



Quectel

Bambu Lab / PT230 Antenna Debugging Report

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Revision History



Revision	Date	Reporter	Reviewer	Note
V1.0	2024/07/09	Jialin.chen	Leo.Hu	Simulative debugging
V1.1	2024/07/17	Jialin.chen	Leo.Hu	Update single antenna passive test data (290mm line length)
V1.2	2024/08/26	Jialin.chen	Leo.Hu	Update machine condition test data (290mm line length)
V1.3	2024/09/02	Jialin.chen	Leo.Hu	Update machine condition test data (440mm line length)
V1.4	2026/01/23	Jialin.chen	Tony.Dai	Update the antenna gain data(440mm line length)



Project Overview

Antenna Performance Evaluation and Debugging
Conclusion and Suggestion

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Project Overview



Prototype Schematic

- Mainboard Dimensions: 136mm*43mm
- Antenna Quantity: 1
- Antenna OC: Y0RRS0CA0AA
- Network Standard and Frequency Band:
 - ✓ WIFI: 2400-2500MHz&5150-5850MHz
- Module Model: FCS452



Project Overview

Antenna Performance Evaluation and Debugging

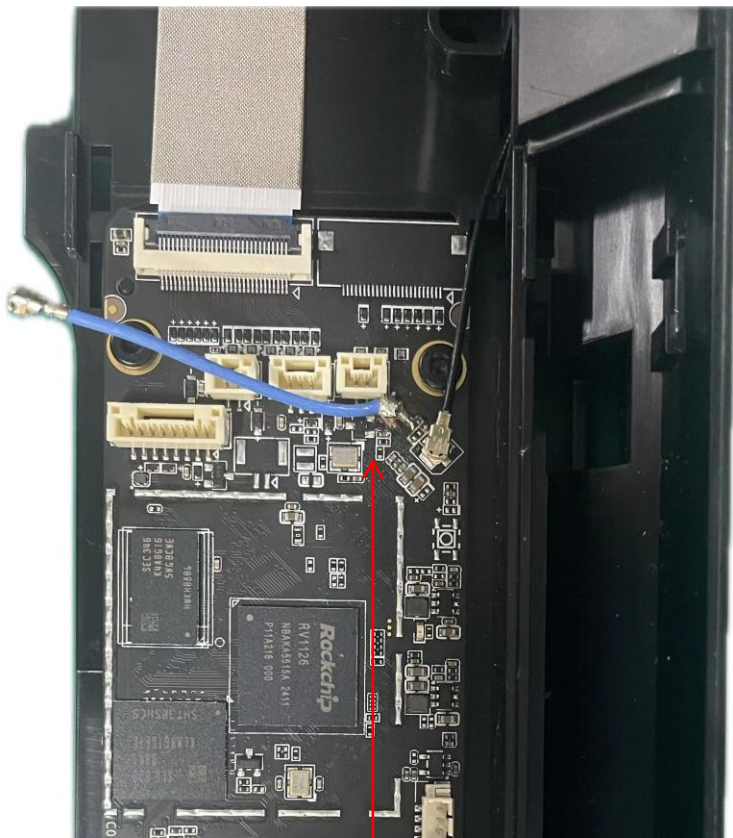
Conclusion and Suggestion

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Antenna Placement Analysis



Antenna fixture



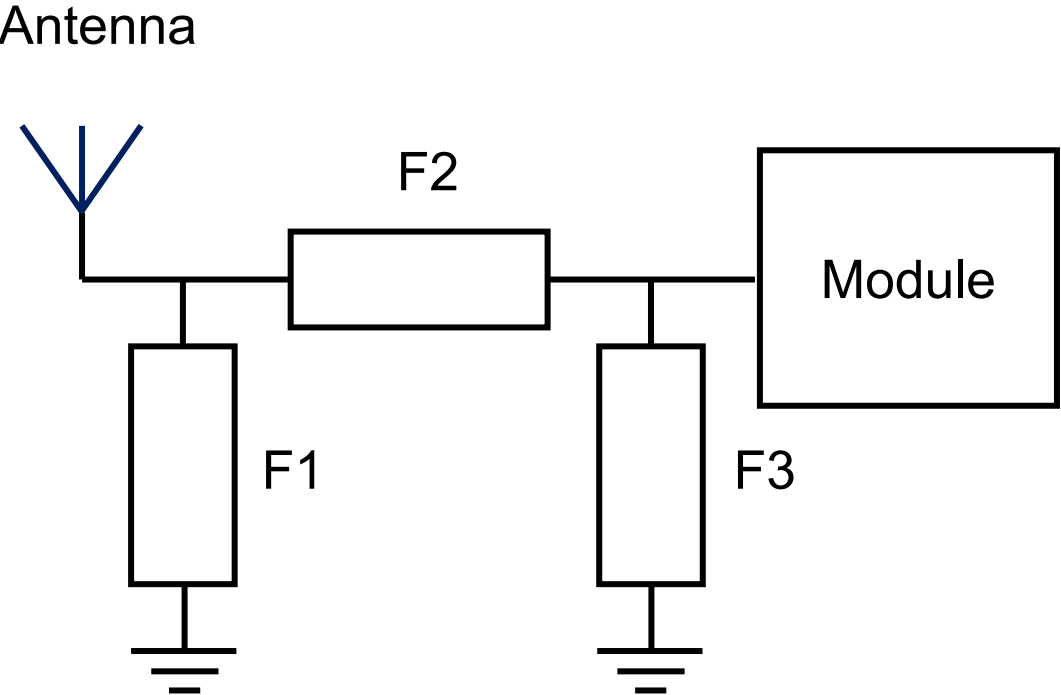
Antenna

Antenna matching network



- Matching network

- Value:



No.	L/C
F1	NA
F2	0Ω
F3	NA

Active Test (OTA)

