

Test Report

Verified code: 375441

Report No.: E202308308600-1

Customer: Polaris Industries Inc.

Address: 1600 SE 18th Ave, Battle Ground, Washington, United States of America

Sample Name: PCB Antenna

Sample Model: XK-PL-ANT1

Receive Sample Date: Sep.08,2023

Test Date: Sep.11,2023 ~ Sep.11,2023

Reference Document: ANSI IEEE 149-2021 Part 7, Part 8, Part 10

Test Result: Pass

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Xu Xingqiu

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Wang Guodong

Approved by: Zhao Zetian

Zhao Zetian

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2023-09-18

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E202308308600-1	Original Issue	2023-09-11

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1. TEST RESULT SUMMARY

Test Item	TestFrequency	Test Method	Test Scene	Test Result
Gain	2400MHz~2500MHz	ANSI IEEE 149-2021 Part 8	scene 1	/ ¹⁾
Efficiency	2400MHz~2500MHz	ANSI IEEE 149-2021 Part 10	scene 1	/ ¹⁾
Antenna pattern	2400MHz~2500MHz	ANSI IEEE 149-2021 Part 7	scene 1	/ ¹⁾
Note 1): Customer-defined test, test results do not make judgment.				

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2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT INFORMATION

Name:	Polaris Industries Inc.
Address:	1600 SE 18th Ave, Battle Ground, Washington, United States of America

2.2 MANUFACTURER

Name:	Polaris Industries Inc.
Address:	1600 SE 18th Ave, Battle Ground, Washington, United States of America

2.3 FACTORY

Name:	Fuzhou Zhengqiang Electronics Co.,Ltd.
Address:	Jingxi town,Minhou County,189 Gushanzhou village FUZHOU, CN

2.4 BASIC DESCRIPTION OF EUT

Product Name:	PCB Antenna
Product Model:	XK-PL-ANT1
Trade Name:	/
Software Version:	/
Hardware Version:	/
Antenna Type:	/
Frequency Band:	2400MHz~2500MHz
Sample submitting way:	☒ Provided by customer ☐ Sampling
Sample No:	E202308308600-0001
Note:	/

2.5 TEST SCENE

Scene	Scene description
Test scene 1	Free space

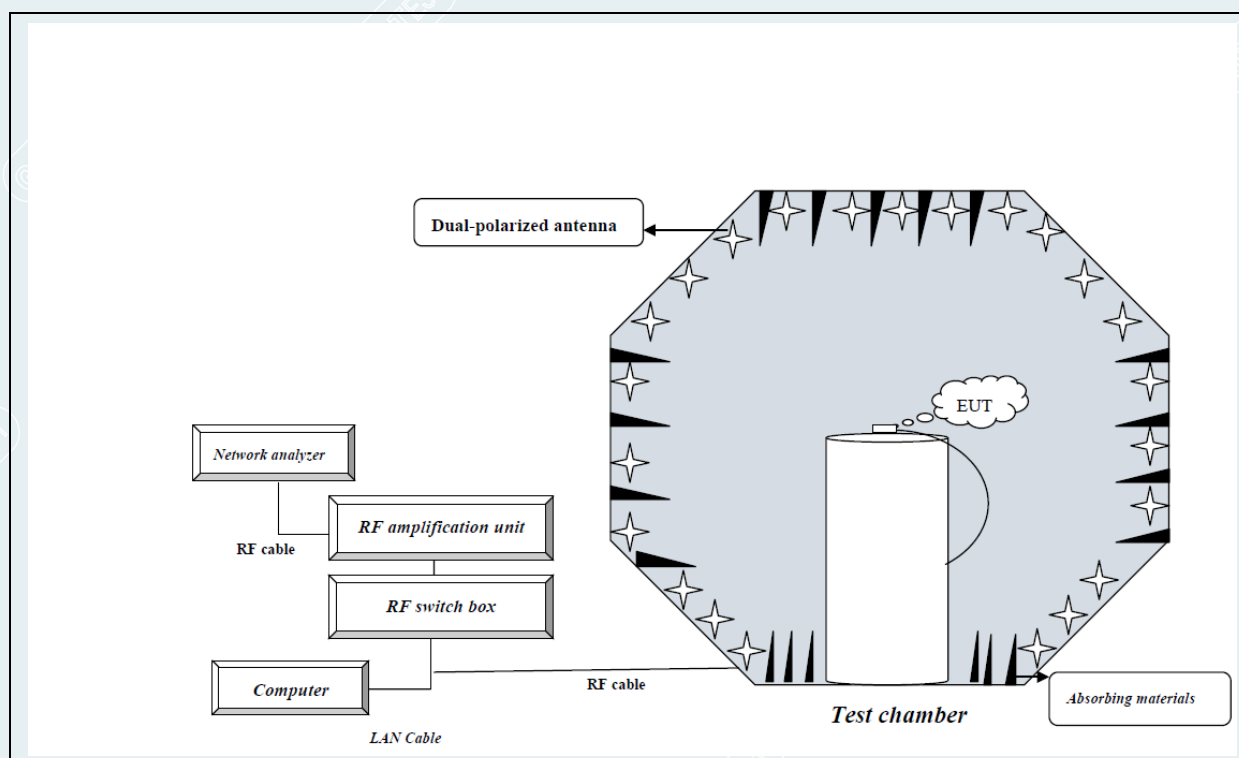
2.6 SAMPLE WORK DESCRIPTION

Serial No.	Work description
a)	The sample is erected according to the standard, so that the sample can be tested under normal operation

