



# NP2081G Antenna information

## Record for version modification

Date	Revision	Modify Content	Author
2023-05-19	V1.0	1 <sup>st</sup> Version	Yin Feijie

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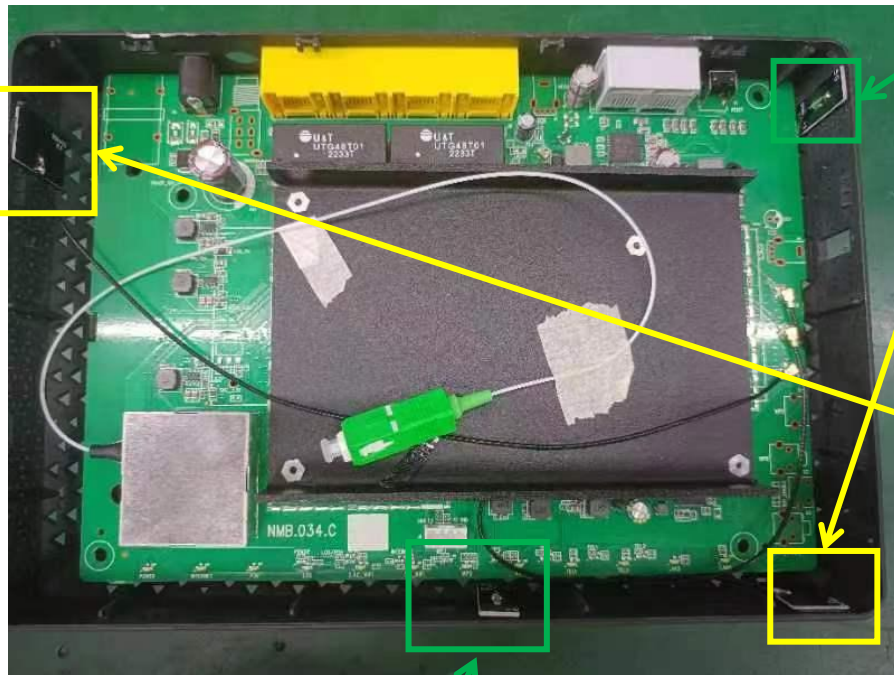
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# 1. Project information

Model No.	NP2081G
HW Version	V1
SW Version	10.3.3.1
Antenna type	Metal built-in antenna
Installation mode	Internal
WIFI Model	RTL8822CS
Antenna supplier	Shenzhen Yingjiachuang Electronic Technology Co. LTD
Tester	Yin Feijie
Acceptance	Fang Wenfeng
Reviewer	Chauhan
Date	2023/05/19

## 2. Appearance and specification



天线贴附位置图(5.8G 短线)  
Antenna attachment position diagram 5.8G short line

天线贴附位置图(2.4G/5.8G 短线)  
Antenna attachment position diagram 2.4G/5.8G short line

天线贴附位置图(2.4G/5.8G 长线)  
Antenna attachment position diagram 2.4G/5.8G long line

天线贴附位置图(5.8G 长线)  
Antenna attachment position diagram 5.8G long line

## 3. Performance parameter

### 3.1 Antenna passive test

Frequency	2400Mhz~2500Mhz/5150Mhz~5850Mhz
Impedance	50Ω
Antenna Gain	双频 2.4G/5.8G long $\cong$ 3.2dBi, 2.4G/5.8G short $\cong$ 3.16dBi 5.8G long $\cong$ 4.42dBi, 5.8G short $\cong$ 4.56dBi
Power capacity	<10w
Radiation	Omni-directional

### 3.1.1 Reflection loss&V.S.W.R

Test tools: network analyzer:(E5071B)