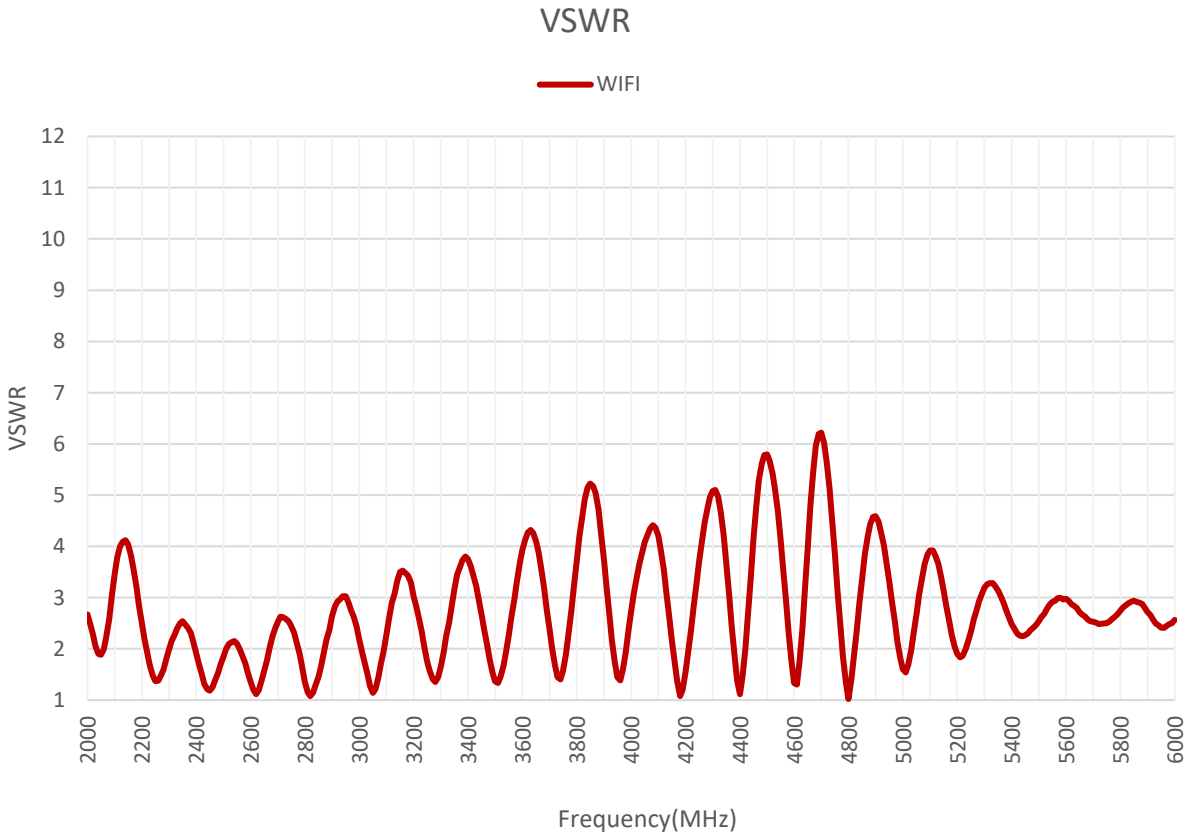


			Light up the screen		Close the screen
Band	Channel	Frequency	TRP (440mm)	Band	TIS (440mm)
B_1M	1	2412	15.34	B_11M	-87.24
	6	2437	15.49		-87.51
	13	2472	14.7		-86.69
A_6M	36	5180	15.62	A_54M	-74.62
	100	5500	15.09		-74.95
	165	5805	13.07		-74.55
G_6M	1	2412	15.27	G_54M	-76.17
	6	2437	15.33		-75.84
	13	2472	14.98		-74.32
N_MCS0	1	2412	15.18	N_MCS7	-71.23
	6	2437	14.36		-71.49
	13	2472	14.2		-70.02
N_MCS0	36	5180	16.89	N_MCS7	-69.88
	100	5500	17.03		-70.17
	165	5825	16.94		-70.52

