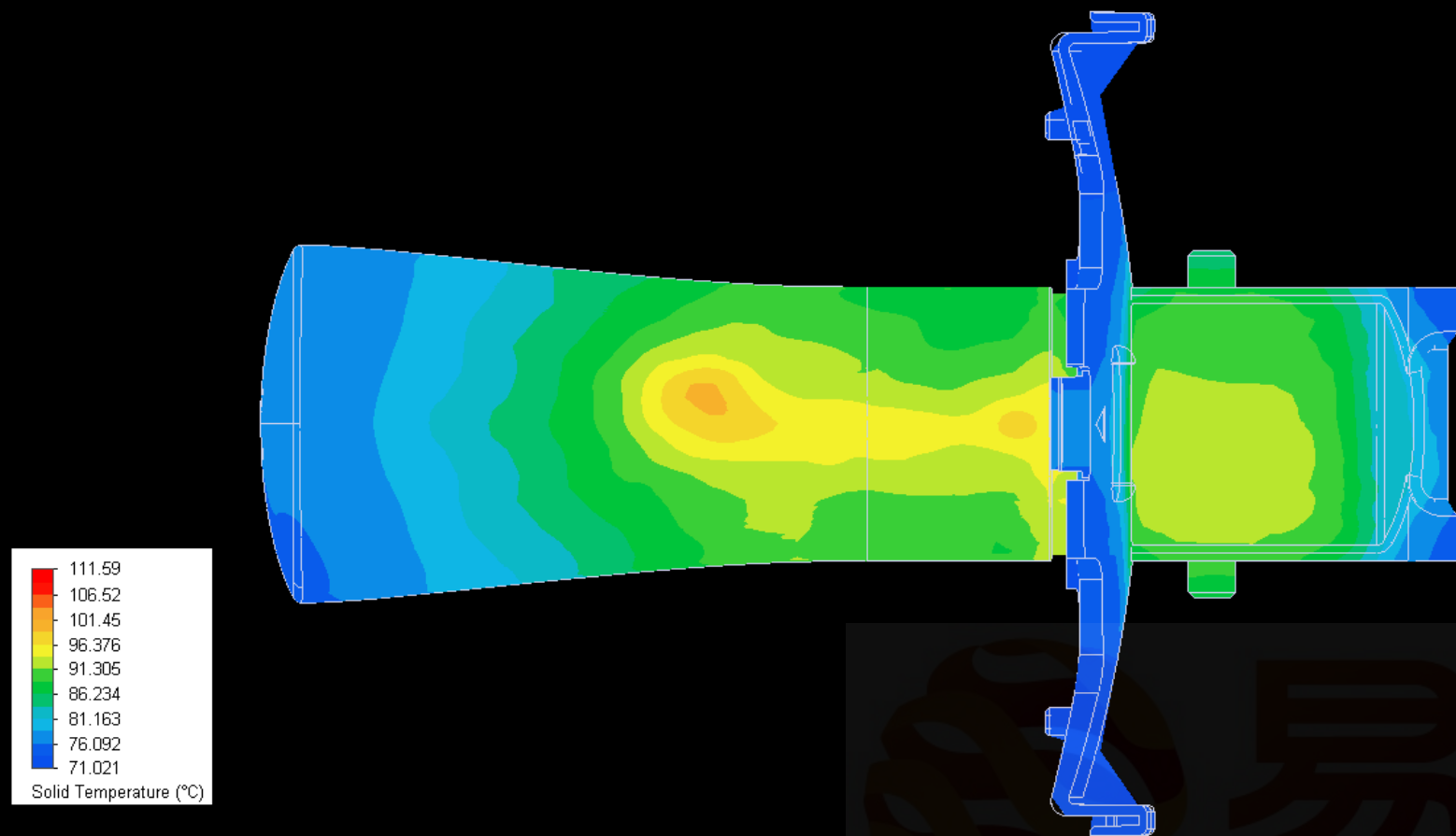


Improved Result



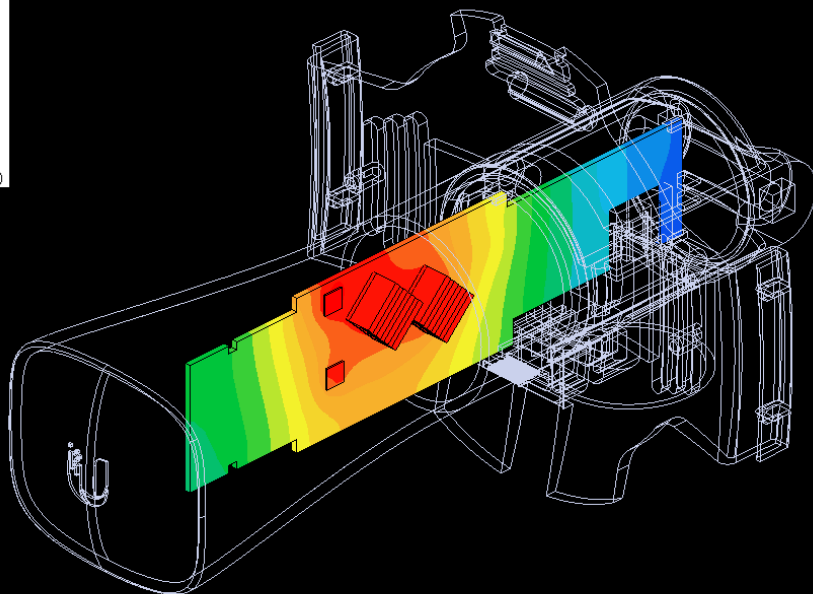
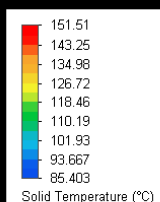
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Improved Result

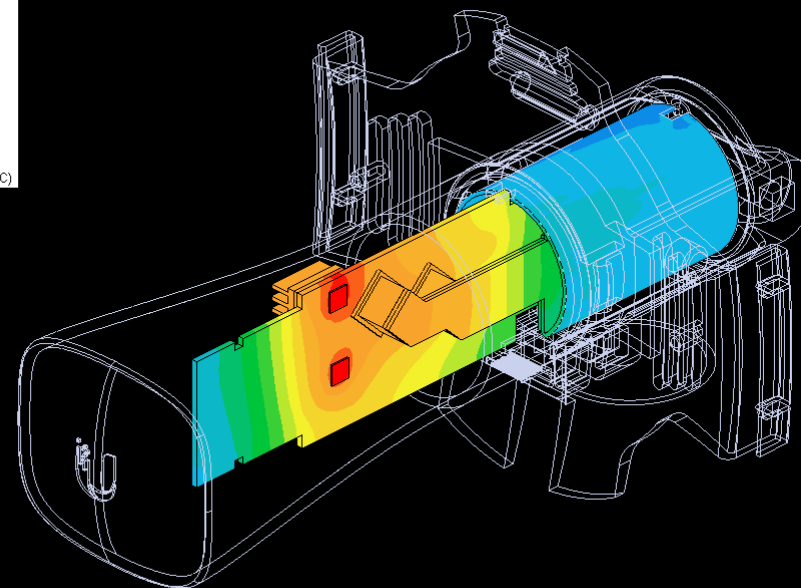
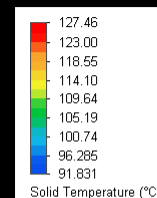