Standard: Reflection loss $\leq$ -10db V.S.W.R $\leq$ 1.92

Antenna-2.4G/5.8GShort line



#### V.S.W.R

Freq/GHz	2.4	2.45	2.5	5.15	5.72	5.85
VSWR	1.70	1.32	1.42	1.11	1.50	1.37

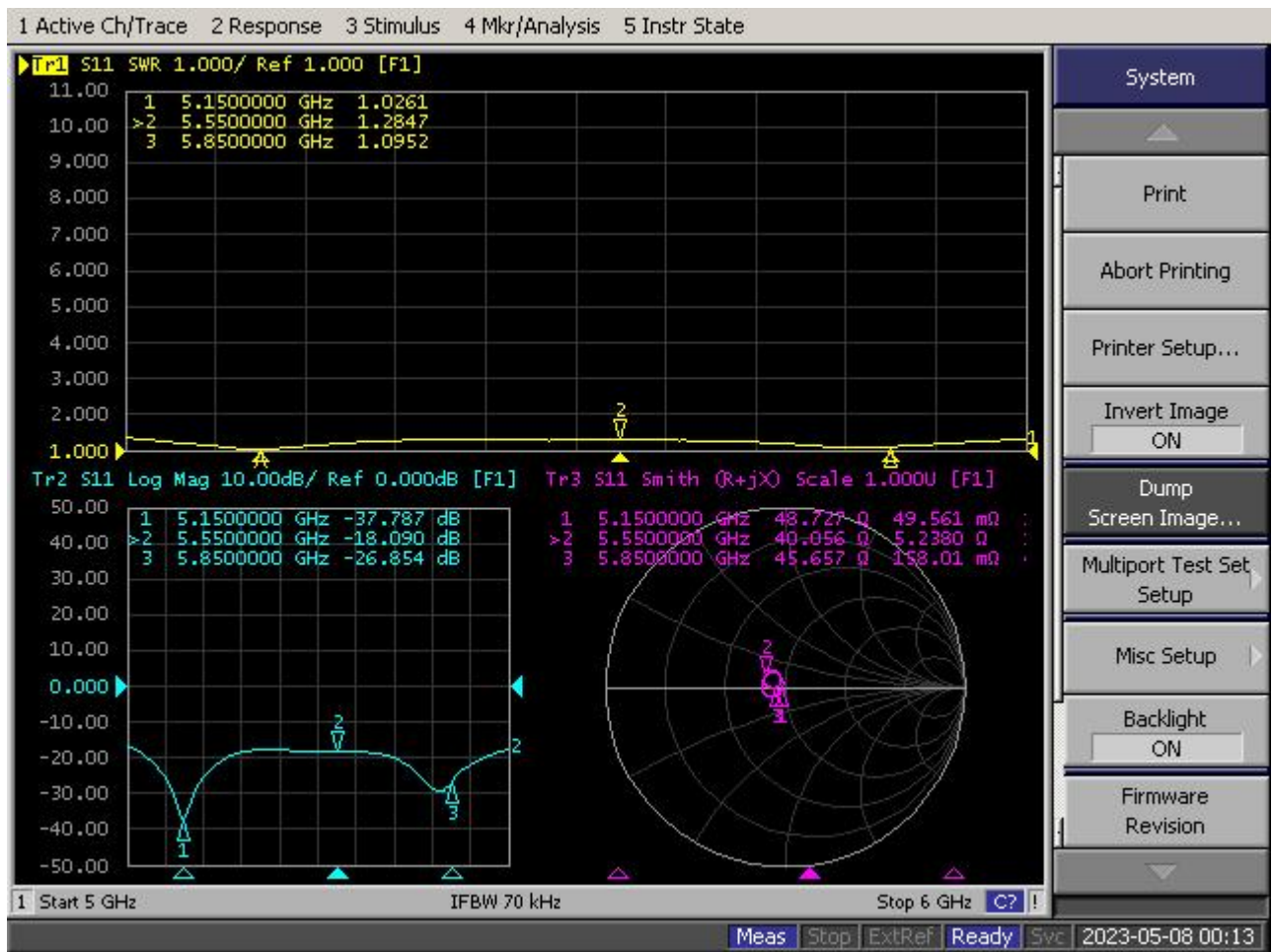
Antenna-2.4G/5.8G Long line



V.S.W.R

Freq/GHz	2.4	2.45	2.5	5.15	5.72	5.85
VSWR	1.31	1.36	1.54	1.18	1.30	1.42

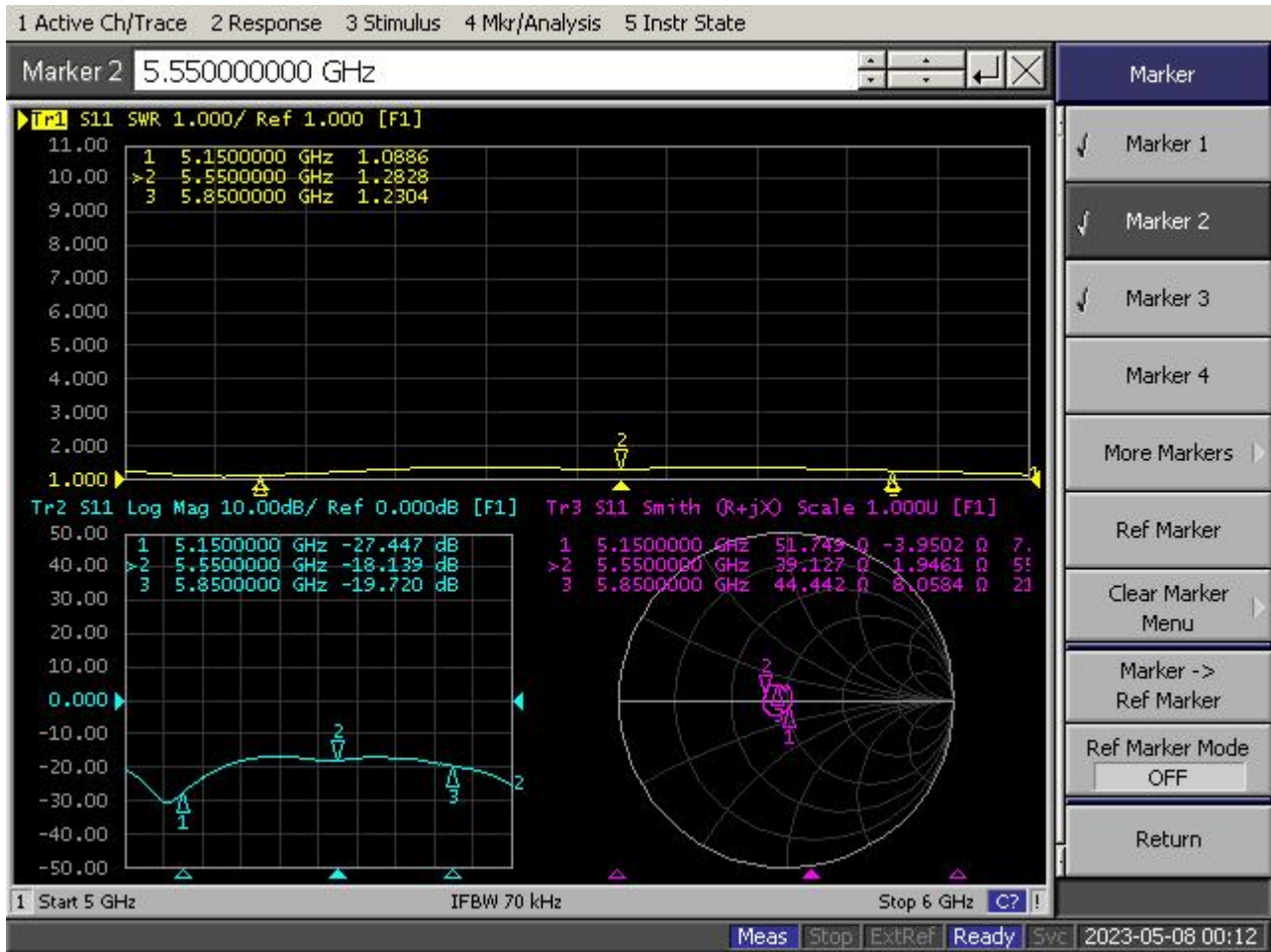
Antenna-5.8GLong line



V.S.W.R

Freq/GHz	5.15	5.72	5.85
VSWR	1.02	1.28	1.09

Antenna-5.8GShort line



V.S.W.R

Freq/GHz	5.15	5.72	5.85
VSWR	1.08	1.28	1.23

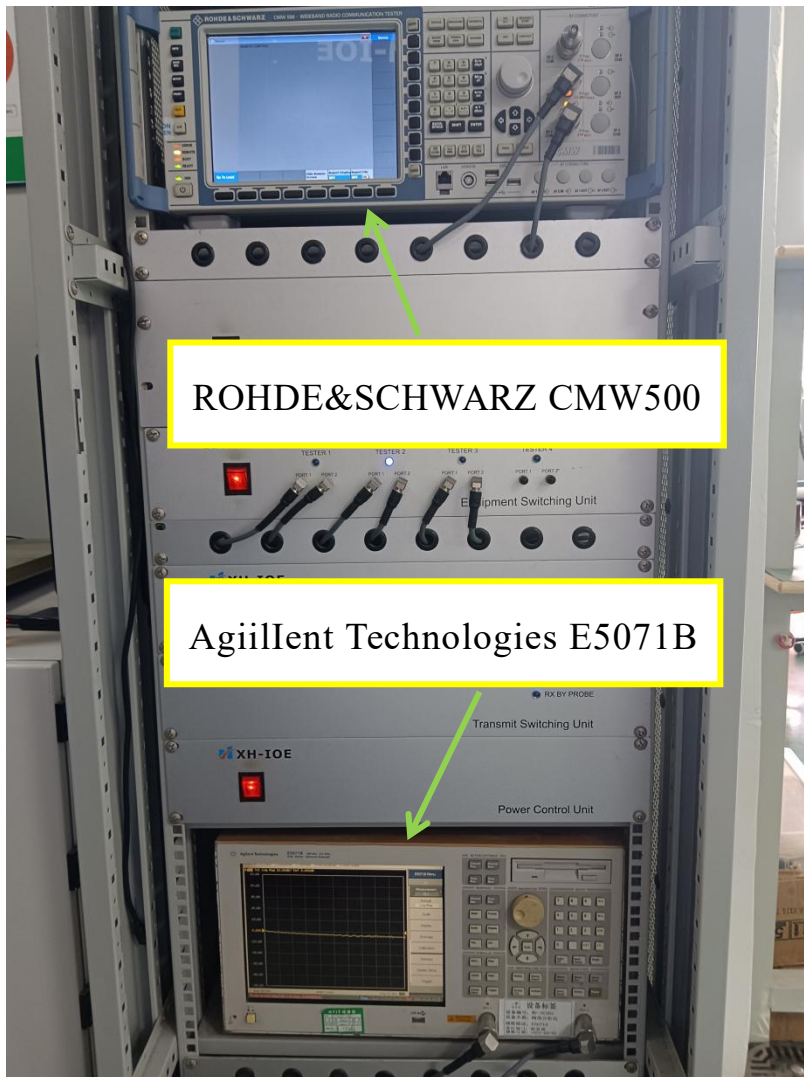


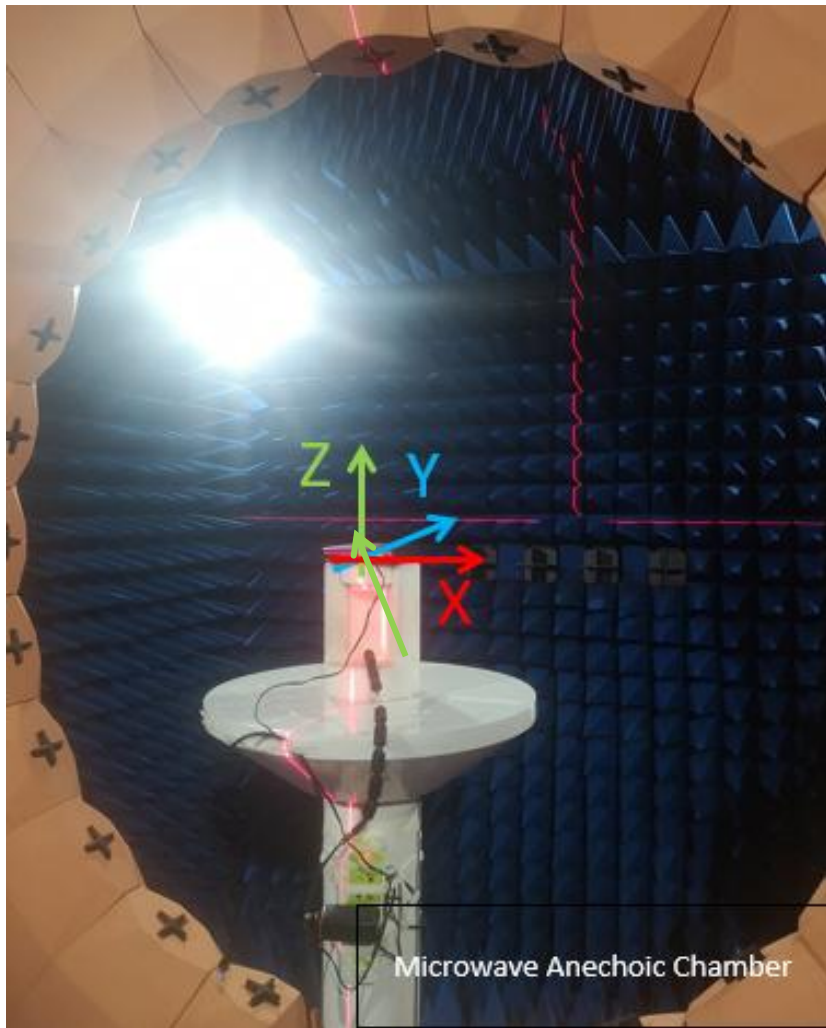
### 3.1.2 Gain & Efficiency

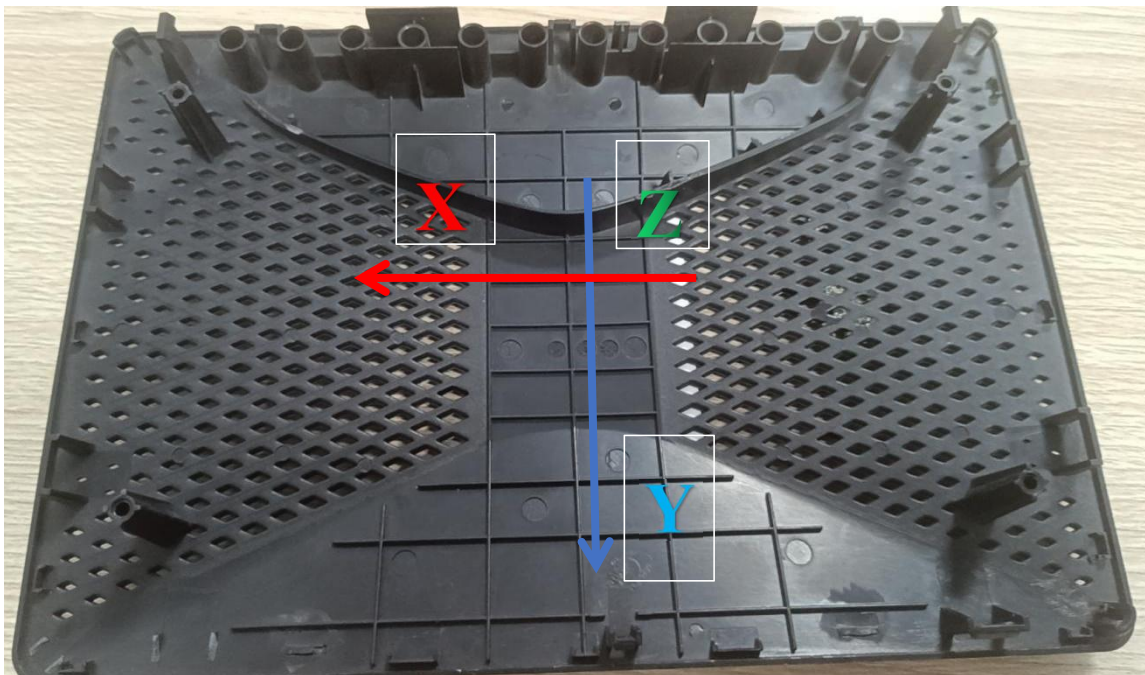
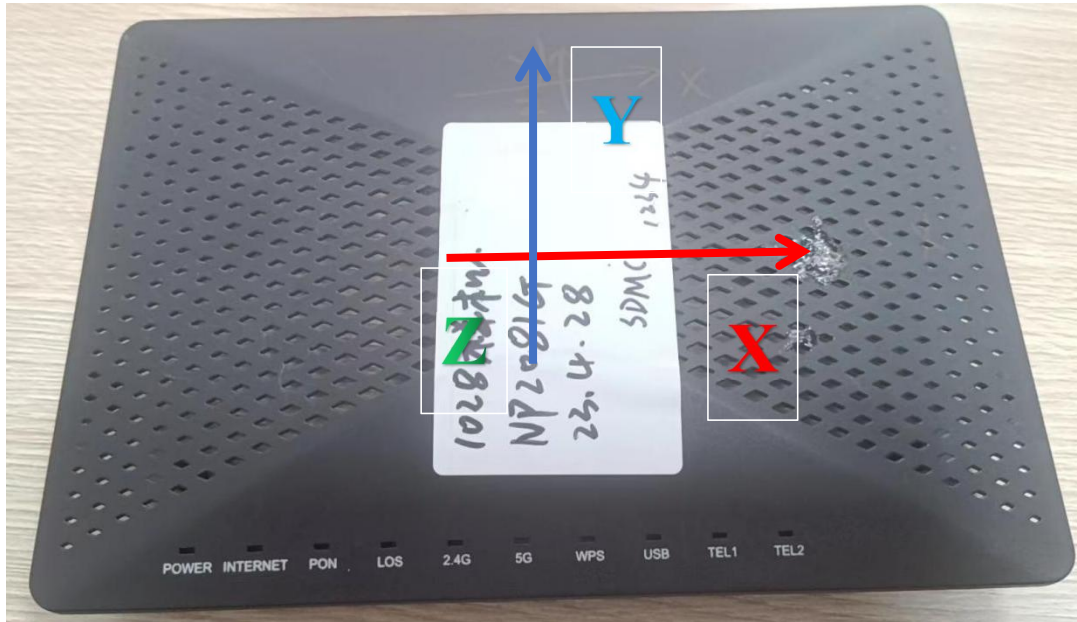
Test tools: Microwave Anechoic Chamber+Agilent Technologies E5071B

Standard: 2.4G  $1.5\text{dBi} \leq \text{Gain} \leq 6\text{dBi}$  Efficiency  $\geq 55\%$   
5G  $1.7\text{dBi} \leq \text{Gain} \leq 6\text{dBi}$  Efficiency  $\geq 60\%$

Testing Environment: As shown in the figure







Antenna test data

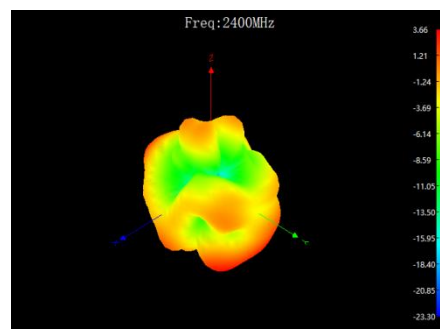
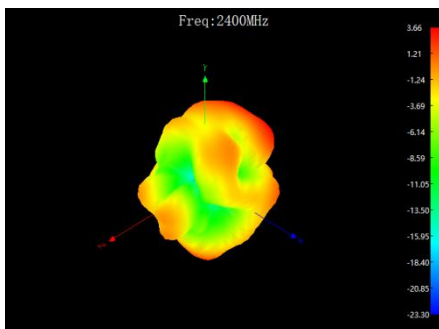
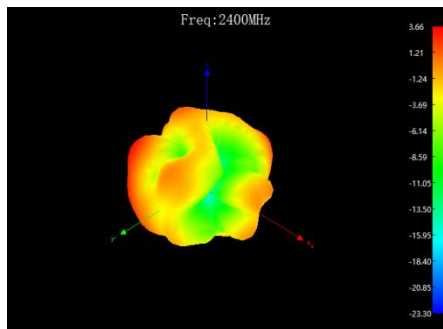
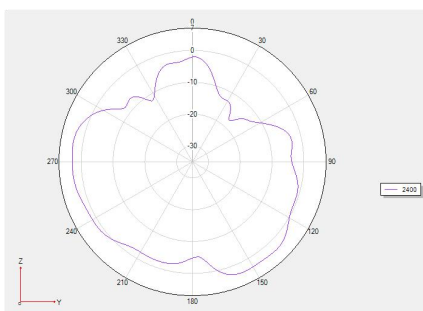
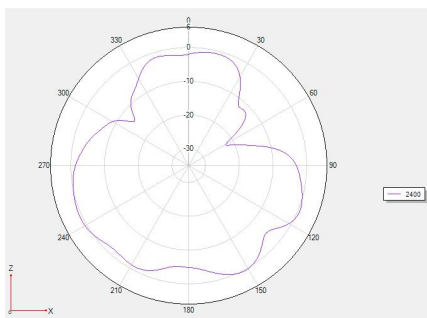
2.4G/5.8GShort line					
2.4G			5.8G		
Frequency / MHz	Gain/ dBi	Efficiency / %	Frequency / MHz	Gain/ dBi	Efficiency / %
2400	3.66	62.36	5150	5.41	69.89
2410	3.53	65.32	5250	5.03	64.83
2420	3.29	65.48	5350	5.02	66.49
2430	3.38	67.15	5450	4.96	69.57
2440	3.57	69.9	5550	5.1	63.83
2450	3.82	71.3	5650	4.97	61.24
2460	3.96	73.25	5750	4.52	63.1
2470	4.02	77.32	5850	4.94	61.8
2480	3.86	76.88			
2490	3.58	68.54			
2500	3.93	76.77			