Passive Test

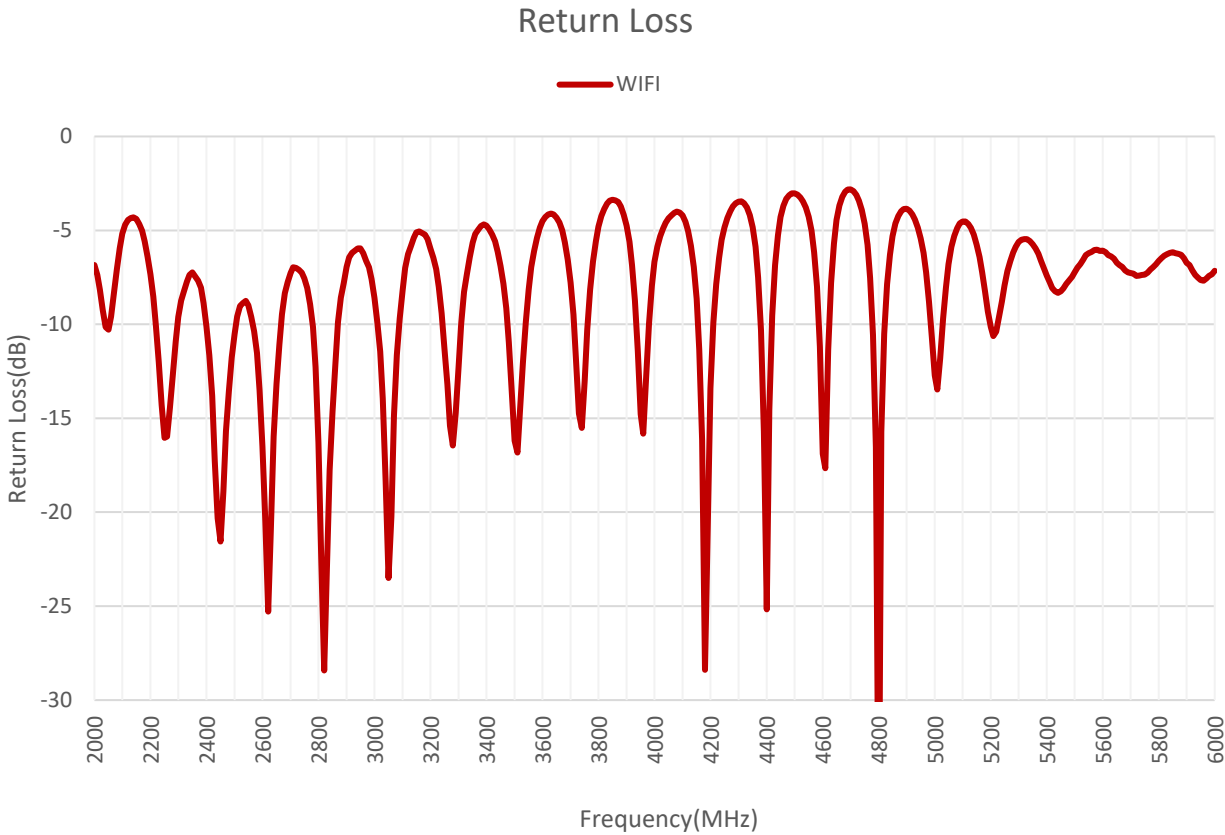


- VSWR



Frequency(MHz)	2400	2450	2500	5150	5500	5850
VSWR	1.9	1.2	1.8	3.1	2.5	2.9

- Return Loss

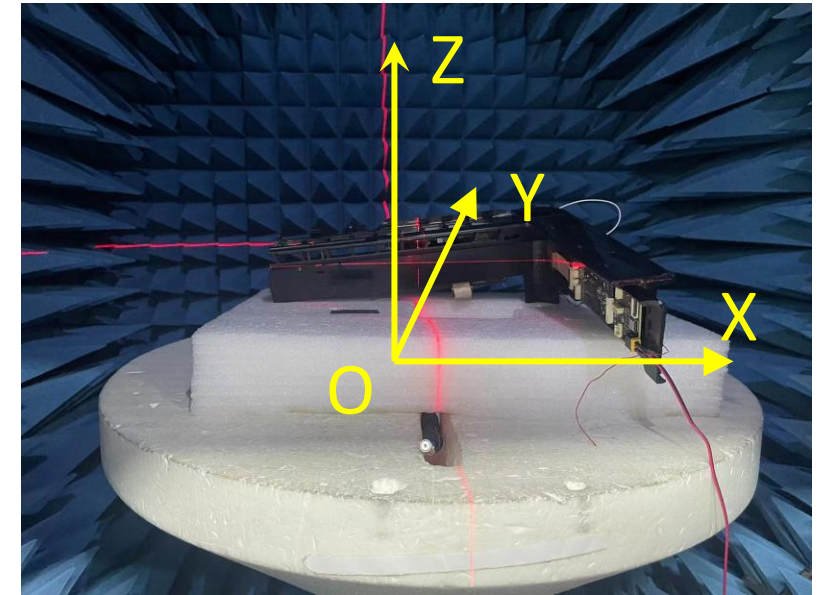
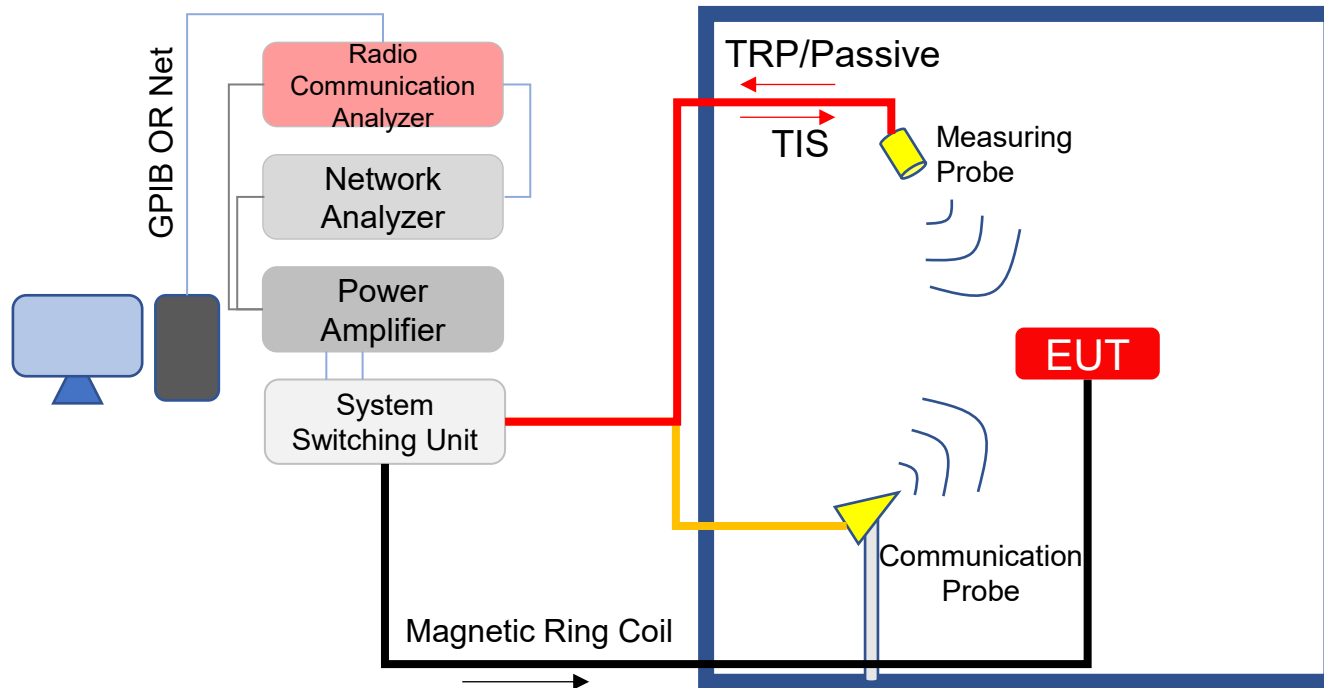


Frequency(MHz)	2400	2450	2500	5150	5500	5850
Return Loss(dB)	-10.1	-21.6	-10.5	-5.8	-7.2	-6.2