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Comparison

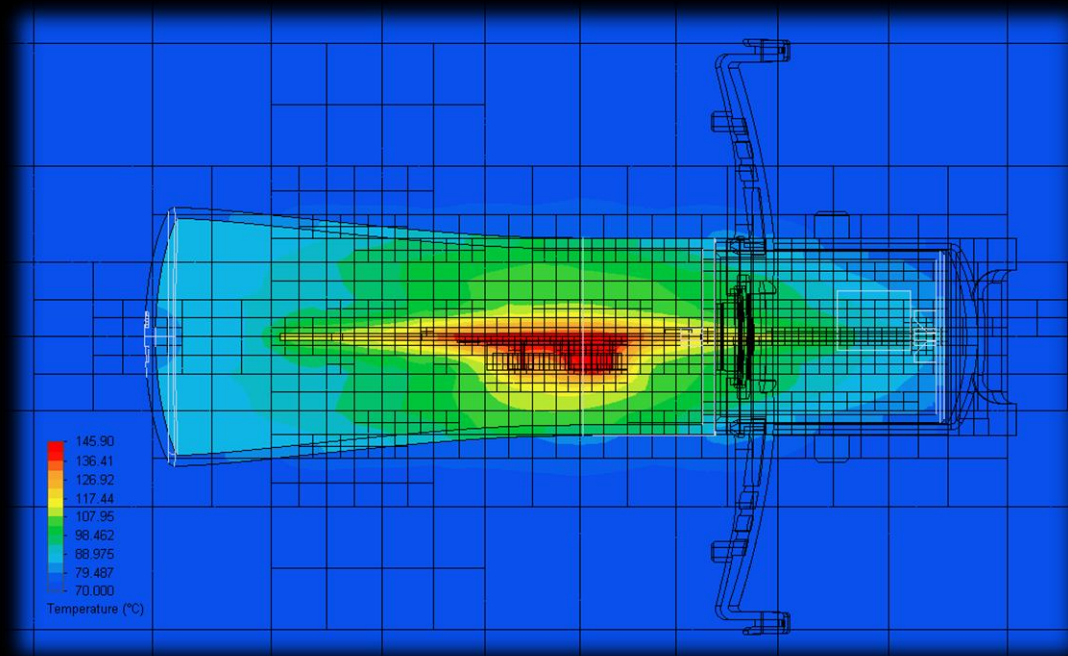


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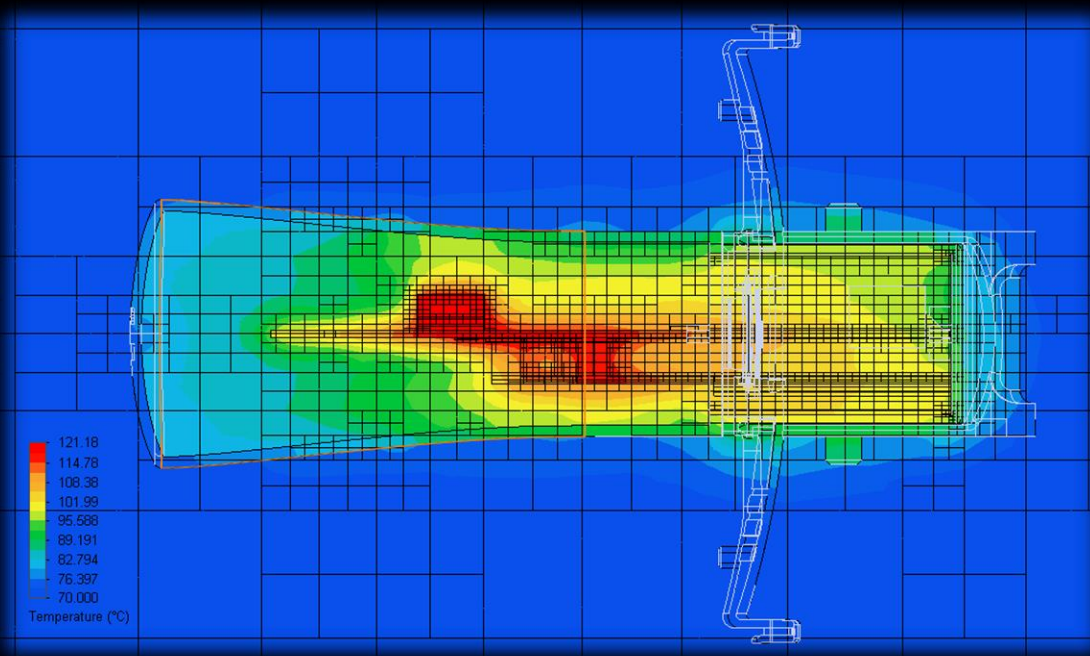


Improved

Comparison



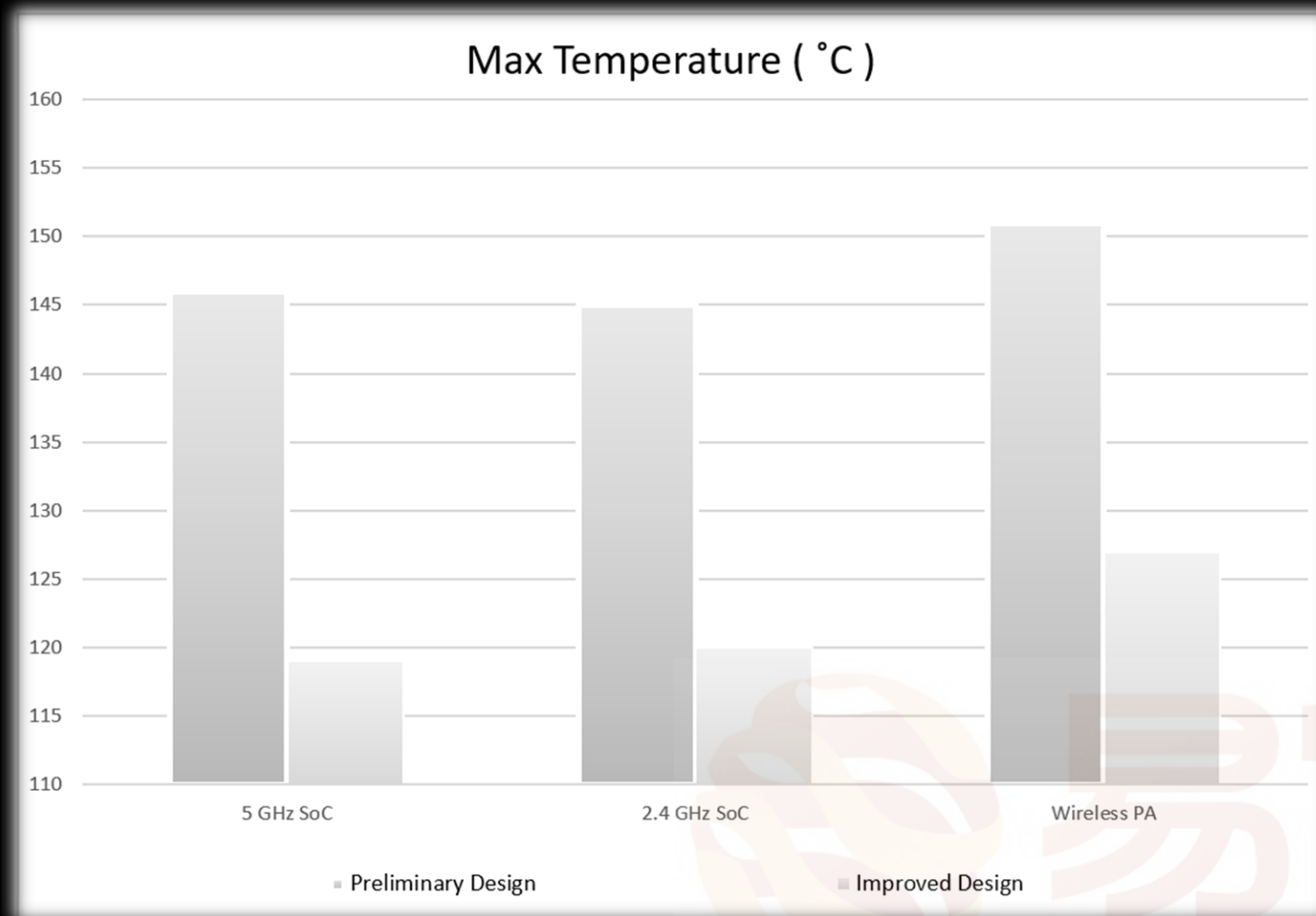
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Improved