2.4G/5.8GShort line 天线方向图-2.4G(Antenna direction diagram - 2.4G/5.8G)

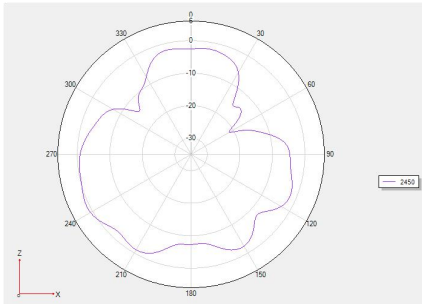
Phi =0 freq=2400MHz

Phi =90 freq=2400MHz

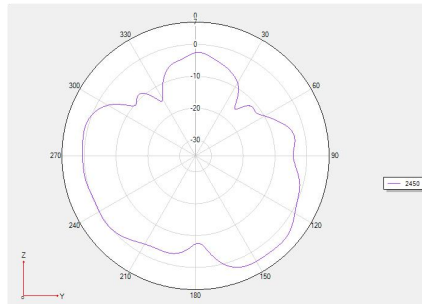
Theta =90 freq=2400MHz



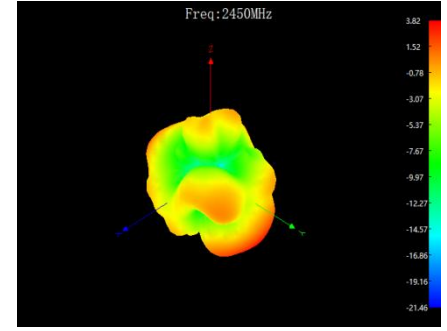
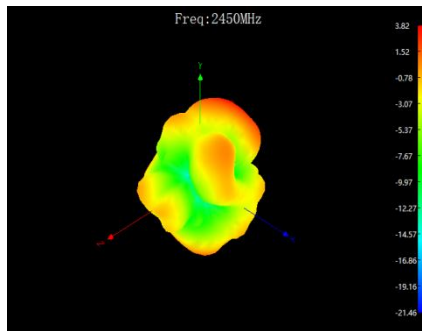
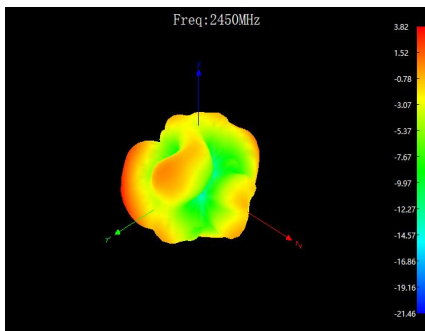
Phi =0 freq=2450MHz



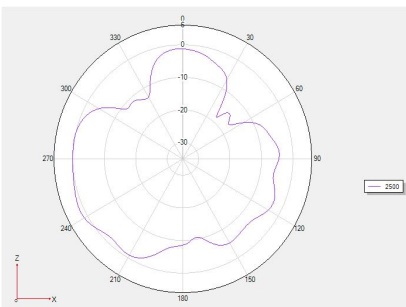
Phi =90 freq=2450MHz



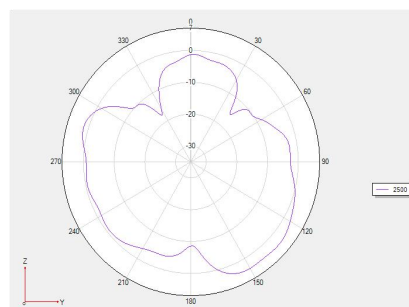
Theta =90 freq=2450MHz



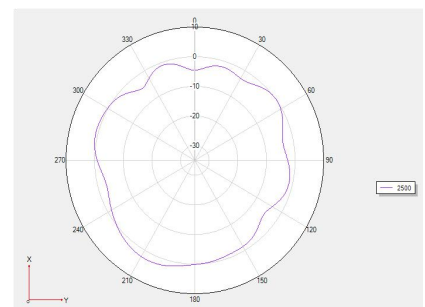
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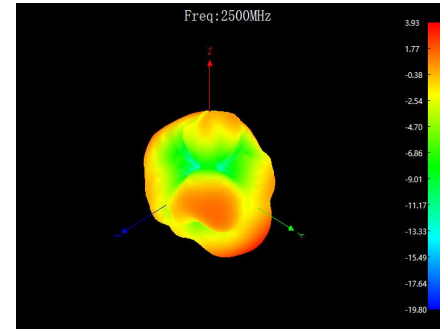
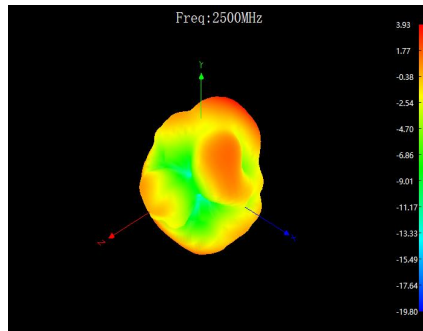
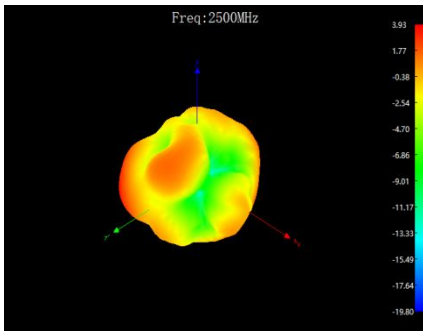


Phi =90 freq=2500MHz



Theta =90 freq=2500MHz

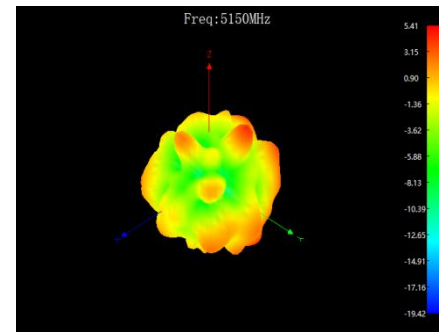
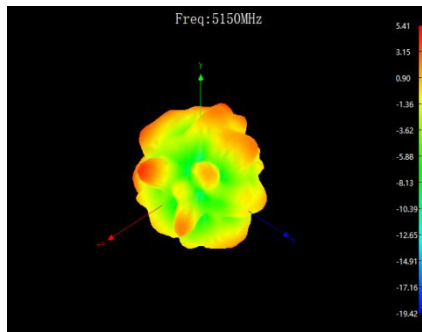
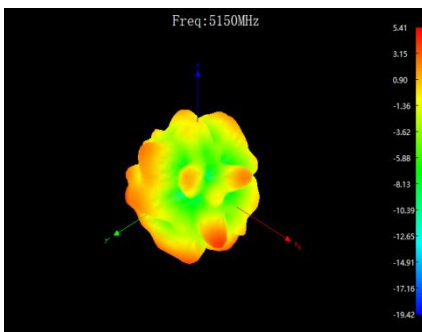
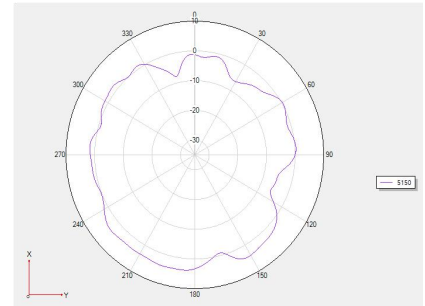
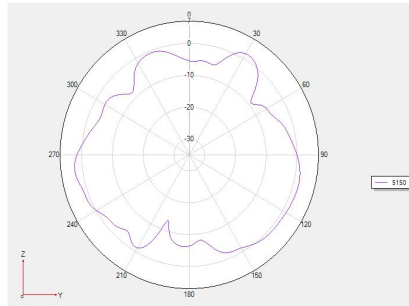
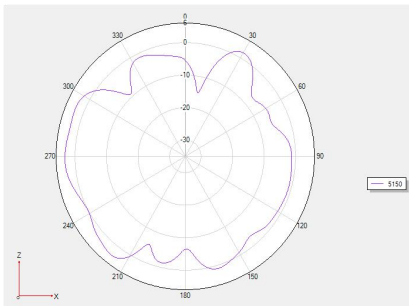




Phi =0 freq=5150MHz

Phi =90 freq=5150MHz

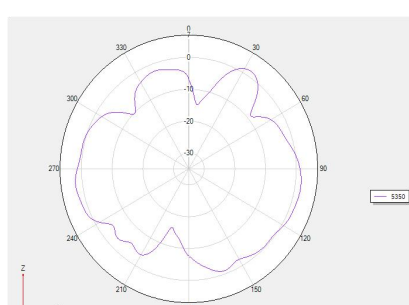
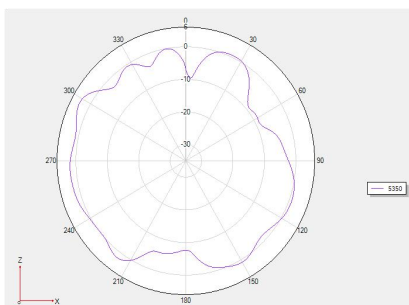
Theta =90 freq=5150MHz



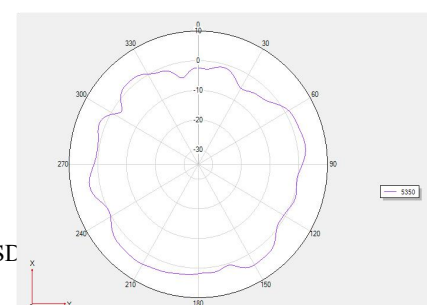
Phi =0 freq=5350MHz

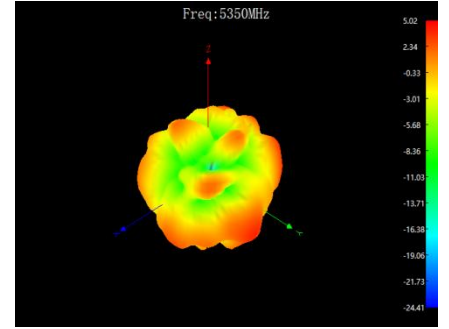
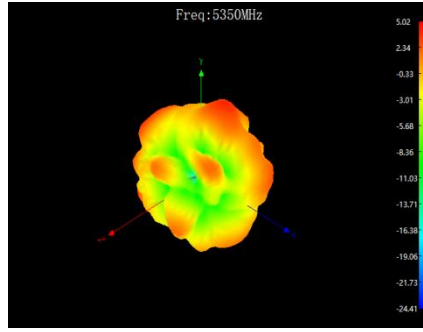
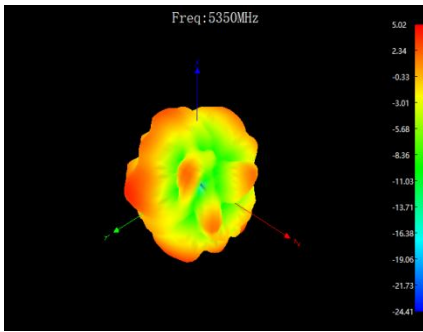
Phi =90 freq=5350MHz