2.7 ASSISTIVE DEVICE INFORMATION

No.	Name of Equipment	Manufacturer	Model No.	Serial No.
1)	RF cable	Jun you radiofrequency	Amplitude stabilization and phase stabilization cable	/
2)	Calibrated parts	R&S	ZV-Z270	/

2.8 SAMPLE CONNECTION DIAGRAM



Sample connection diagram

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3. LABORATORY

The tests and measurements refer to this report were performed by ReportLabEMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

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4. MEASUREMENT UNCERTAINTY

Uncertainty is calculated according to ISO's "Guide to the Expression of Uncertainty in Measurement" (GUM), and the extended uncertainty is expressed using an inclusion factor of $k=2$ and a 95% confidence level.

Measurement	Uncertainty
Gain	0.6 dB

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5. EQUIPMENT AND TOOLS USED DURING TEST

Name of Equipment	Manufacturer	ModelNo.	Serial No.	Calibration Due
OTA test chamber	HWA-TECH	AC7500	OTA-SC2021030 1MSN	2024-02-23
Network analyzer	ROHDE&SCHWARZ	ZNB8	101169	2024-05-23
Automated test software system	HWA-TECH	S6100A (V1.0.0.0)	/	/

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6. ANTENNA RADIATION PERFORMANCE MEASUREMENT

6.1 LIMITS

Test Item	Test Frequency	Limits
Gain	2400MHz~2500MHz	/ ¹⁾
Efficiency	2400MHz~2500MHz	/ ¹⁾
Antenna pattern	2400MHz~2500MHz	/ ¹⁾
Note 1): Customer-defined tests, unlimited definitions.		

6.2 TEST PROCEDURE

a) Adjust the ambient temperature of the test system to within 20°C-30 °C.

b) System gain calibration:

1) Set up the standard antenna so that the apparent phase center of the standard antenna is consistent with the geometric center of the system, rotate the turntable by 90 °, and adjust the phase center of the standard antenna again;

2) Start the test after setting the test frequency;

3) Gain calibration data is calculated and stored on the control computer.

c) Antenna test:

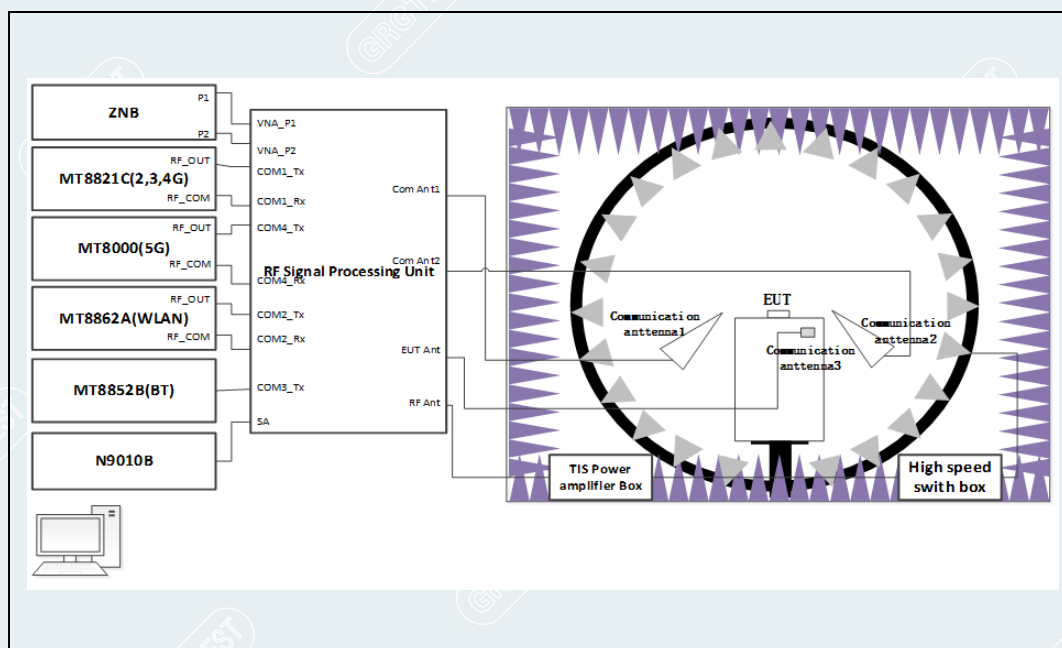
1) The antenna to be measured is erected on the test fixture, and the antenna phase center coincides with the center of the probe array ring by adjusting the antenna;

2) Connect the test cable, set the test frequency, start the test, during the test, the system supporting software should be able to automatically complete the acquisition, storage and calculation of the antenna amplitude and phase data to be measured.