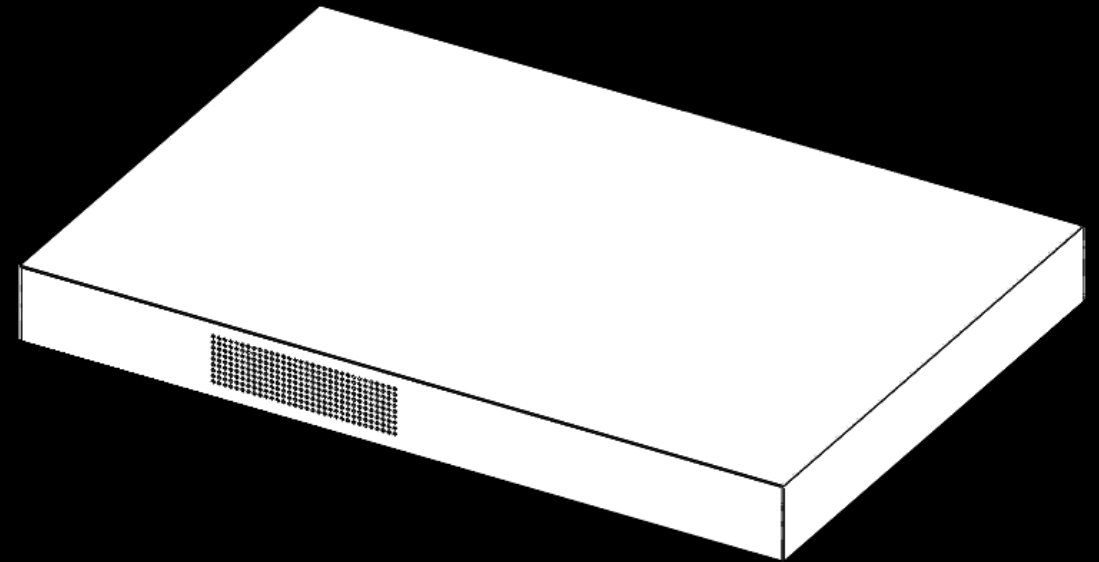
Comparison



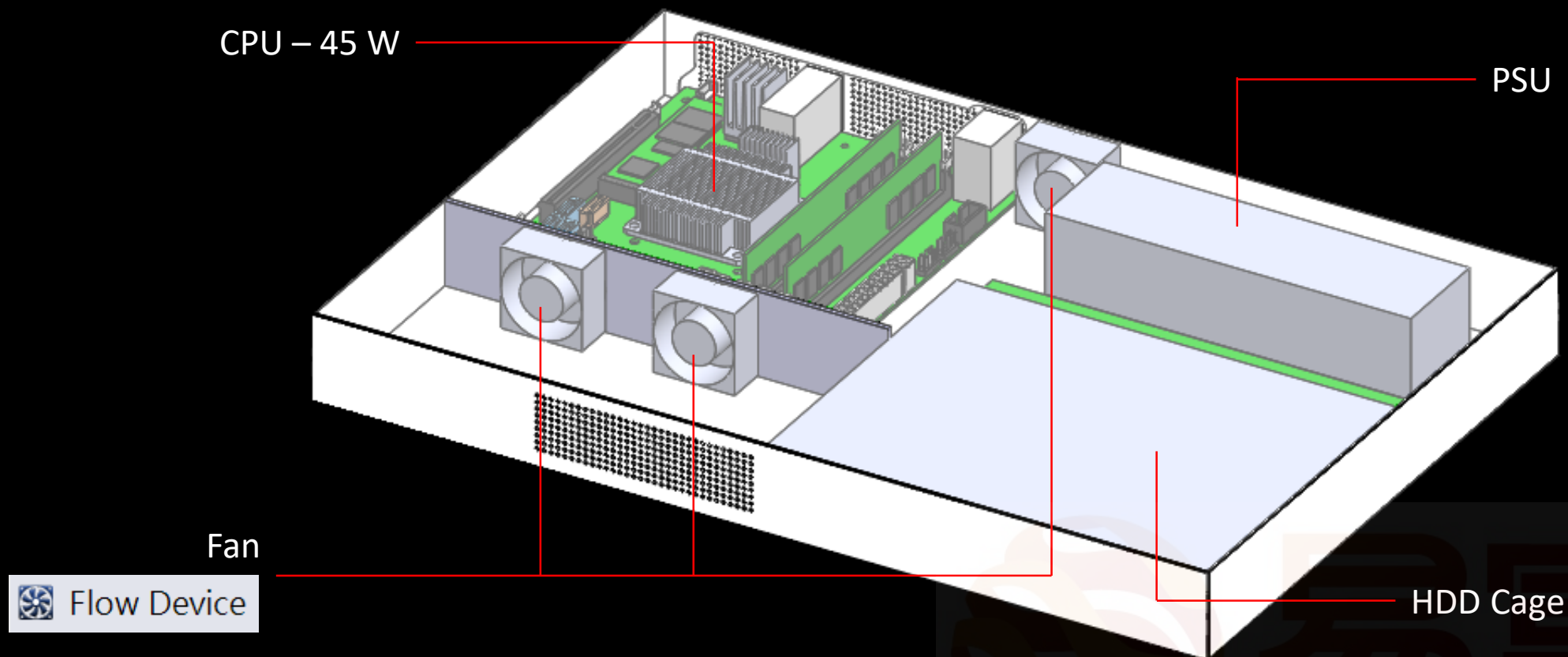
Case Study B



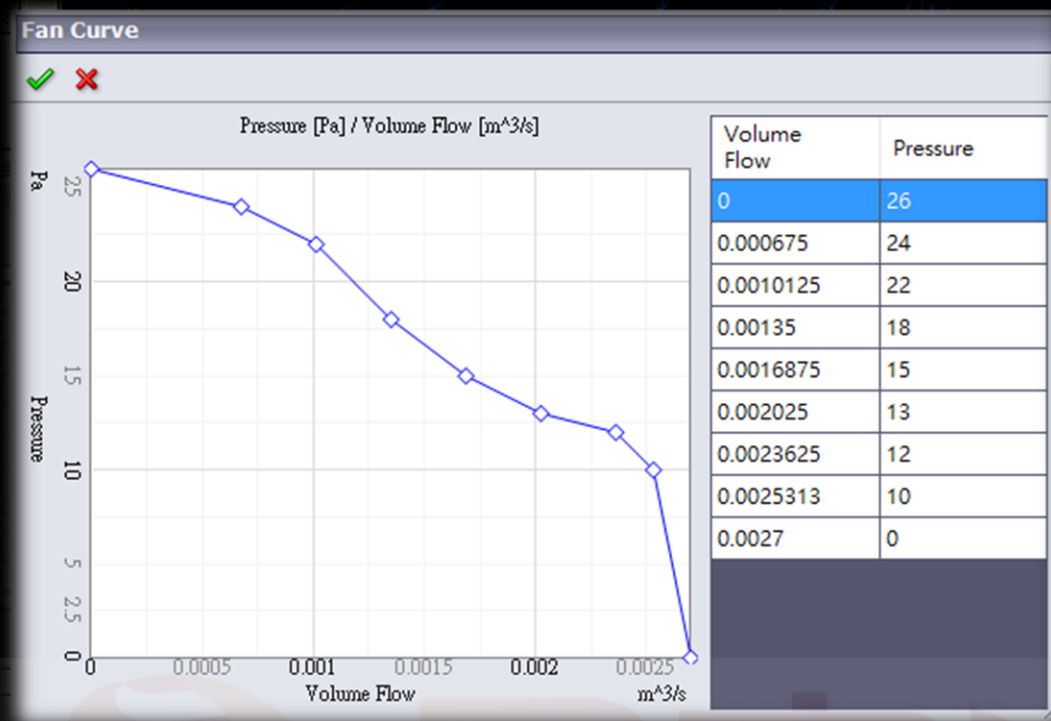
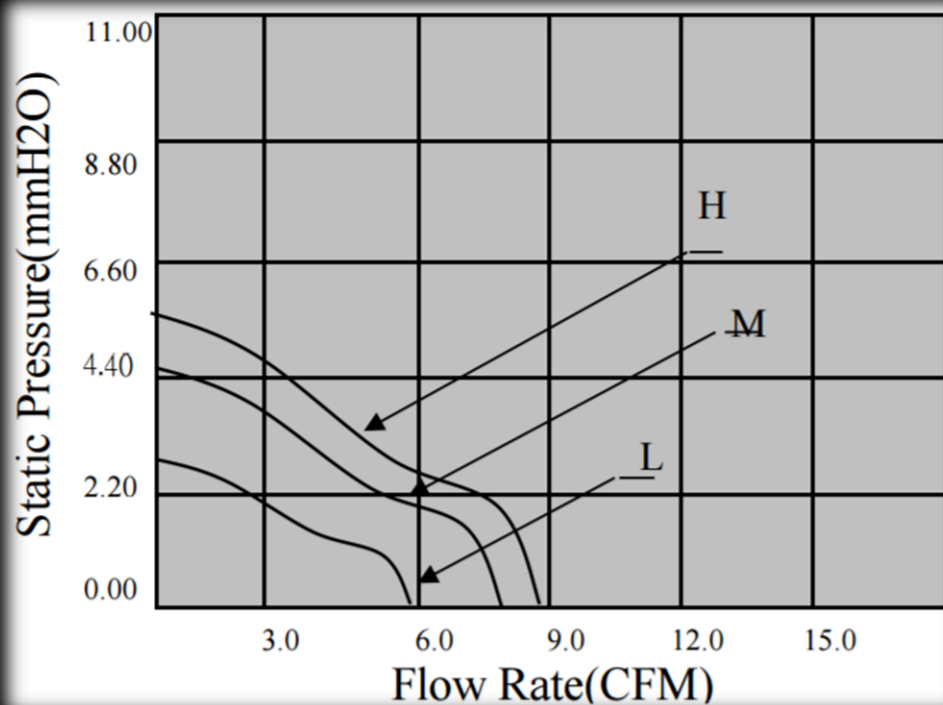
- 1U rack server system
- Under full load
- Ambient temperature 35° C
- Wind velocity 0 m/s
- Forced convection