Theta =90 freq=5350MHz

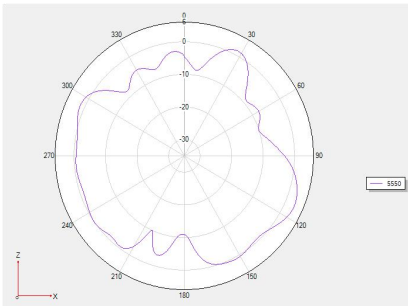


(C)SE

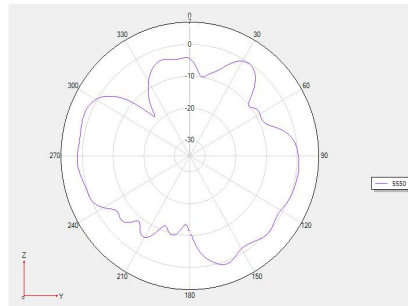




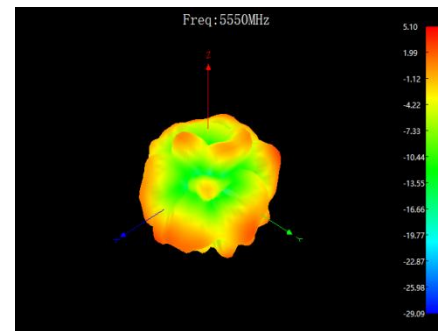
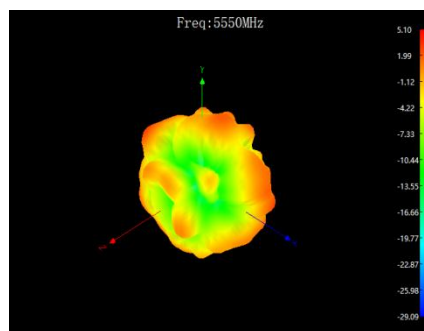
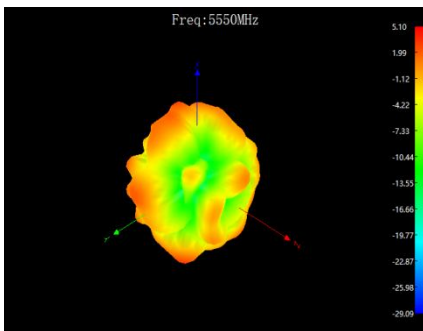
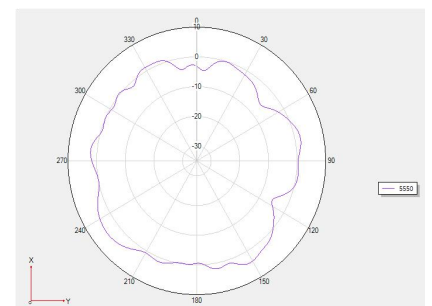
Phi =0 freq=5500MHz



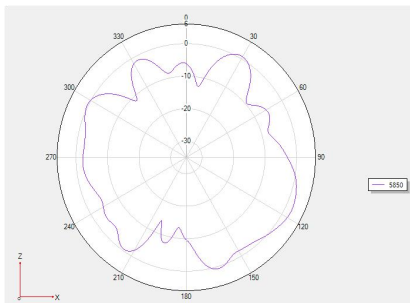
Phi =90 freq=5500MHz



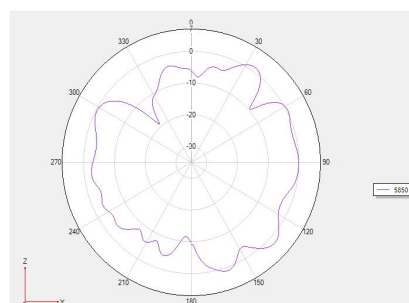
Theta =90 freq=5500MHz



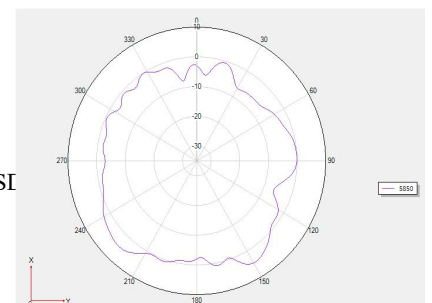
Phi =0 freq=5850MHz



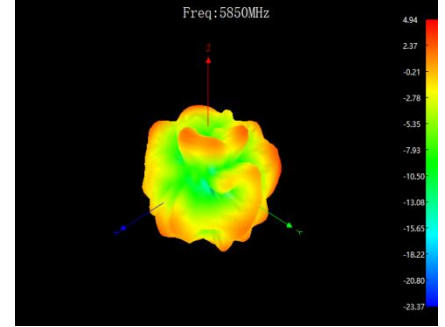
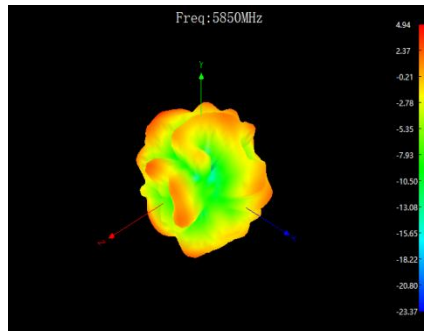
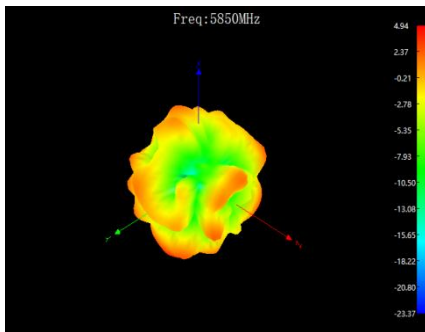
Phi =90 freq=5850MHz



Theta =90 freq=5850MHz



(C)SI

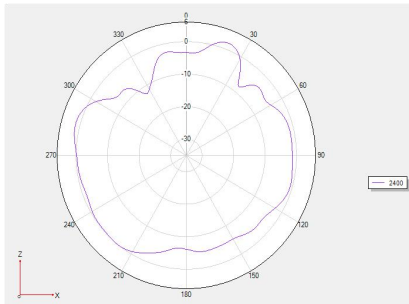


2.4G/5.8GLong line					
2.4G			5.8G		
Frequency / MHz	Gain/ dBi	Efficiency / %	Frequency / MHz	Gain/ dBi	Efficiency / %
2400	4.45	72.92	5150	4.67	57.15
2410	3.62	65.04	5250	5.02	56.1
2420	3.88	69.73	5350	5.39	54.33
2430	3.63	66.04	5450	5.1	55.72
2440	3.66	65.53	5550	5.34	57.94
2450	3.37	68.18	5650	4.6	54.33
2460	3.93	69.97	5750	5.1	55.21
2470	3.77	67.36	5850	4.9	51.88
2480	3.42	64.2			
2490	3.79	69.36			
2500	4.36	71.76			

2.4G/5.8GLong line 天线方向图-2.4G(Antenna direction diagram - 2.4G/5.8G)



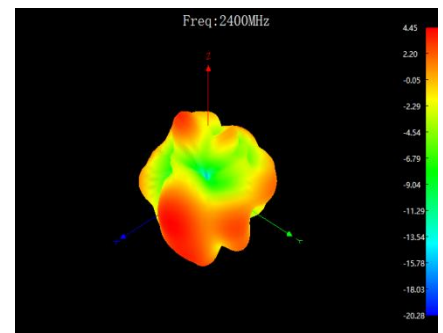
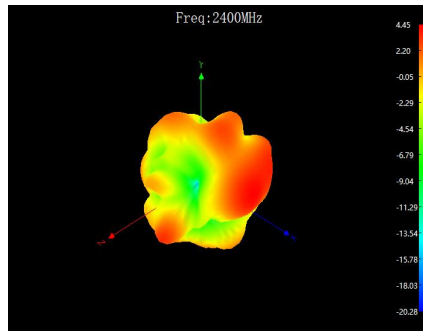
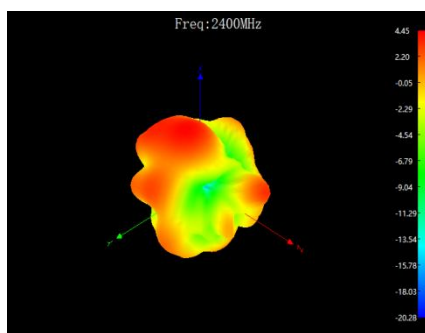
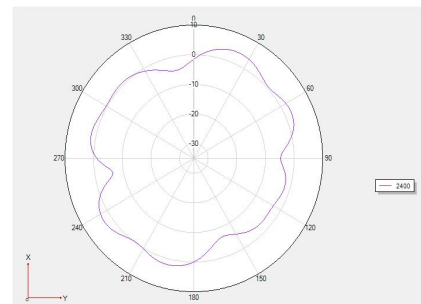
Phi =0 freq=2400MHz



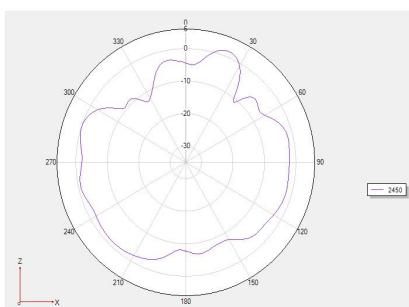
Phi =90 freq=2400MHz



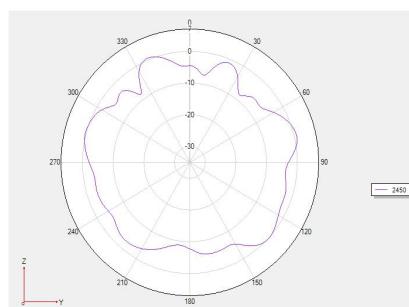
Theta =90 freq=2400MHz



Phi =0 freq=2450MHz

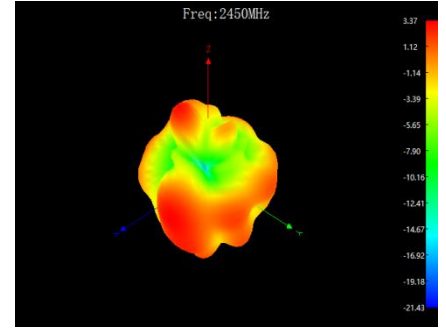
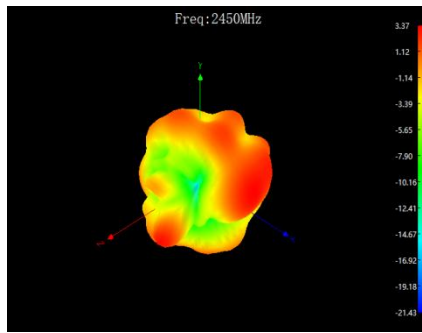
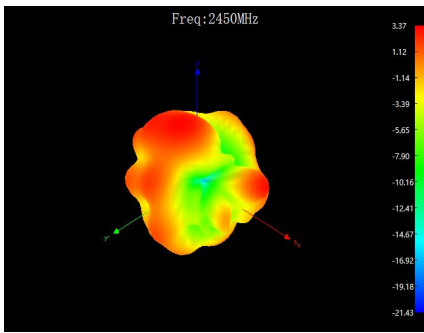