Antenna Test

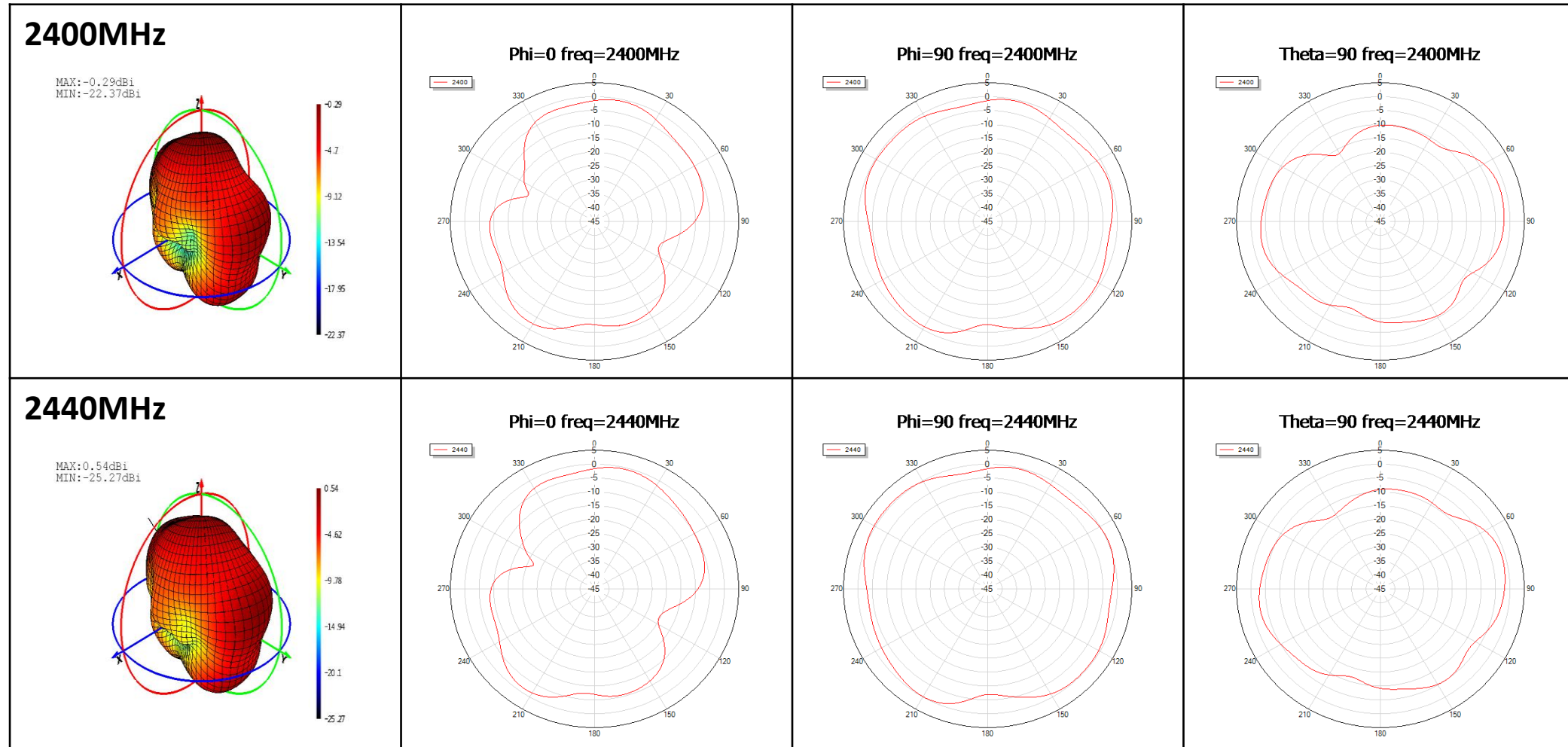
- Chamber Coordinate System SZ-S-1(ID)