Model




Fan P-Q Curve
















SmartParts



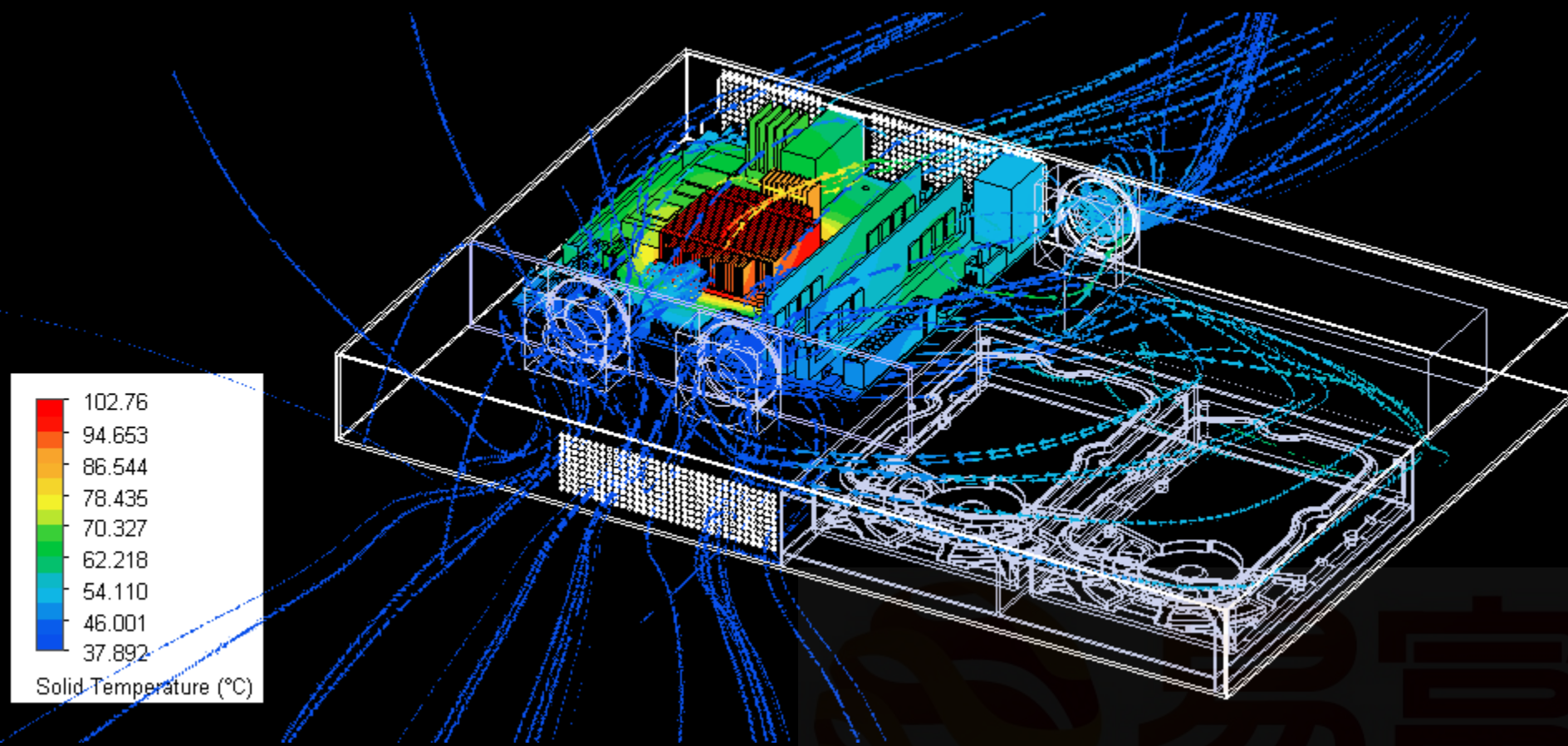
Geometric

-  Cuboid
-  Cylinder
-  Enclosure
-  Fan
-  Heat Sink - Circ InLine
-  Heat Sink - Circ Staggered
-  Heat Sink - Plate Fin
-  Heat Sink - Rect InLine
-  Heat Sink - Rect Staggered
-  Prism
-  Region
-  Thermo Electric Cooler

Non-Geometric

-  Contact Resistance
-  Electrical Condition
-  External Wall
-  Fixed Flow
-  Flow Device
-  Fluid Subdomain
-  Heat Pipe
-  Network Assembly
-  PCB
-  Planar Thermal Source
-  Pressure
-  Radiation Surfaces
-  Surface Exchange