Phi =90 freq=2450MHz



Theta =90 freq=2450MHz

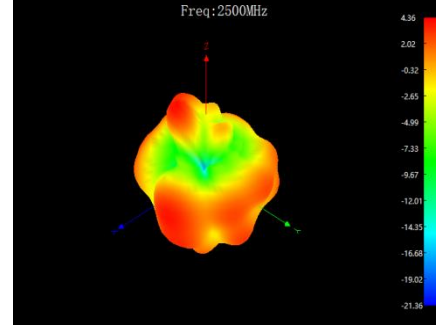
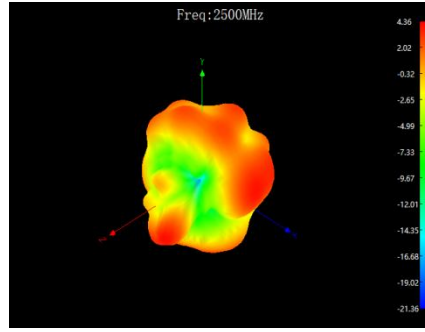
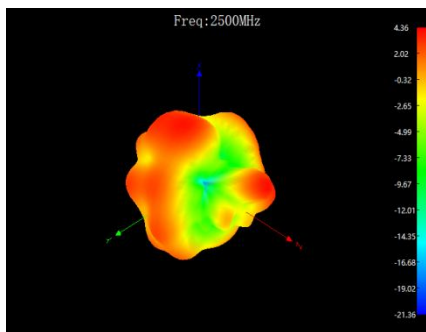
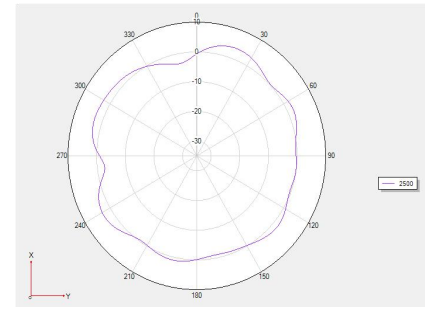
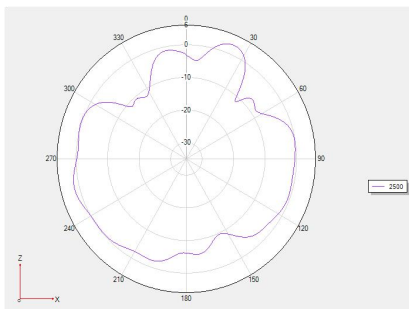




Phi =0 freq=2500MHz

Phi =90 freq=2500MHz

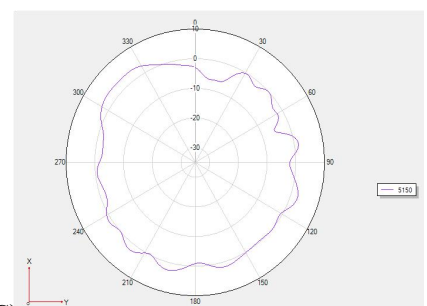
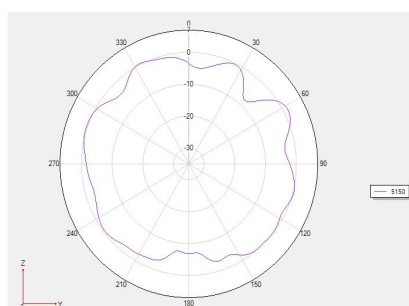
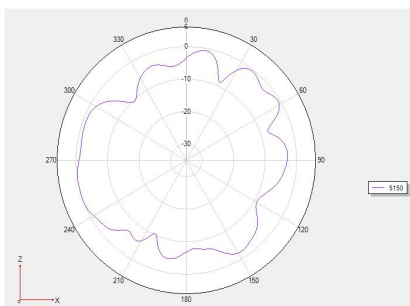
Theta =90 freq=2500MHz

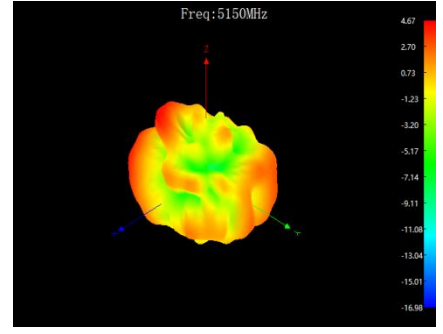
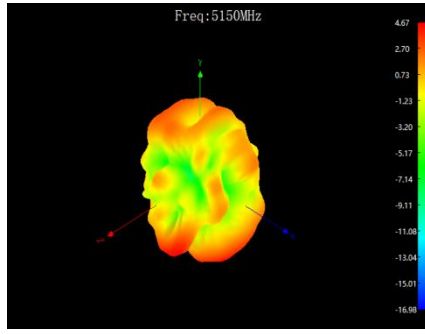
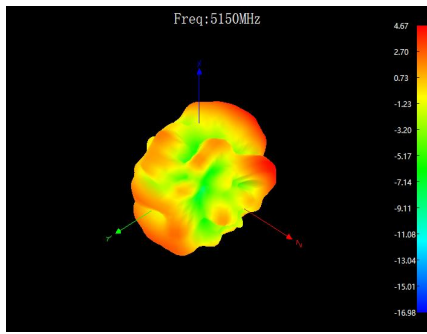


Phi =0 freq=5150MHz

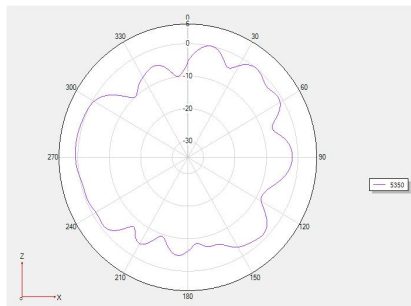
Phi =90 freq=5150MHz

Theta =90 freq=5150MHz

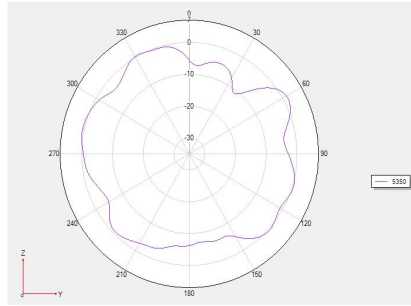




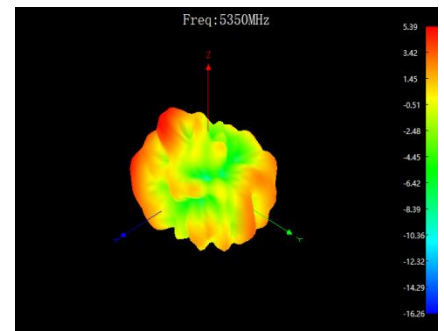
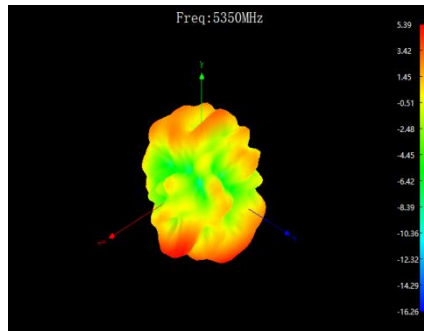
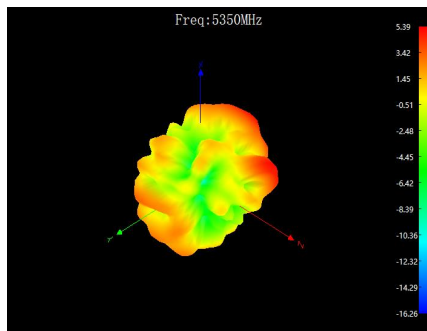
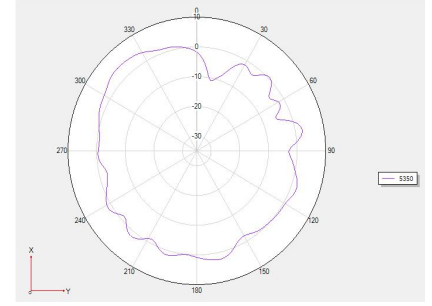
Phi =0 freq=5350MHz



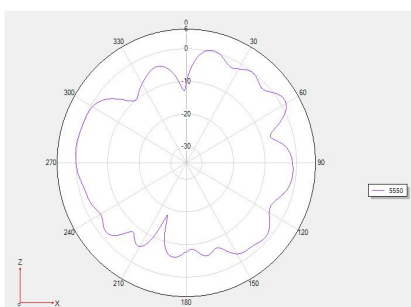
Phi =90 freq=5350MHz



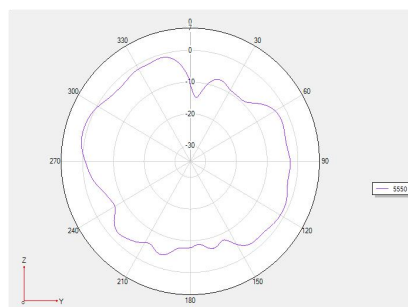
Theta =90 freq=5350MHz



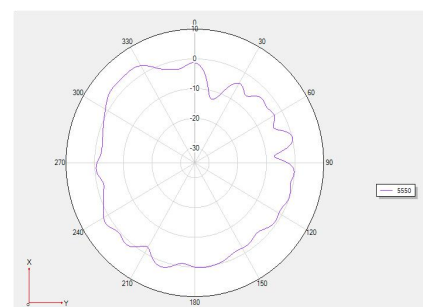
Phi =0 freq=5500MHz

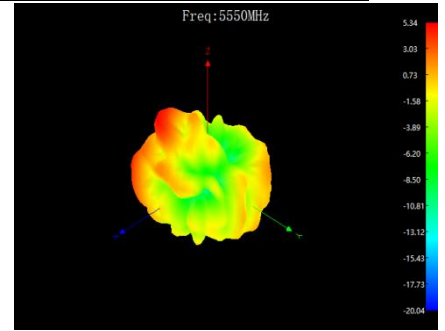
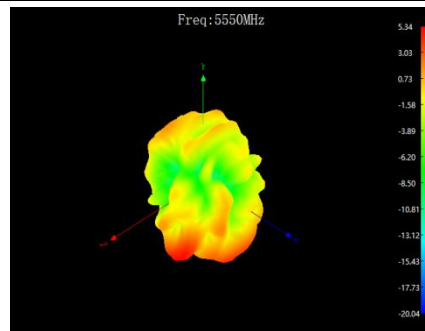
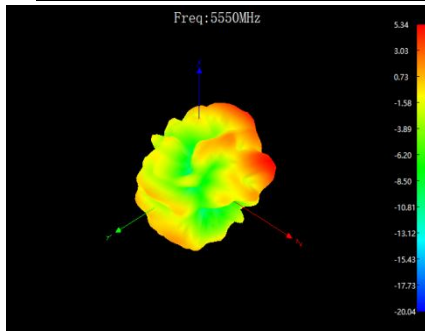


Phi =90 freq=5500MHz

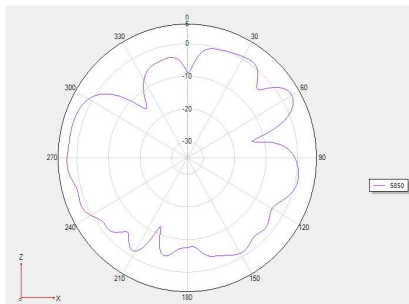


Theta =90 freq=5500MHz

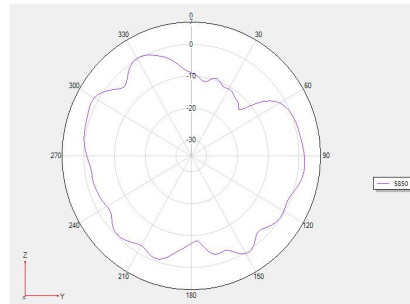




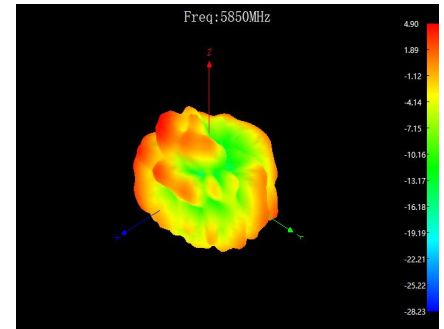
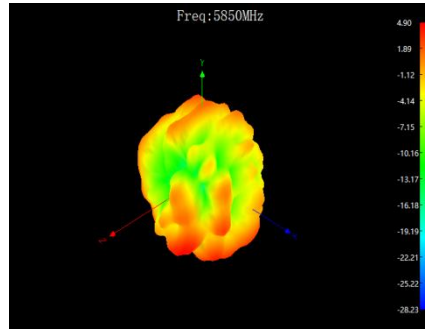
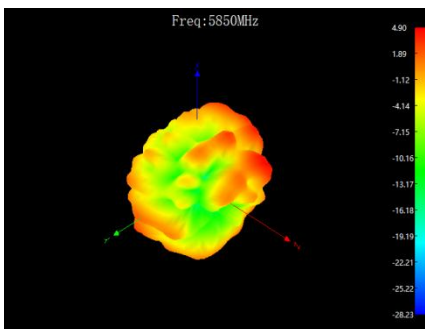
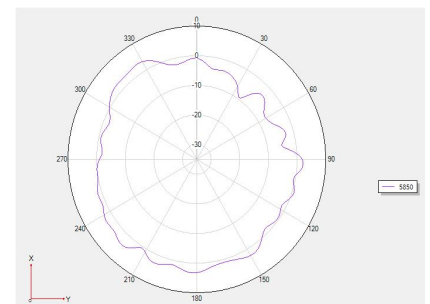
Phi =0 freq=5850MHz