H Plane : XY
E1 Plane : XZ
E2 Plane : YZ



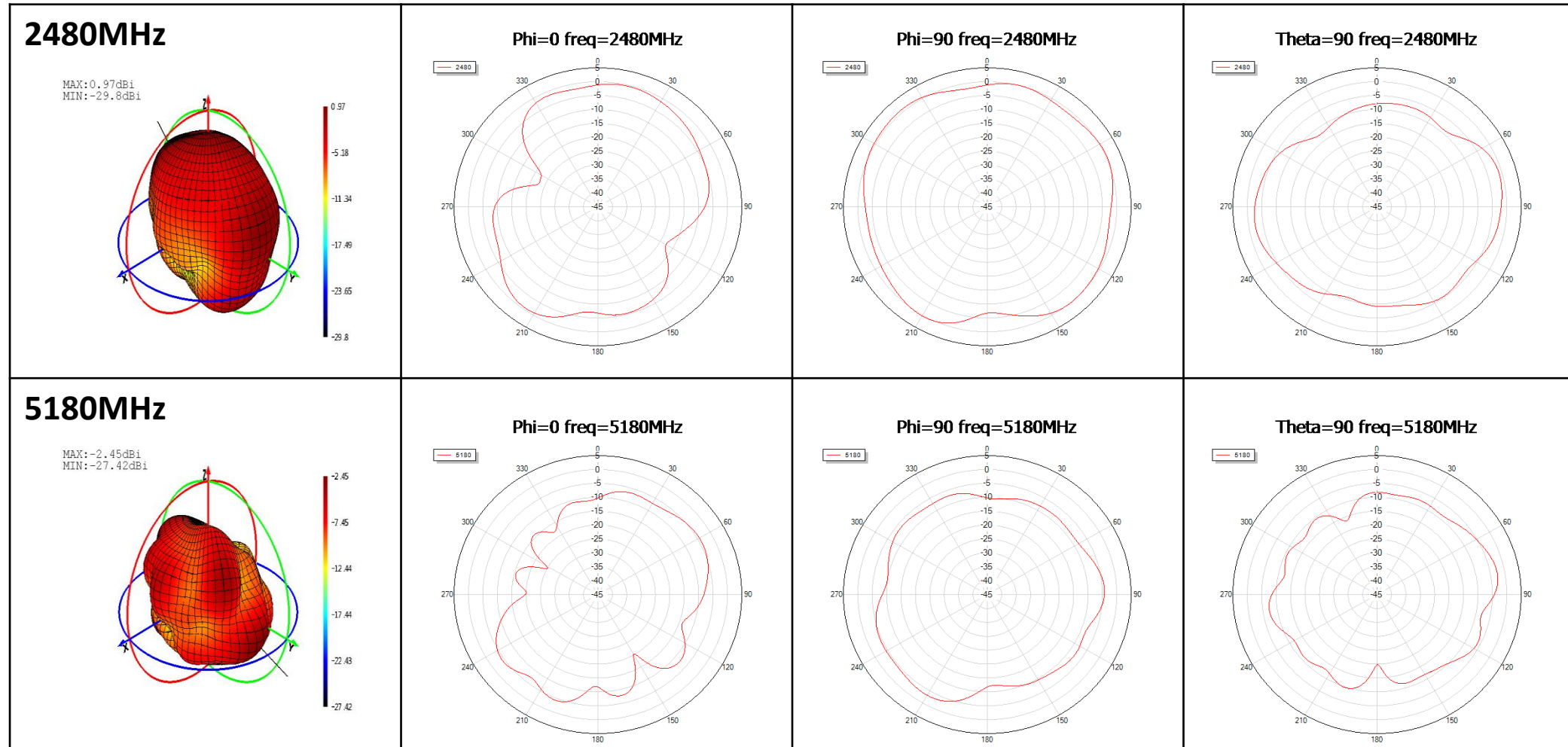
Passive Test

- Radiation Pattern



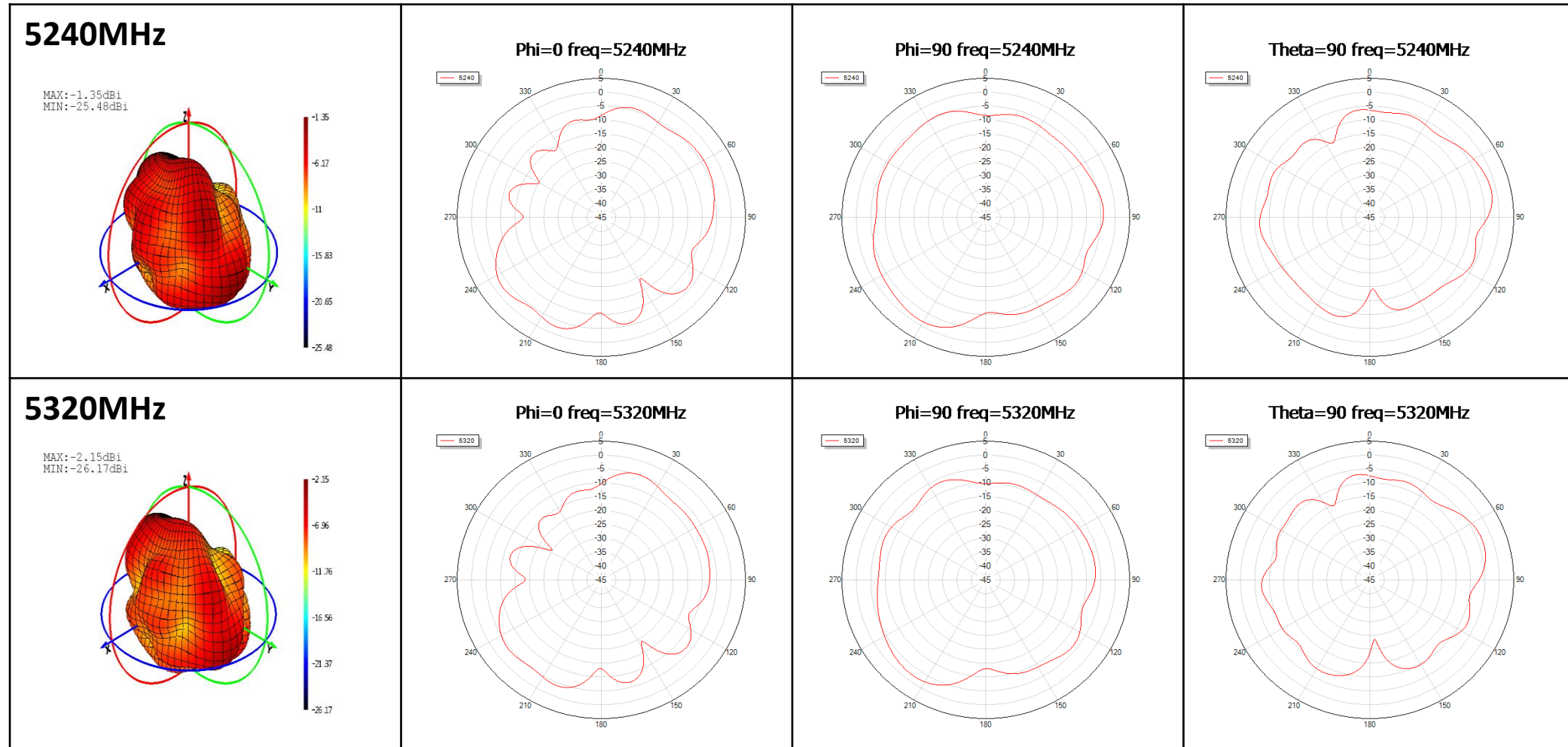
Passive Test

- Radiation Pattern



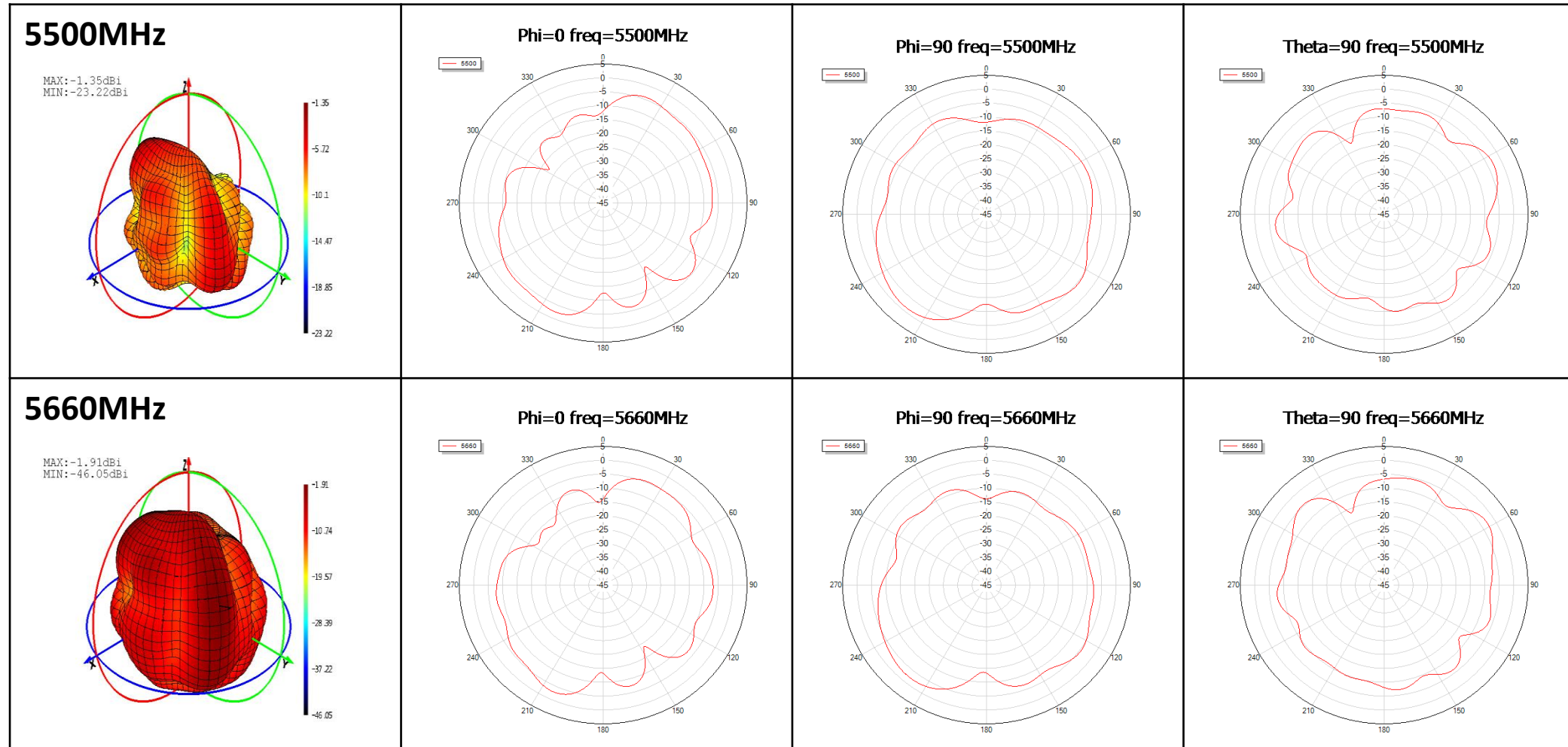
Passive Test

- Radiation Pattern



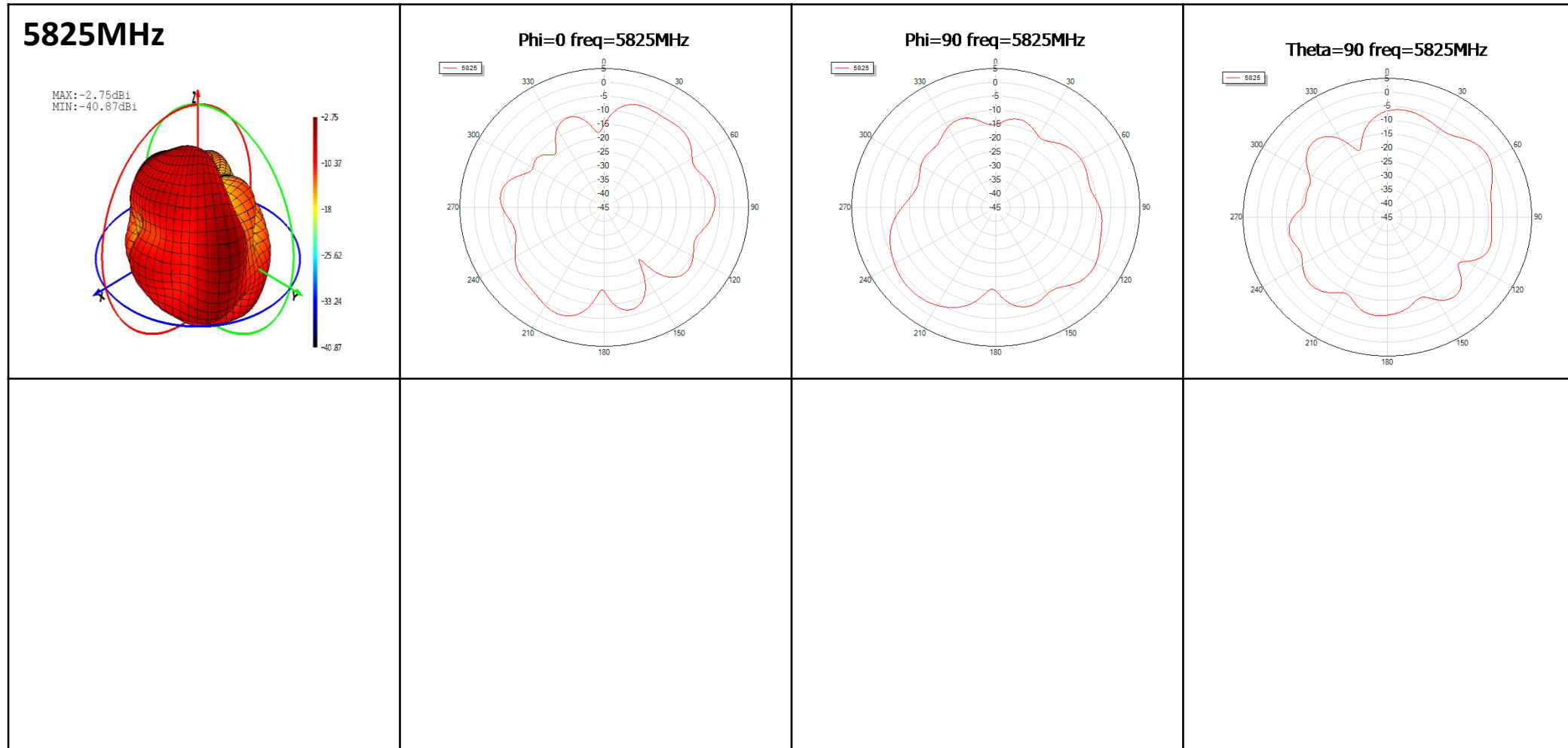
Passive Test

- Radiation Pattern



Passive Test

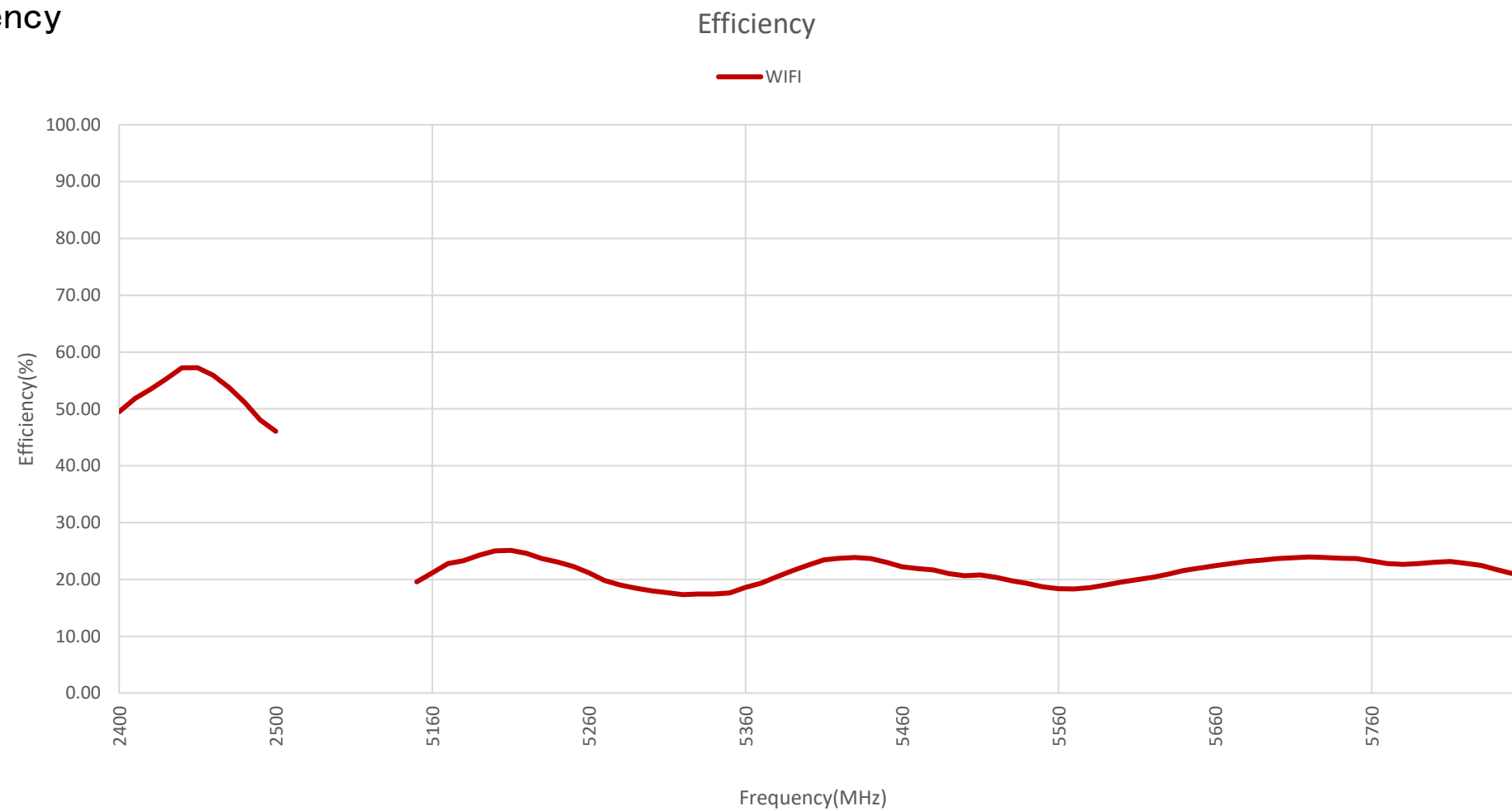