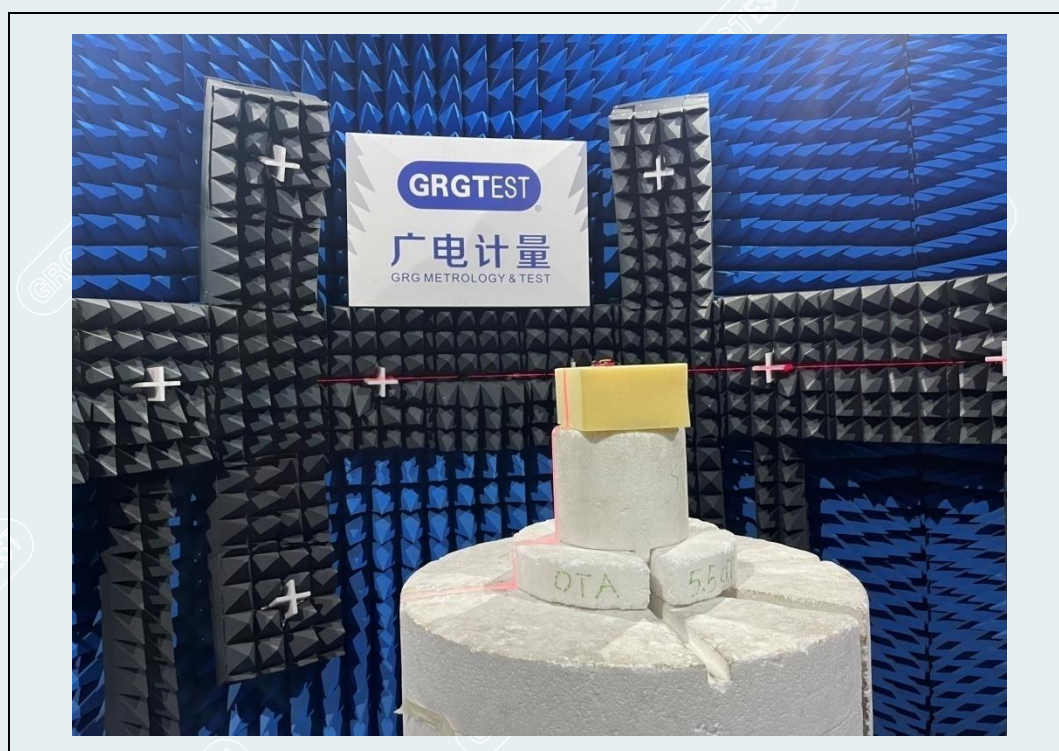
d) Data processing:

The OTA system is used to test the antenna, and all the radiation information on the spherical surface of the antenna (including the polarization mode, gain, efficiency, pattern of the antenna, etc.) can be obtained through one test. Therefore, the antenna radiation indicators described in this standard can be obtained by a single test, the difference is that the data of different indicators are extracted differently.