Phi =90 freq=5850MHz



Theta =90 freq=5850MHz



5.8GLong line		
5.8G		
Frequency / MHz	Gain/ dBi	Efficiency / %
5150	4.71	66.22
5250	4.47	64.57
5350	4.72	62.37
5450	4.93	62.95



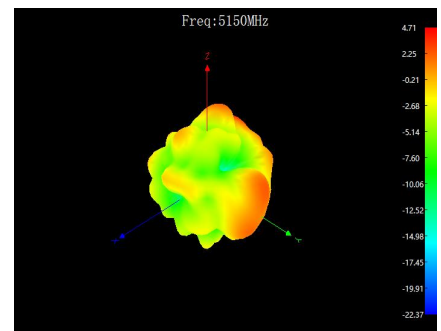
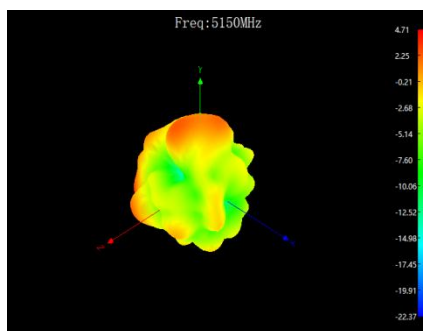
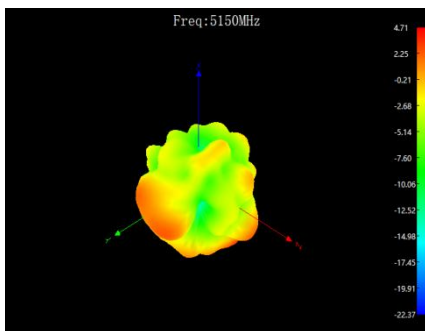
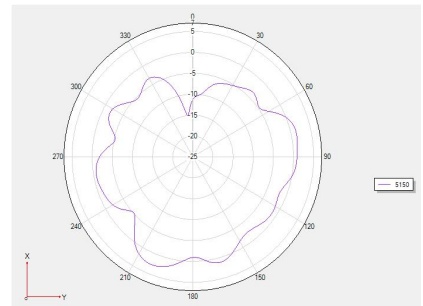
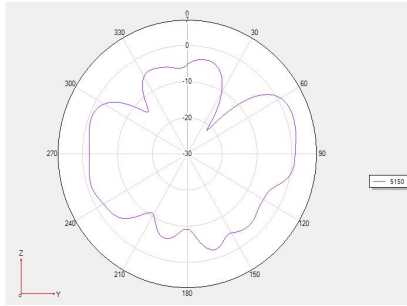
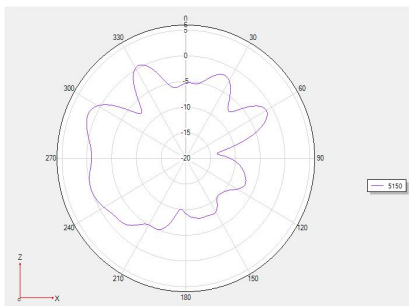
5550	5.06	65.61
5650	4.78	61.38
5750	4.59	62.66
5850	4.97	59.98

5.8G Long line 天线方向图-5.8G (Antenna direction diagram - 5.8G)

Phi =0 freq=5150MHz

Phi =90 freq=5150MHz

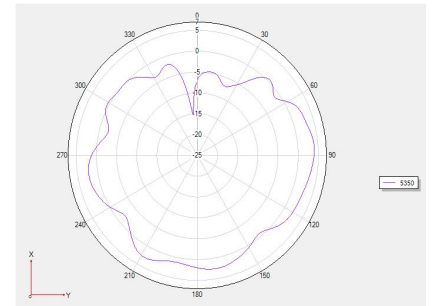
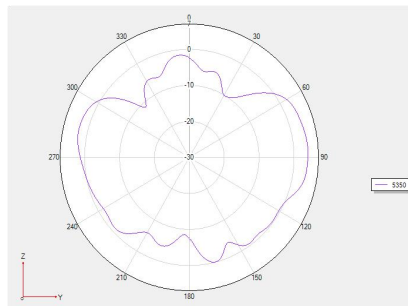
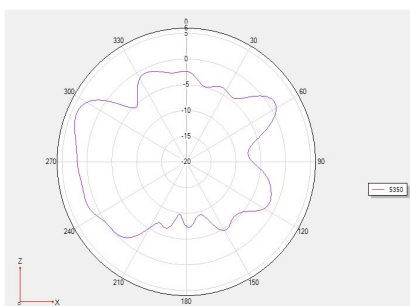
Theta =90 freq=5150MHz

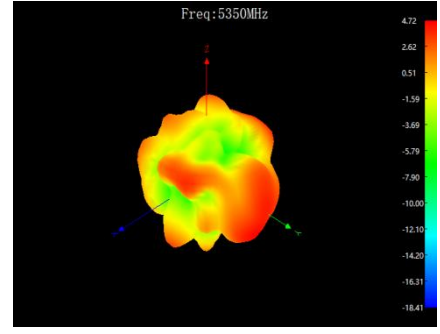
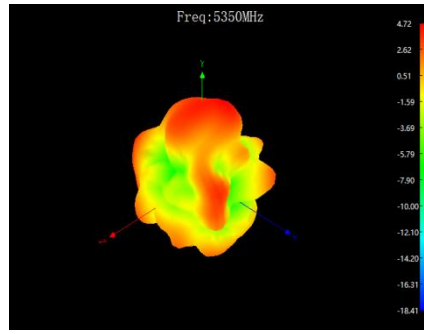
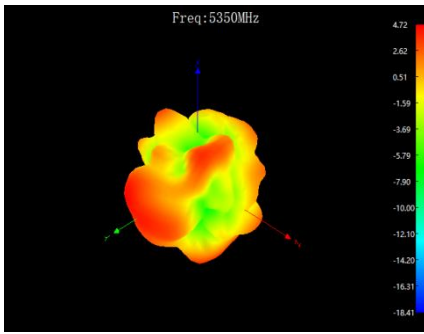


Phi =0 freq=5350MHz

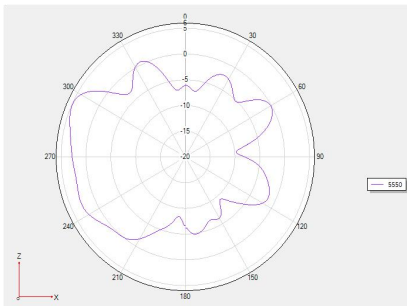
Phi =90 freq=5350MHz

Theta =90 freq=5350MHz

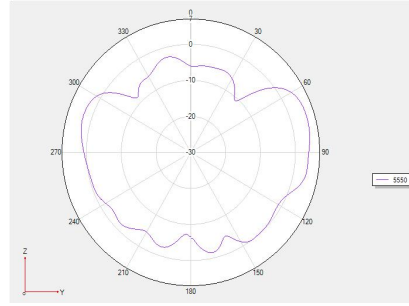




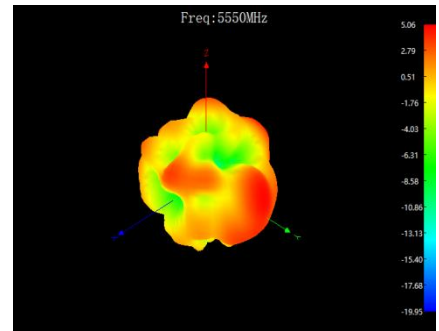
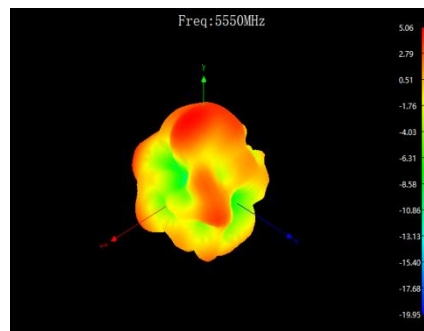
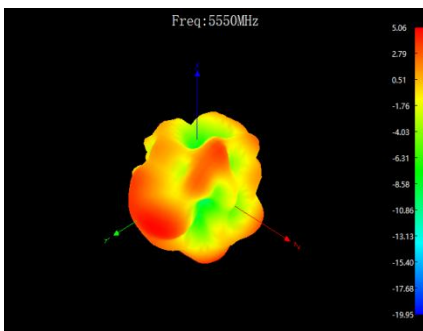
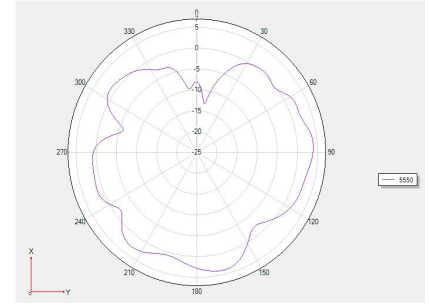
Phi =0 freq=5500MHz



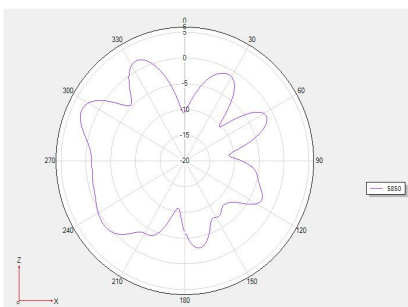
Phi =90 freq=5500MHz



Theta =90 freq=5500MHz



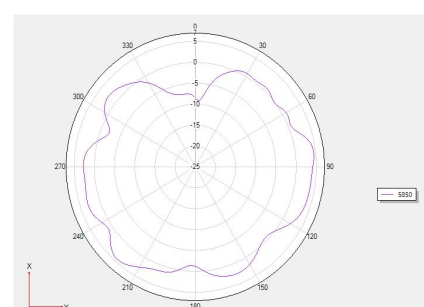
Phi =0 freq=5850MHz

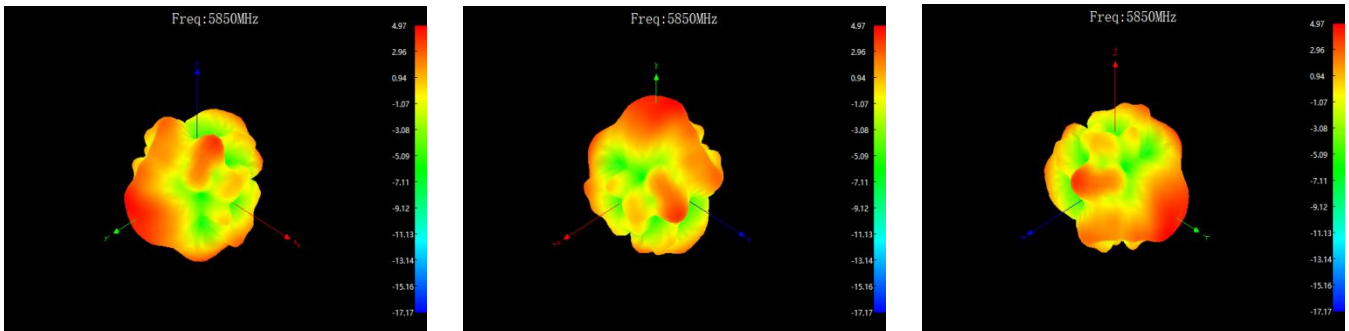


Phi =90 freq=5850MHz



Theta =90 freq=5850MHz





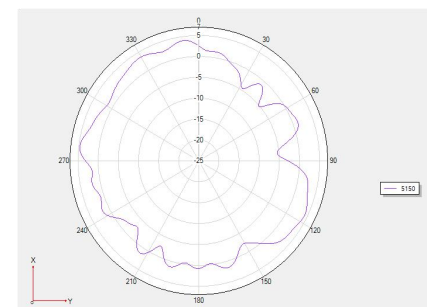
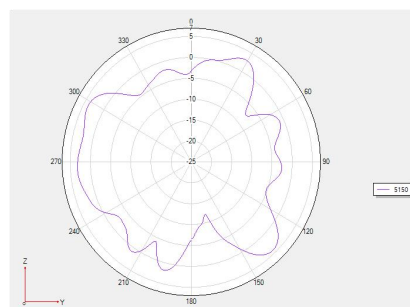
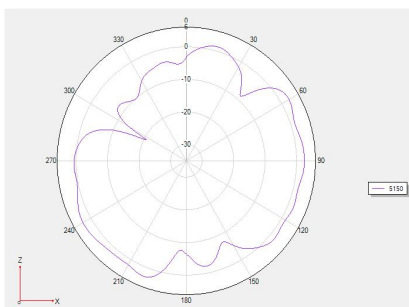
5.8GShort line		
5.8G		
Frequency / MHz	Gain/ dBi	Efficiency / %
5150	4.97	62.95
5250	5.06	62.95
5350	4.97	61.66
5450	5.2	61.09
5550	5.36	63.1
5650	4.84	58.75
5750	5.08	59.98
5850	5.23	57.41