Preliminary Result

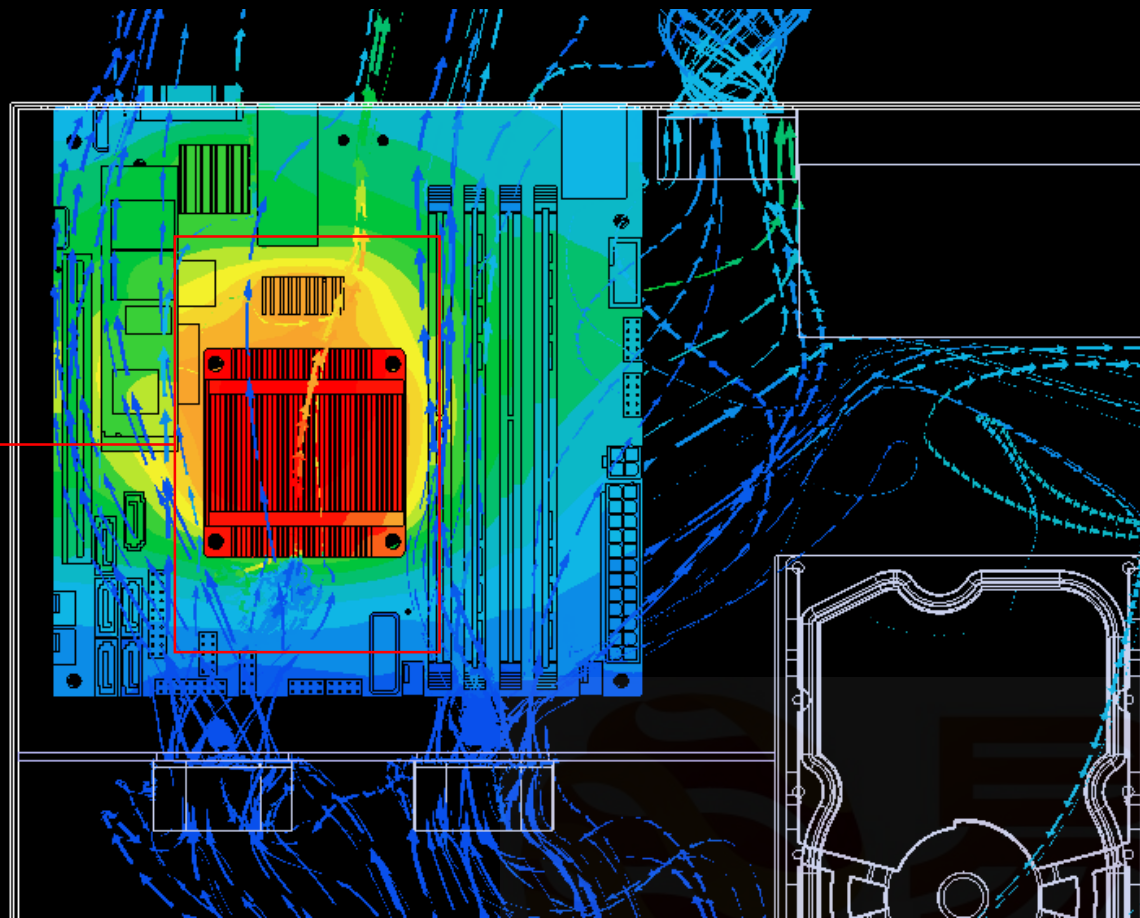


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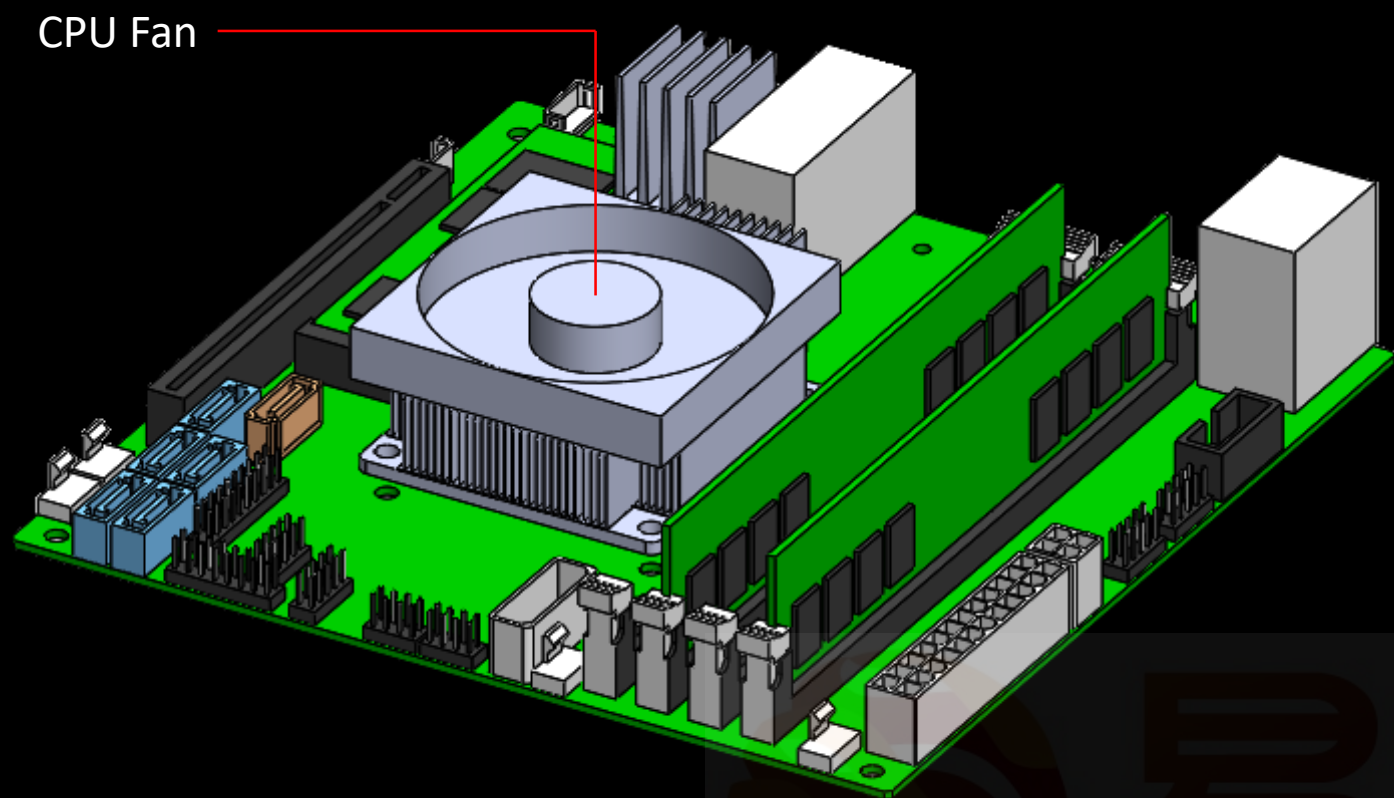
Preliminary Result