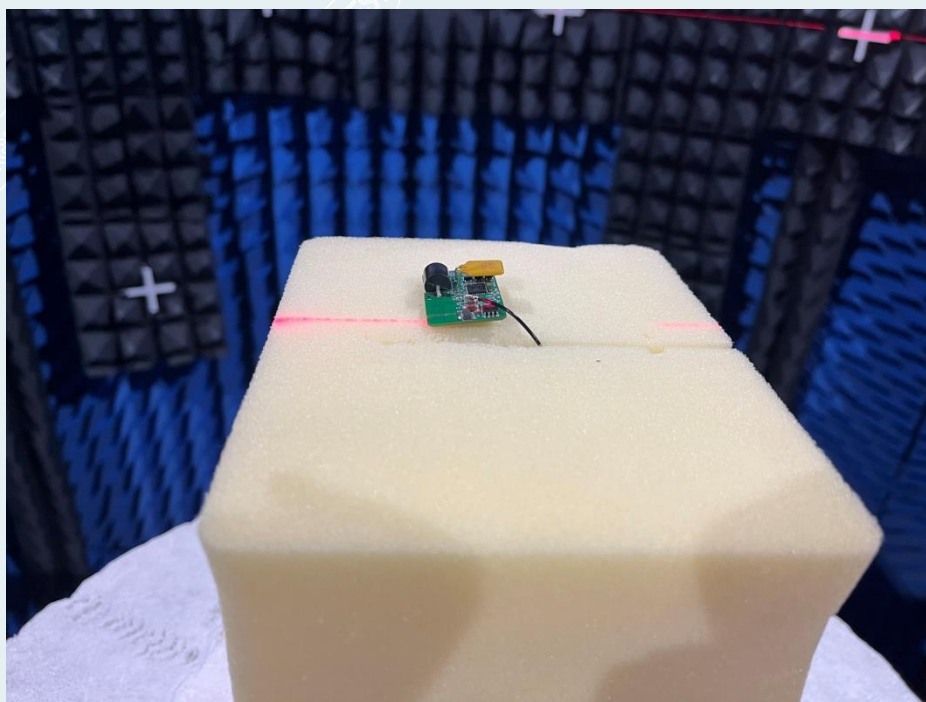
6.3 CONFIGURATION OF SYSTEM UNDER TEST



6.4 TEST PHOTOS



Test photo 1



Test photo 2

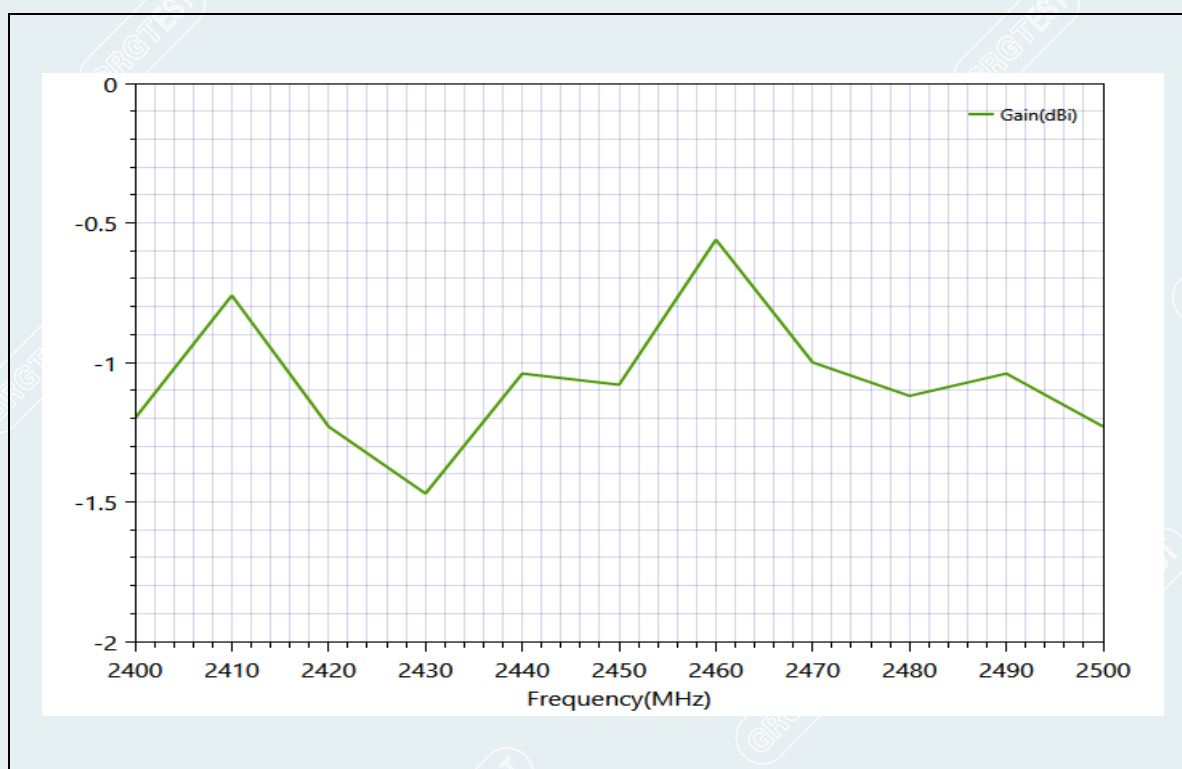
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6.5 TEST RESULTS