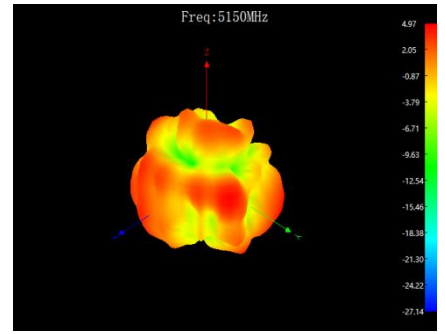
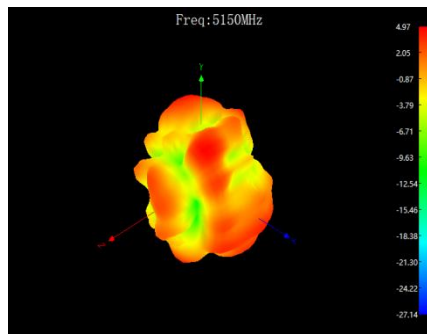
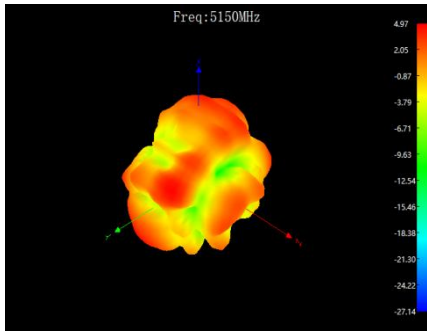
5.8GShort line 天线方向图-5.8G(Antenna direction diagram -5.8G)

Phi =0 freq=5150MHz

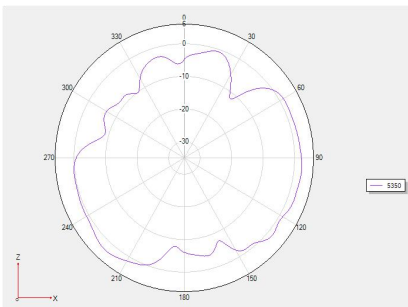
Phi =90 freq=5150MHz

Theta =90 freq=5150MHz

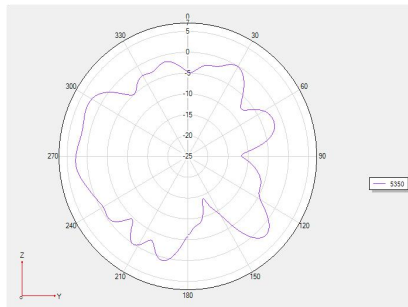




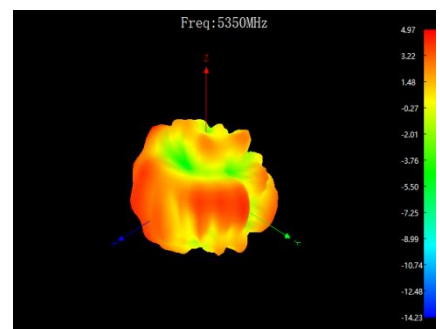
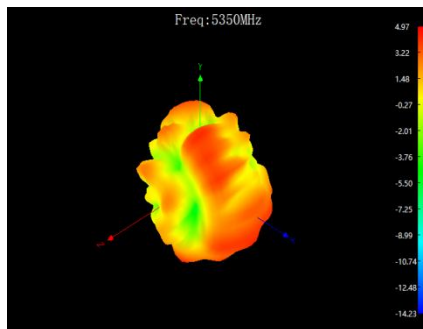
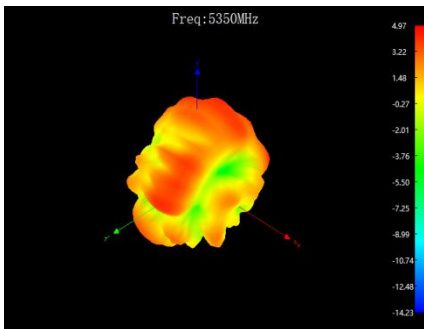
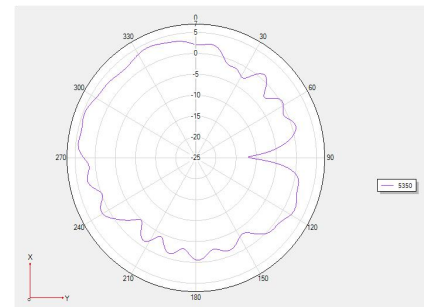
Phi =0 freq=5350MHz



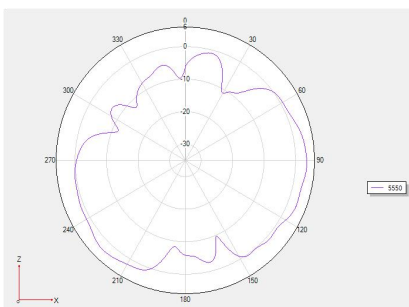
Phi =90 freq=5350MHz



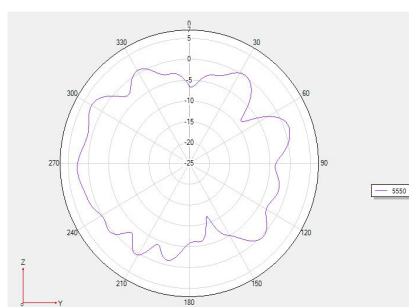
Theta =90 freq=5350MHz



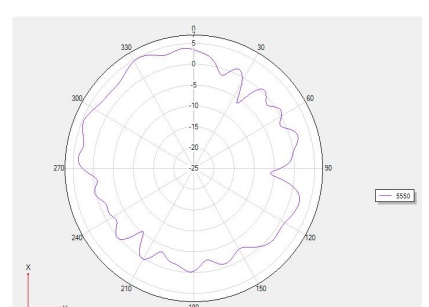
Phi =0 freq=5550MHz



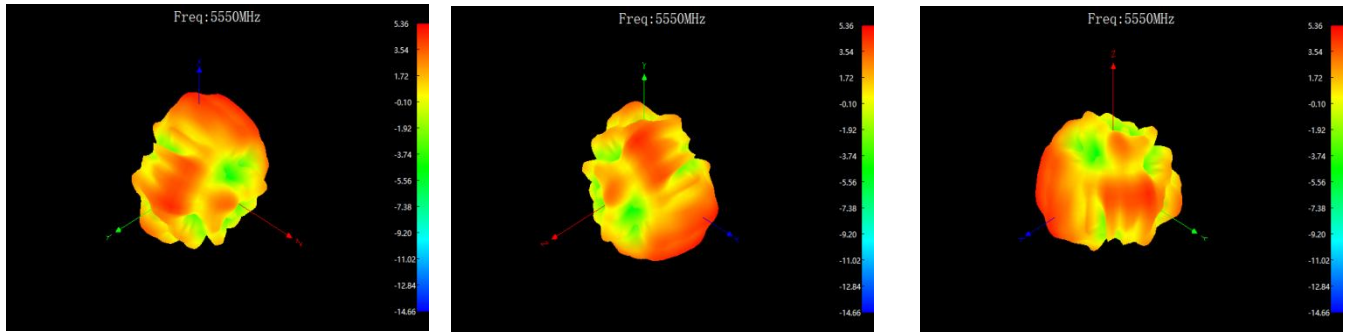
Phi =90 freq=5550MHz



Theta =90 freq=5550MHz



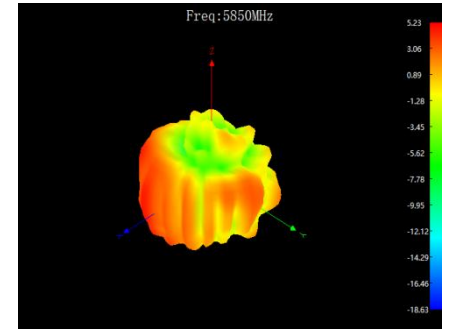
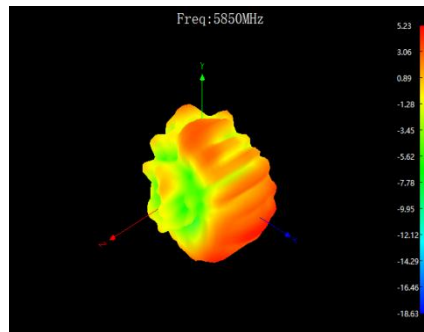
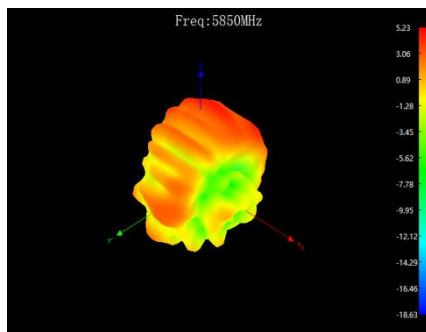
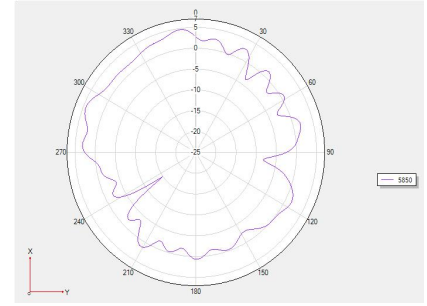
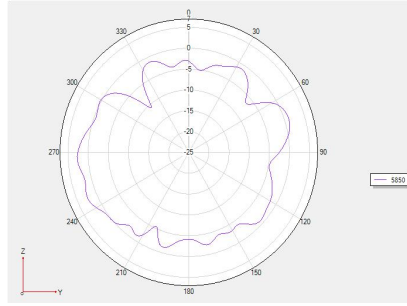
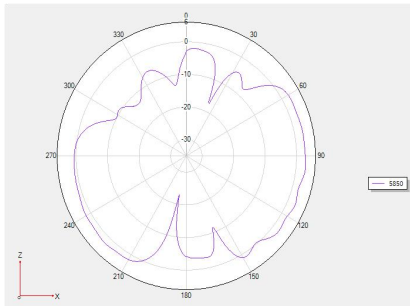




Phi =0 freq=5850MHz

Phi =90 freq=5850MHz

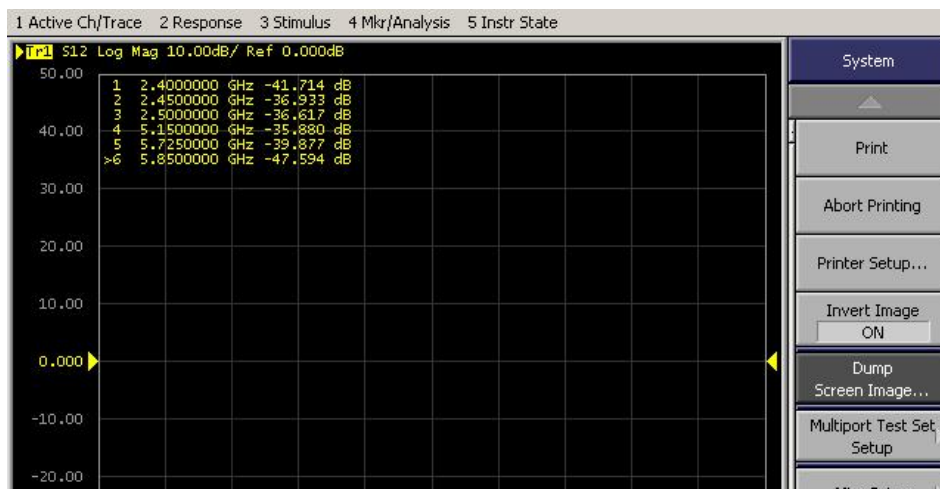
Theta =90 freq=5850MHz



### 3.1.3 Antenna isolation

Test tools: network analyzer: ( E5017B)