- Radiation Pattern



Passive Test



- Efficiency

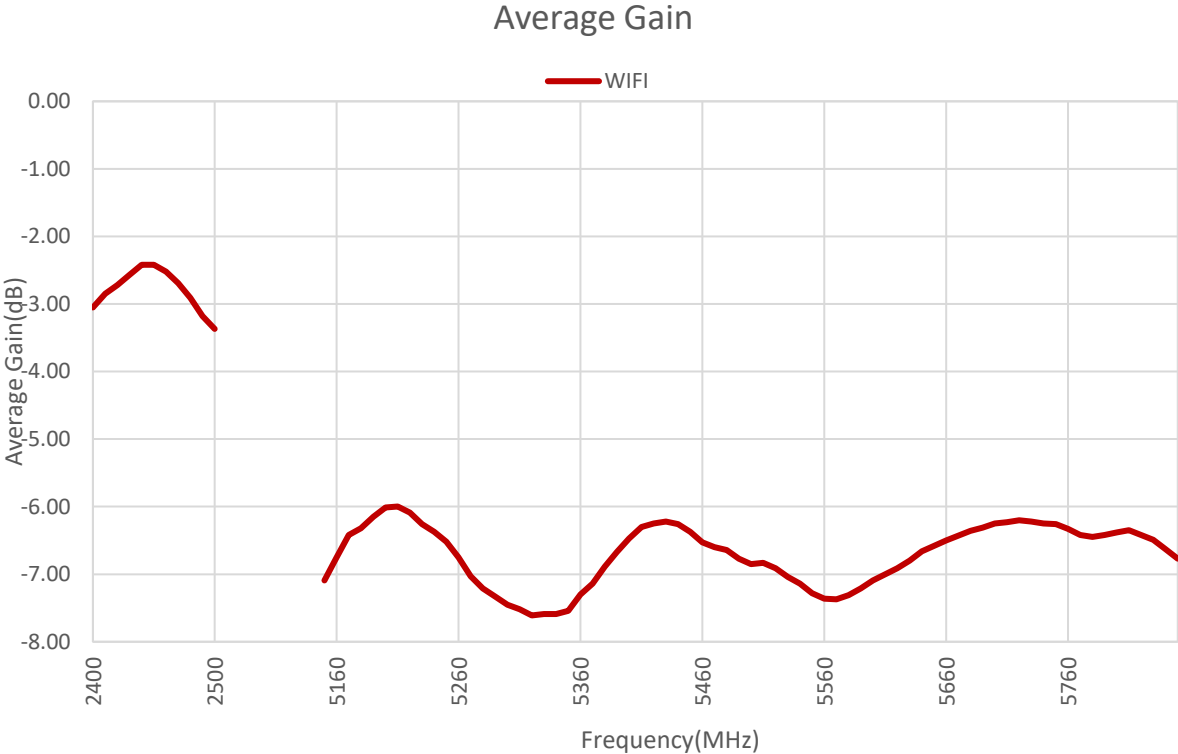


Frequency(MHz)	2400	2450	2500	5150	5500	5850
Efficiency(%)	49.5	57.3	46.1	19.6	20.6	21.0

Passive Test

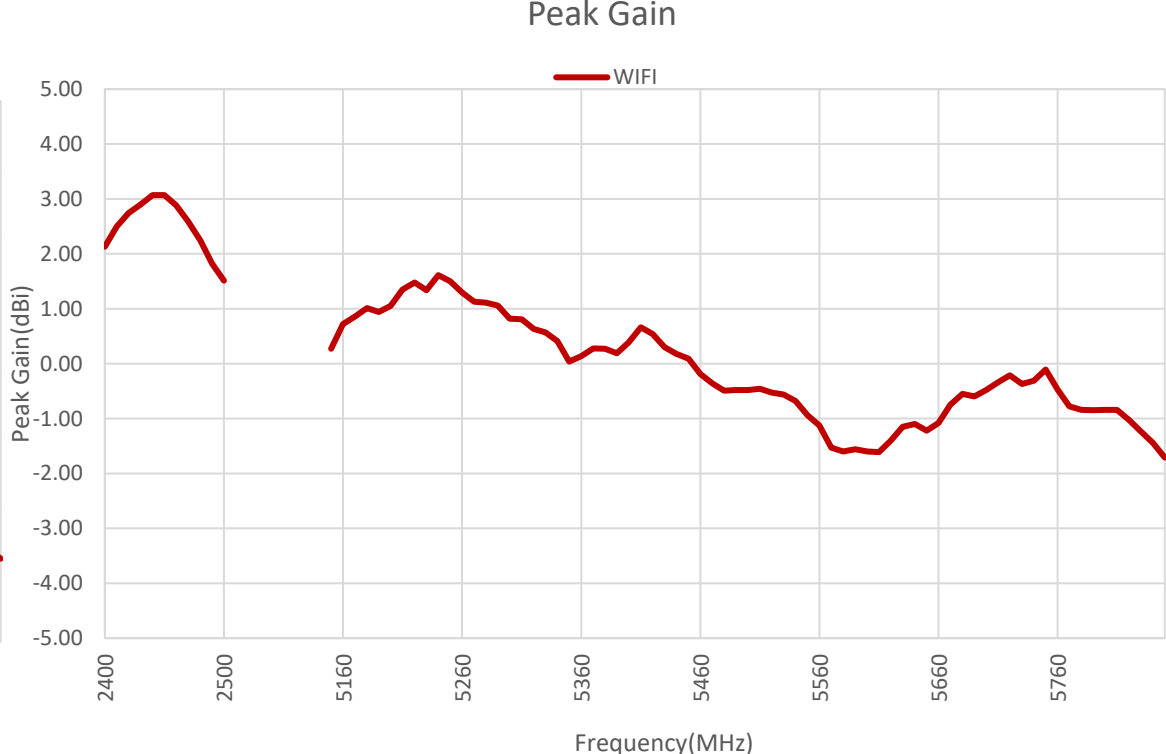


- Average Gain



Frequency(MHz)	2400	2450	2500	5150	5500	5850
Average Gain(dB)	-3.1	-2.4	-3.4	-7.1	-6.9	-6.8

- Peak Gain



Frequency (MHz)	2400	2450	2500	5150	5300	5500	5600	5850
Peak Gain(dBi)	2.1	3.1	1.5	0.3	0.82	-0.5	-1.6	-1.7

Passive Test



- Max Gain

BAND	Frequency (MHz)	Gian(dBi)
B1	5240	1. 61
B2	5250	1. 5
B3	5720	-0. 21
B4	5750	-0. 11



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Conclusion and Suggestion

➤ Antenna Performance

- The latest antenna line length is extended to 440mm, simulating the metal cable close to the cable line, OTA performance theoretically meets the needs of use, it is recommended to install measurement.



移联万物，志高行远

- 拥有更丰富、完整的物联网模组产品组合，一站式满足不同场景和地区的需求
- 推出类型丰富的天线产品，具备全定制天线设计、集成和制造的能力
- 提供物联网解决方案，满足从硬件接入到软件应用的全流程解决方案需求
- 全自动化生产线、测试线，保障产品质量始终如一，同时具有超高性价比
- 建立了业内规模领先的研发团队，为客户提供及时、专业、贴心的技术支持服务
- 持续研发新技术、新产品，率先发布5G、智能模组、LPWA、C-V2X等产品
- 富有创新精神的国际化专业团队，始终保证“客户第一”

Thank You

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