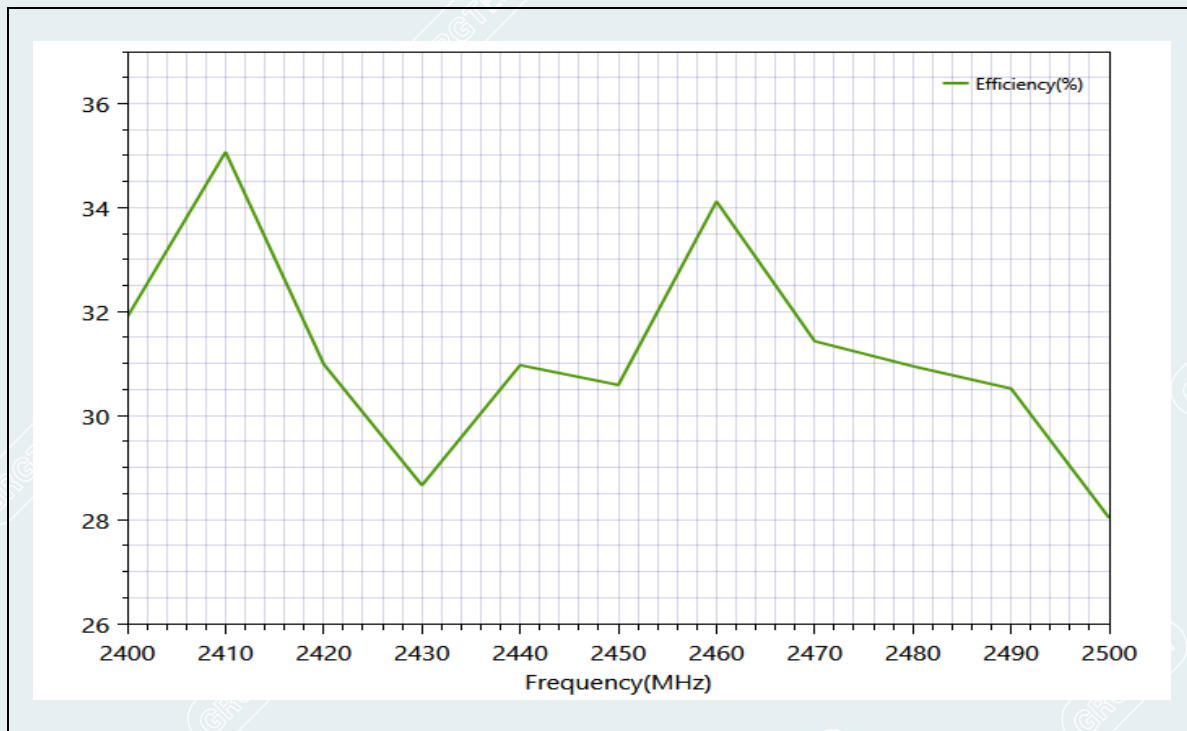
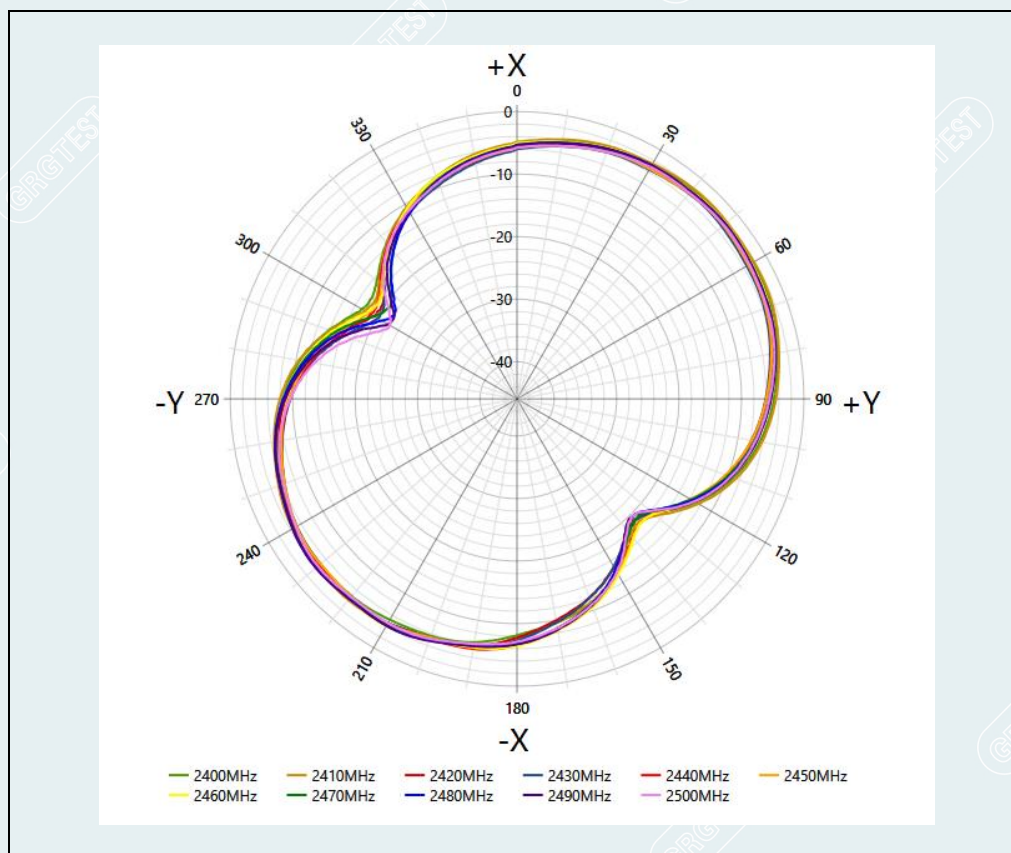
EUT Name	PCB Antenna	Model No.	XK-PL-ANT1
Environmental Conditions	25.7 °C / 57%RH / 101kPa	Test Scene	Scene 1
Power Supply	/	Tested By	Ma Lintao
Test Date	2023-09-11	Sample No.	E202308308600-0001
Antenna polarization	/	Impedance	50 Ω