High Flow Resistance

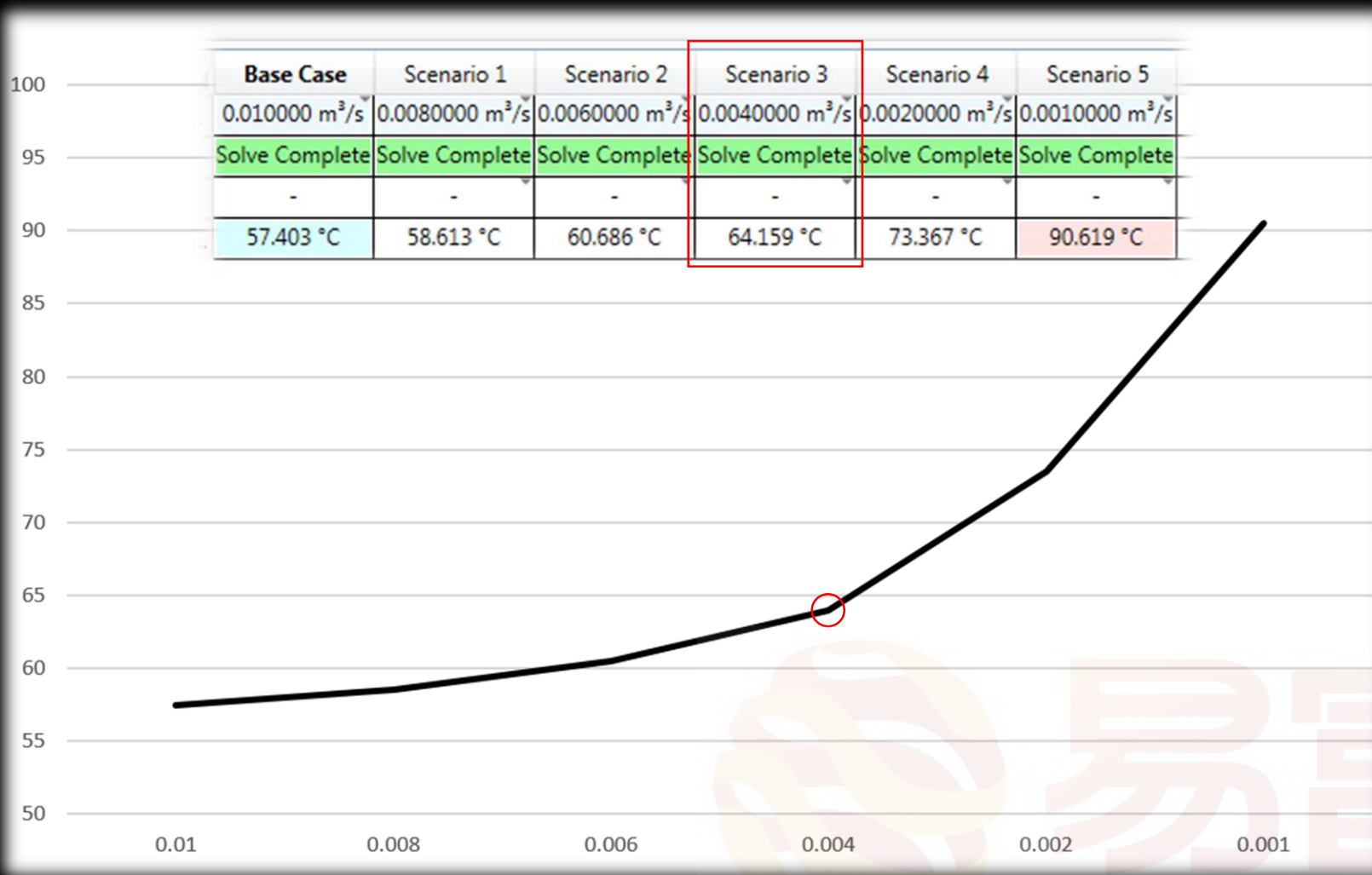


Improved Design

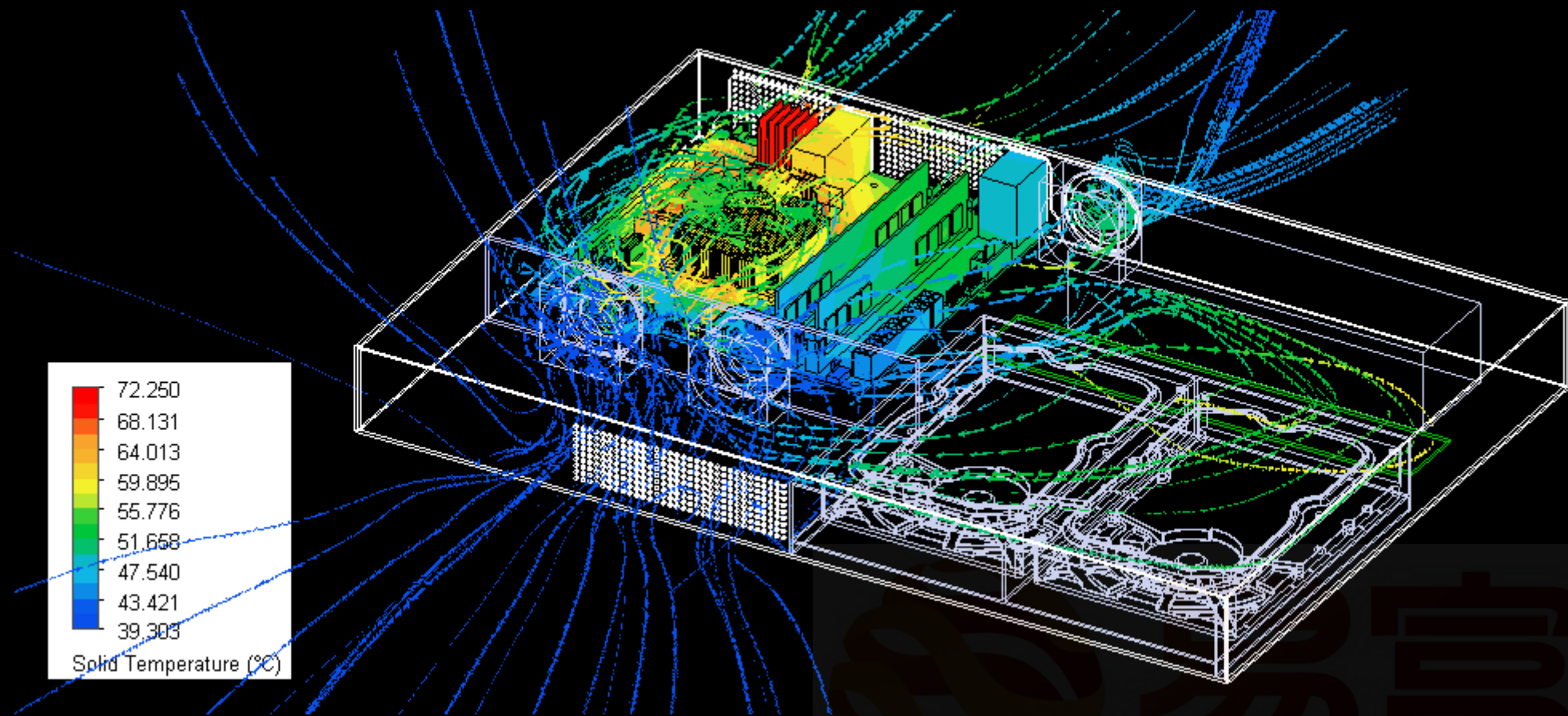


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Parametric Study

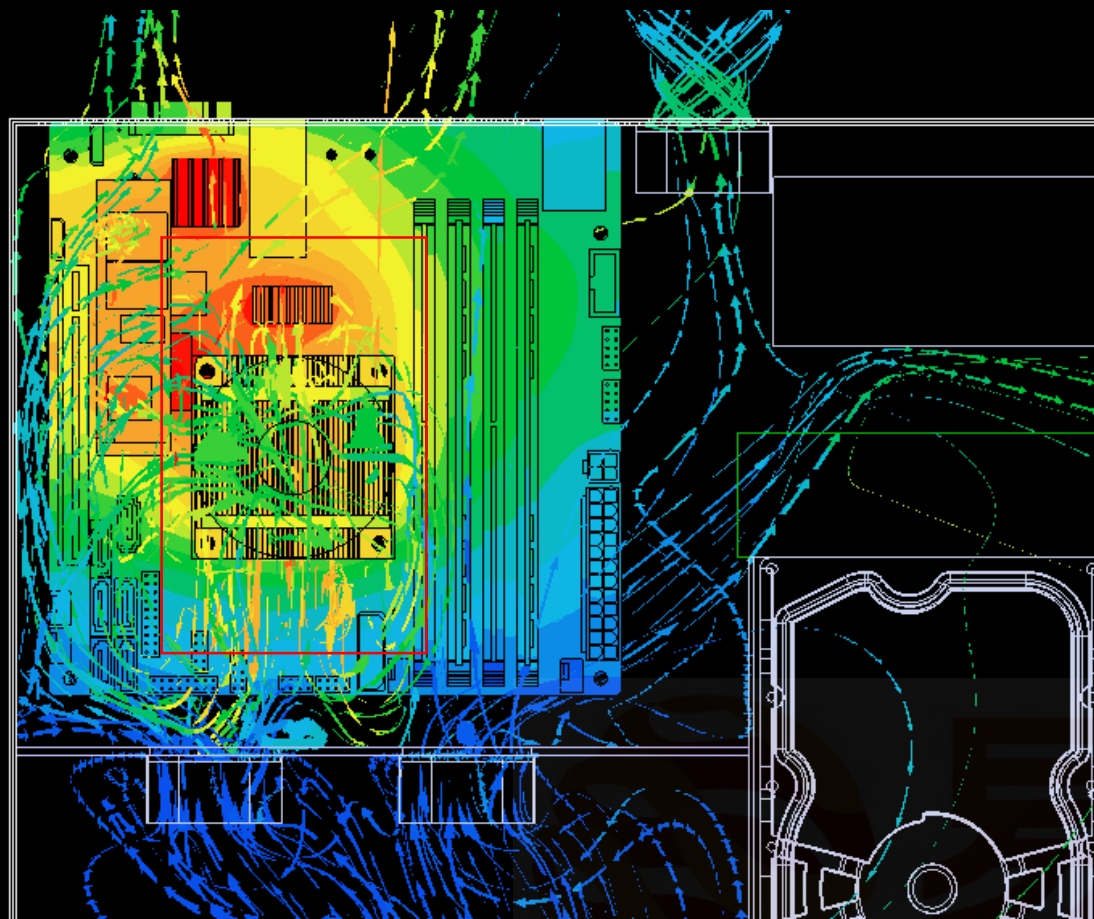


Improved Result

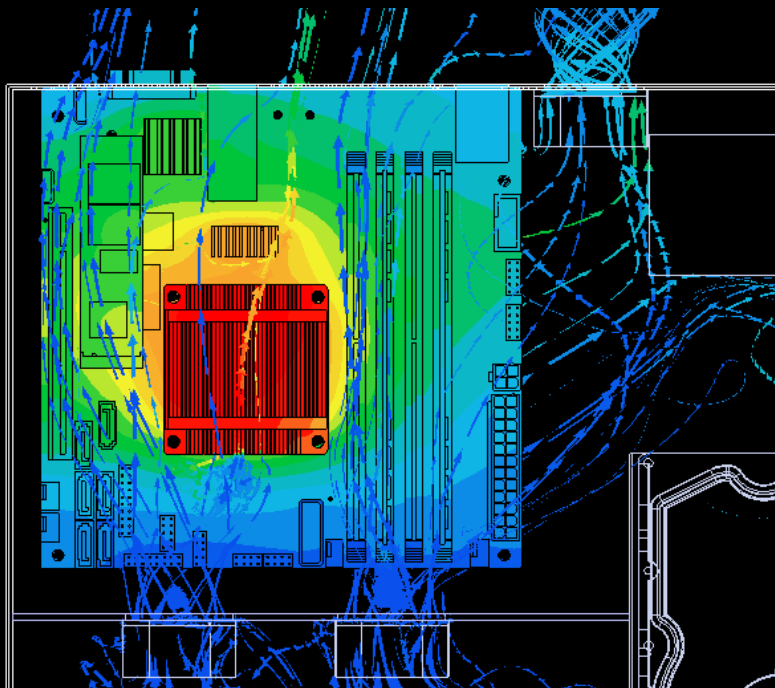