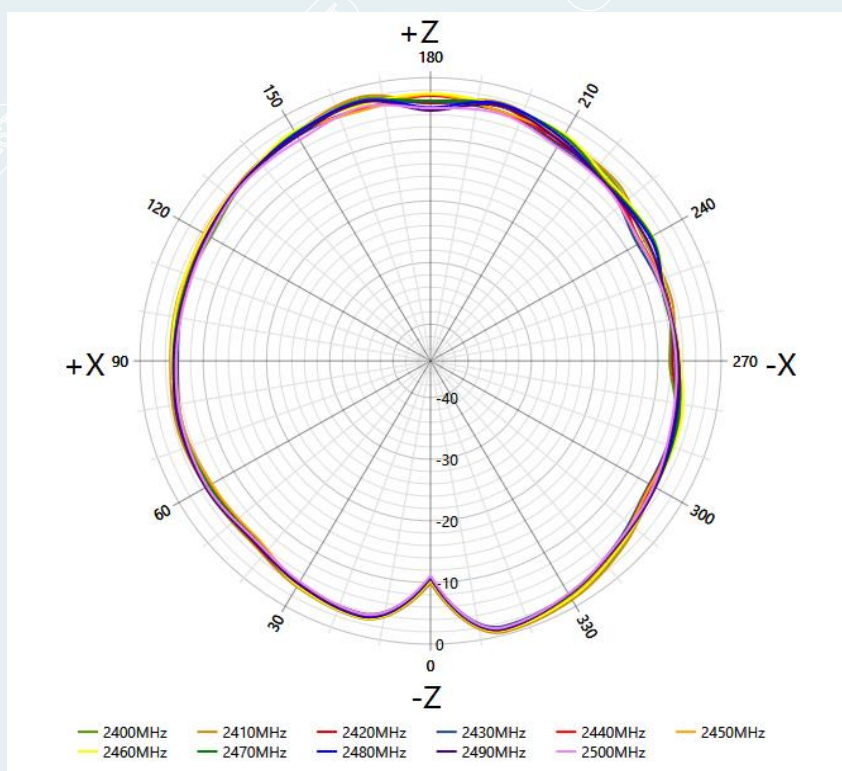
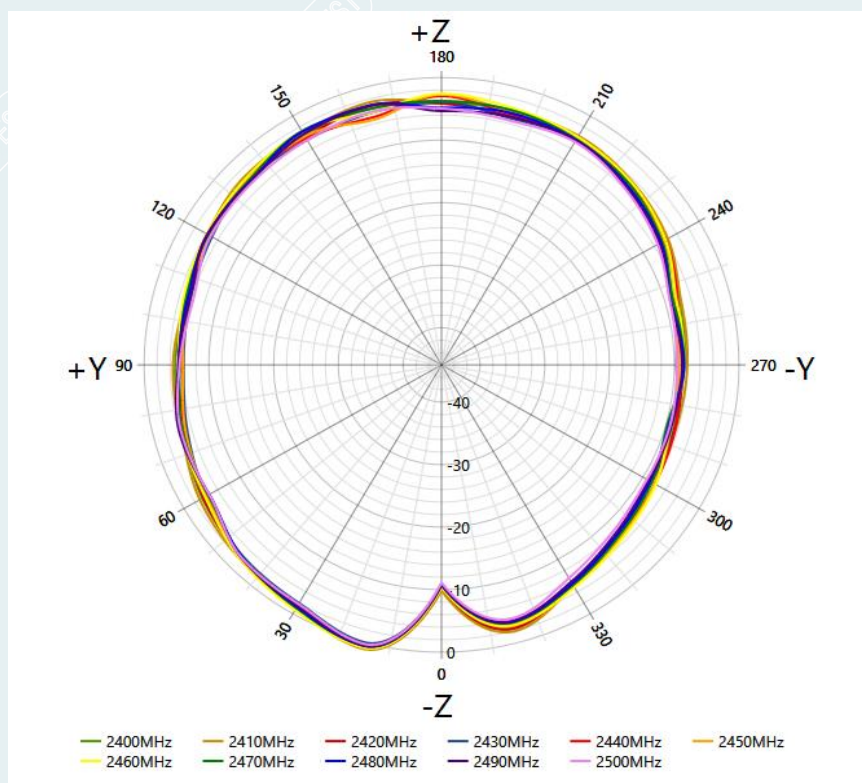
Test Frequency (MHz)	Test item	
	Gain(dBi)	Efficiency
2400	-1.20	31.90%
2410	-0.76	35.07%
2420	-1.23	30.99%
2430	-1.47	28.66%
2440	-1.04	30.97%
2450	-1.08	30.59%
2460	-0.57	34.12%
2470	-1.00	31.44%
2480	-1.12	30.95%
2490	-1.04	30.52%
2500	-1.23	28.03%

a)Gain result plot

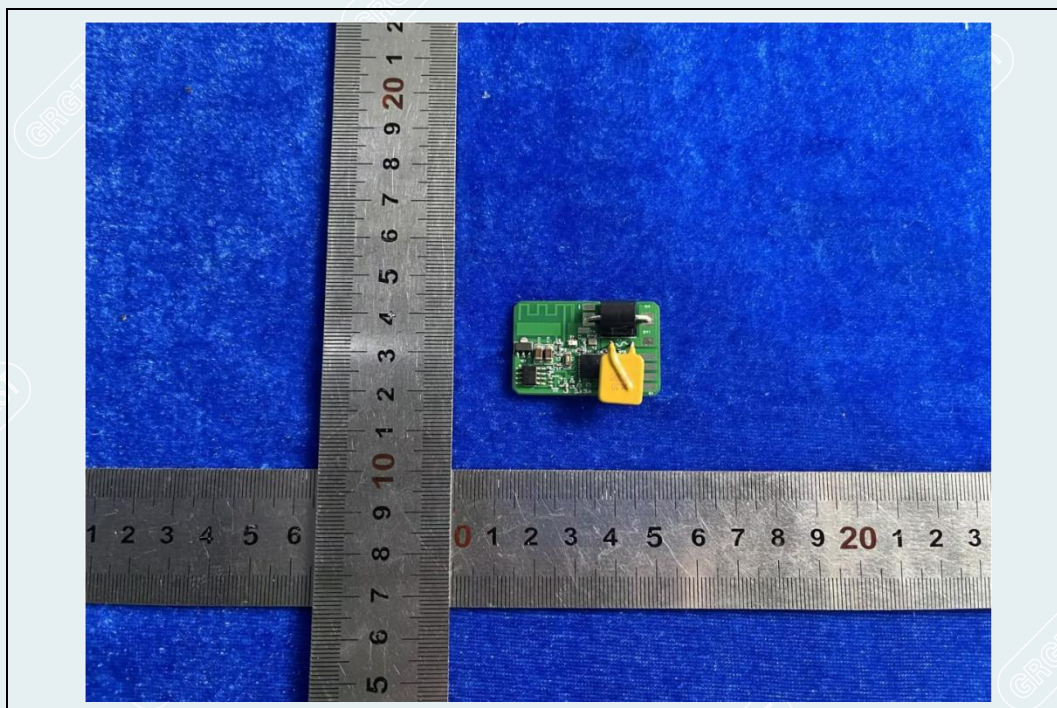


ANTENNA1_Gain plot

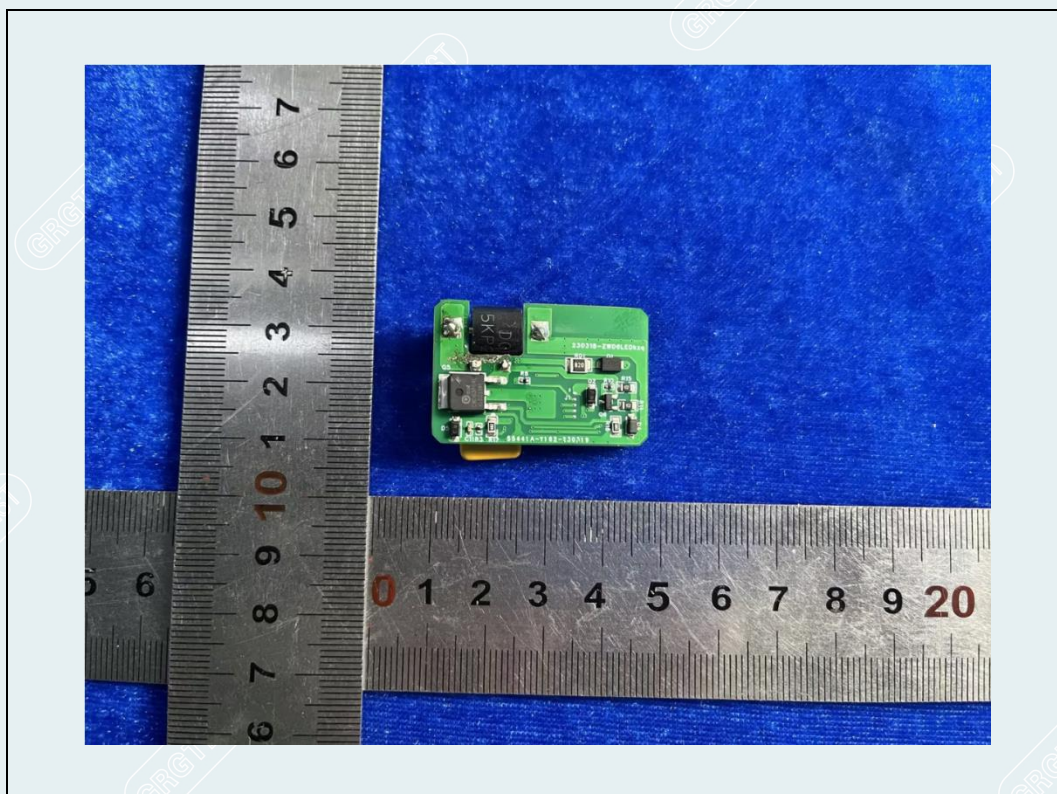
b)Efficiency result plot**ANTENNA1_ Efficiency plot****c) 2D Radiation pattern****ANTENNA1_ Theta=90 °**