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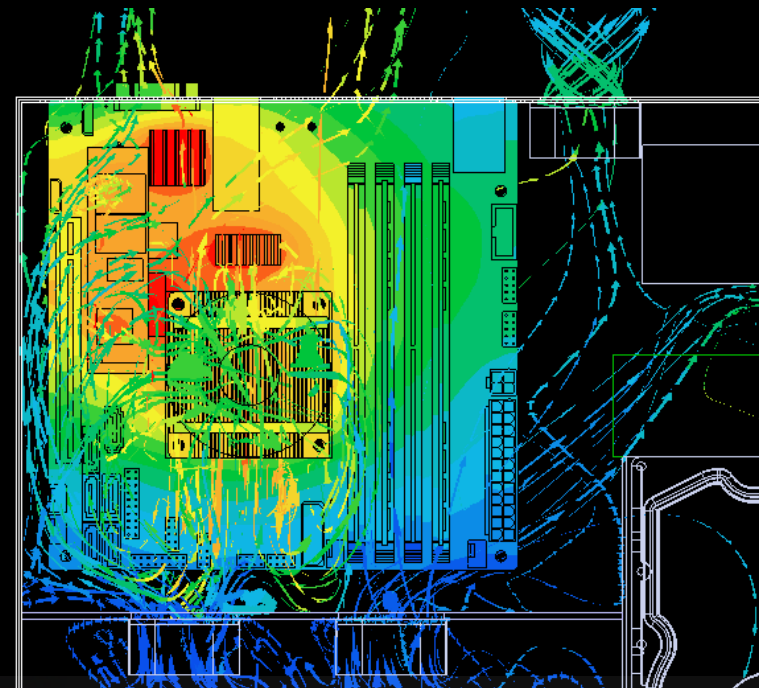
Improved Result



Comparison



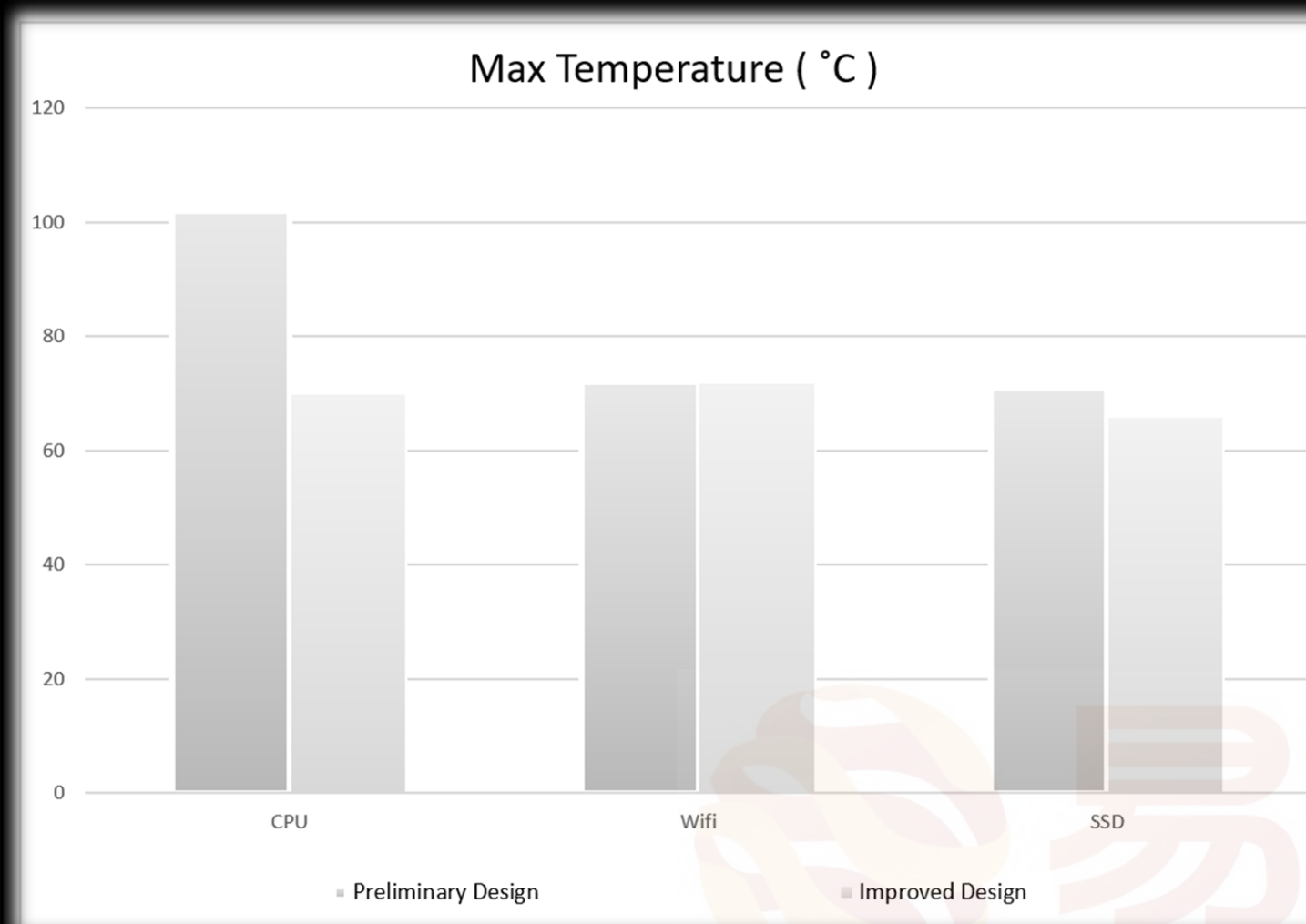
Preliminary



Improved



Comparison



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Why Choose FloTHERM XT



- CAD-centric user interface
- Geometric and non-geometric SmartParts
- Components library
- Powerful mesher and solver
- Advanced FloEDA bridge
- Parametric studies for optimized designs



q u e s t i o n & a n s w e r



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thank you



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