ANTENNA1_ $\Phi = 0^\circ$ ANTENNA1_ $\Phi = 90^\circ$

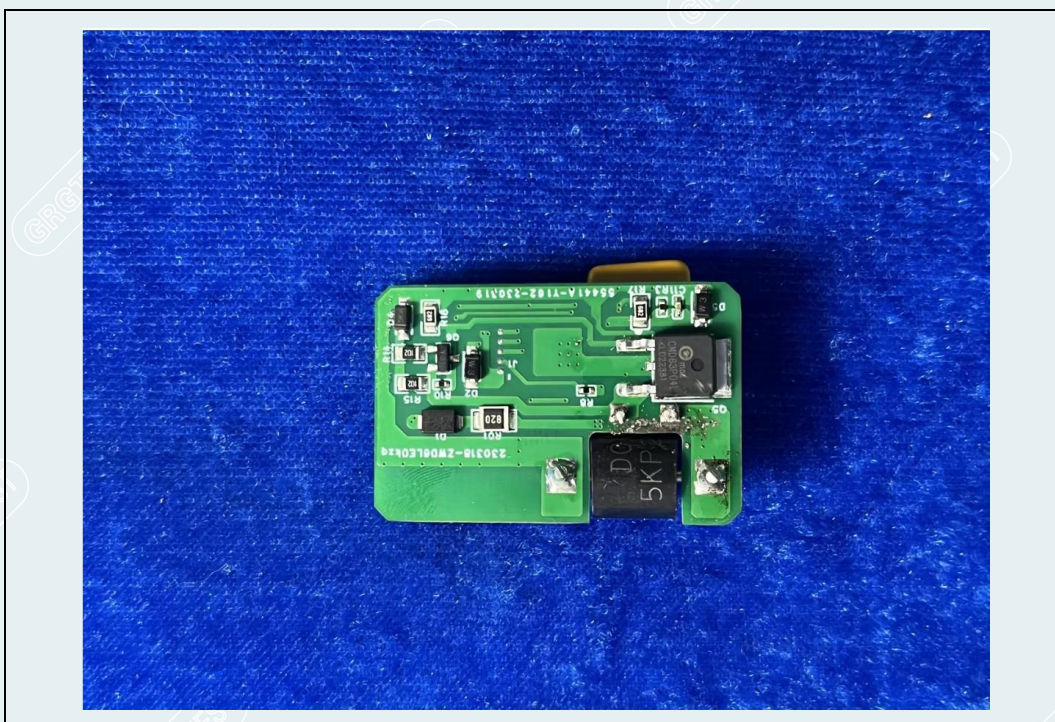
7. PHOTOGRAPH OF THE EUT



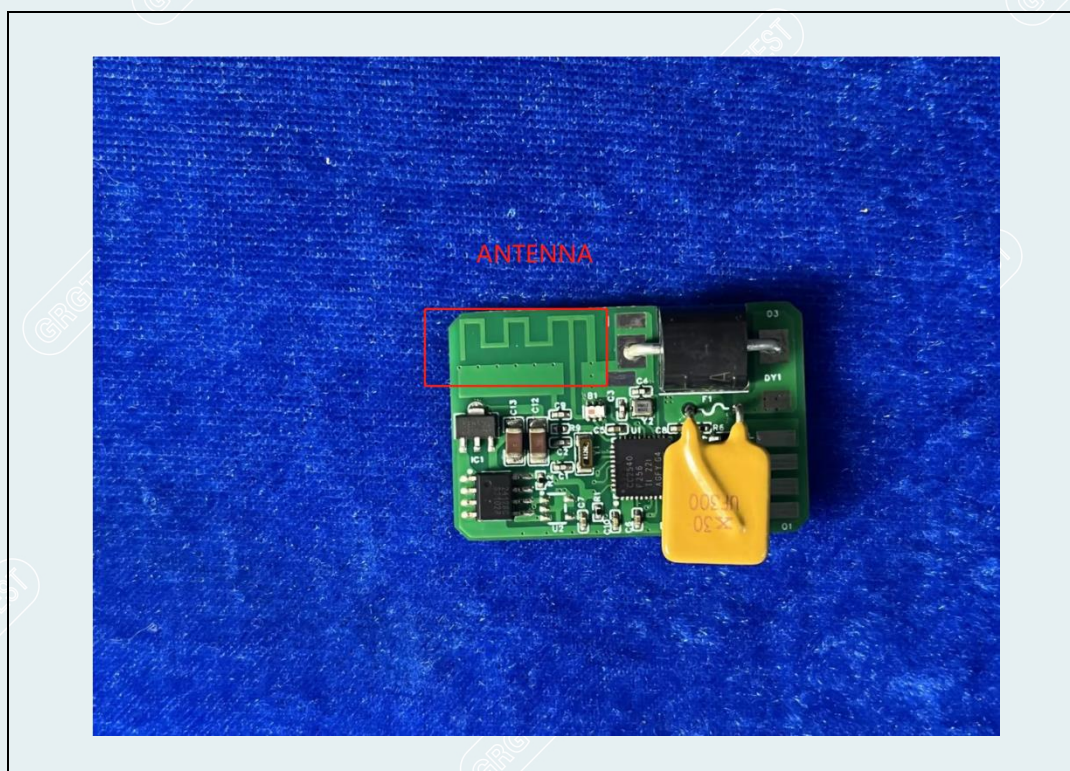
EUT photo1



EUT photo2



EUT photo3



EUT interior photo4

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