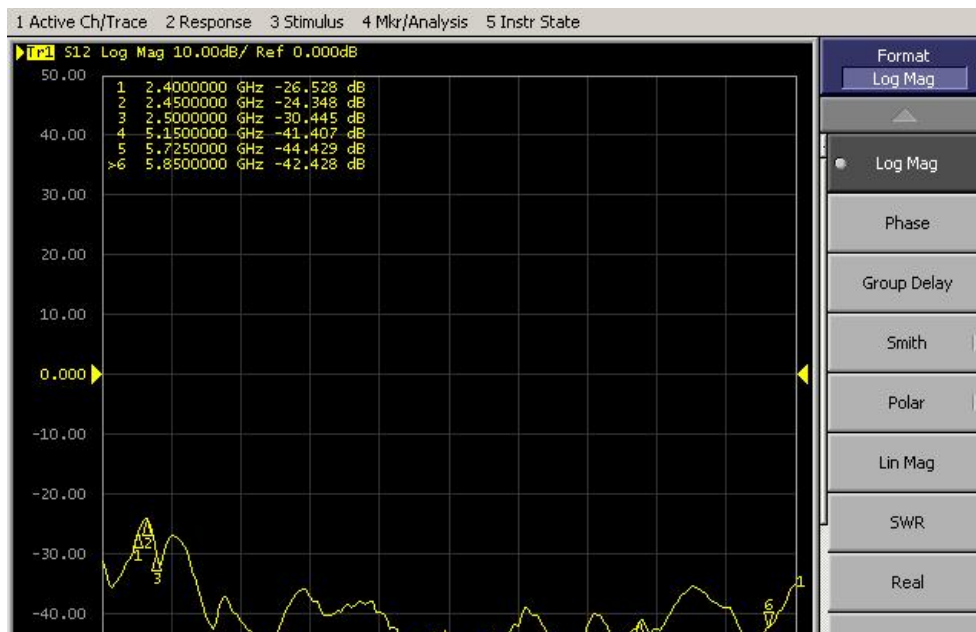
Standard: Isolation  $\leq$  -20dB



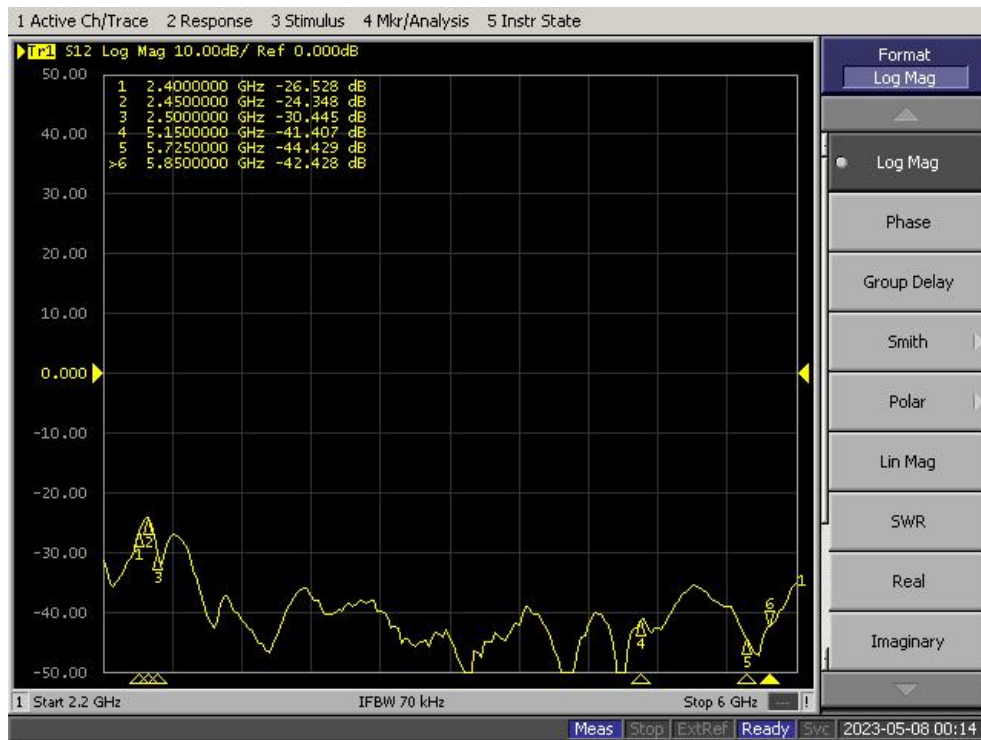
双频长线--5.8G 短线 隔离度 (Dual frequency) - 5.8G (Short line) isolation )



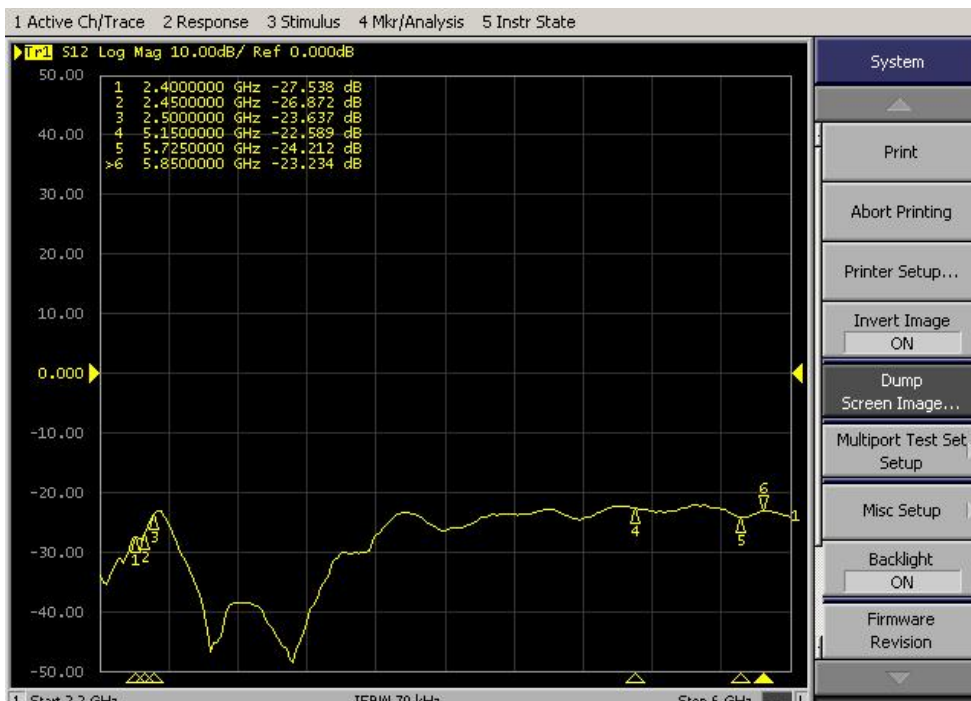
双频长线--5.8G 长线 隔离度 (Dual frequency) - 5.8G (Long line) isolation )



双频长线--双频短线 隔离度 (Dual frequency) - (Double frequency short line) isolation )



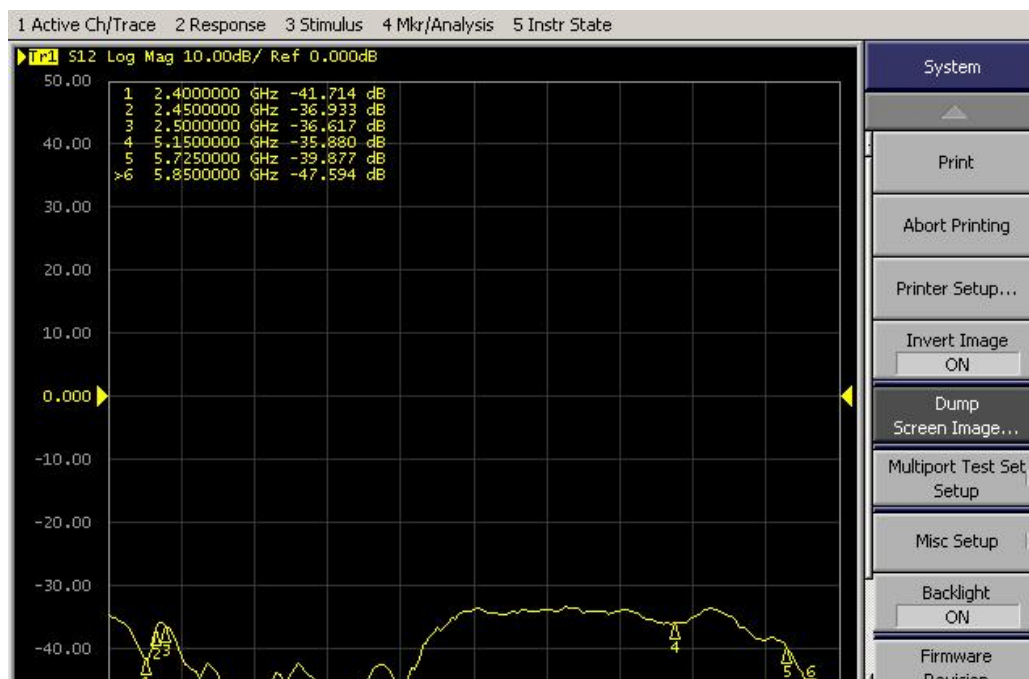
双频短线--双频长线 隔离度 (Double frequency short line) - (Dual frequency) isolation )



双频短线--5.8G 长线 隔离度 (Double frequency short line) - 5.8G (Long line) isolation )



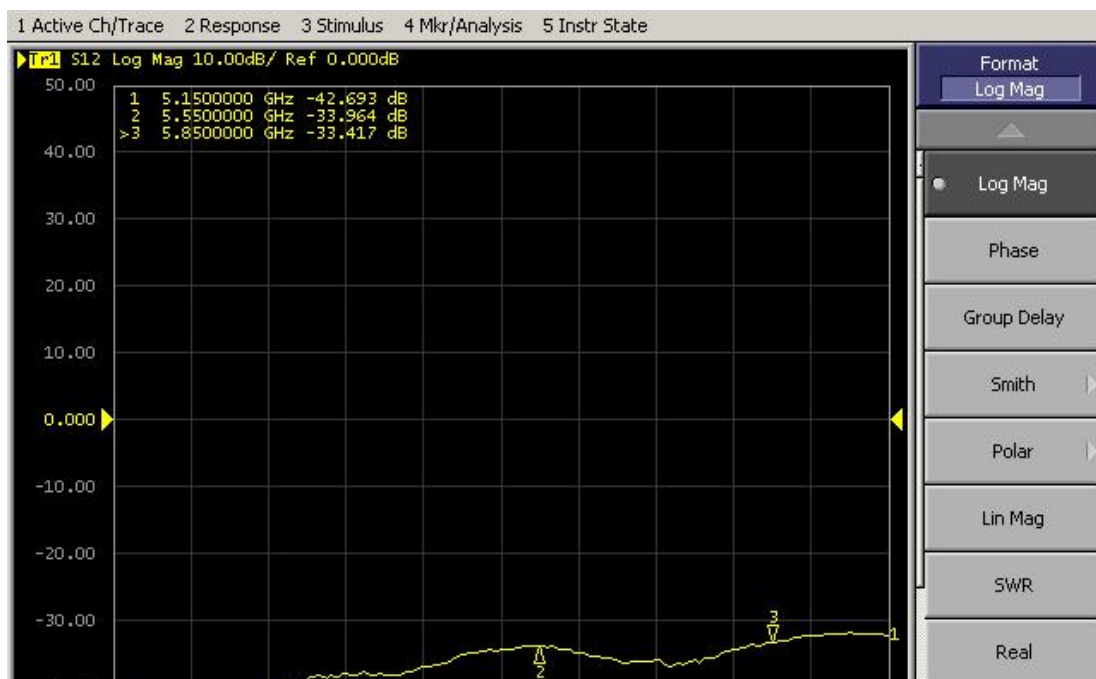
双频短线--5.8G 短线 隔离度 (Double frequency short line) - 5.8G (short line) isolation )



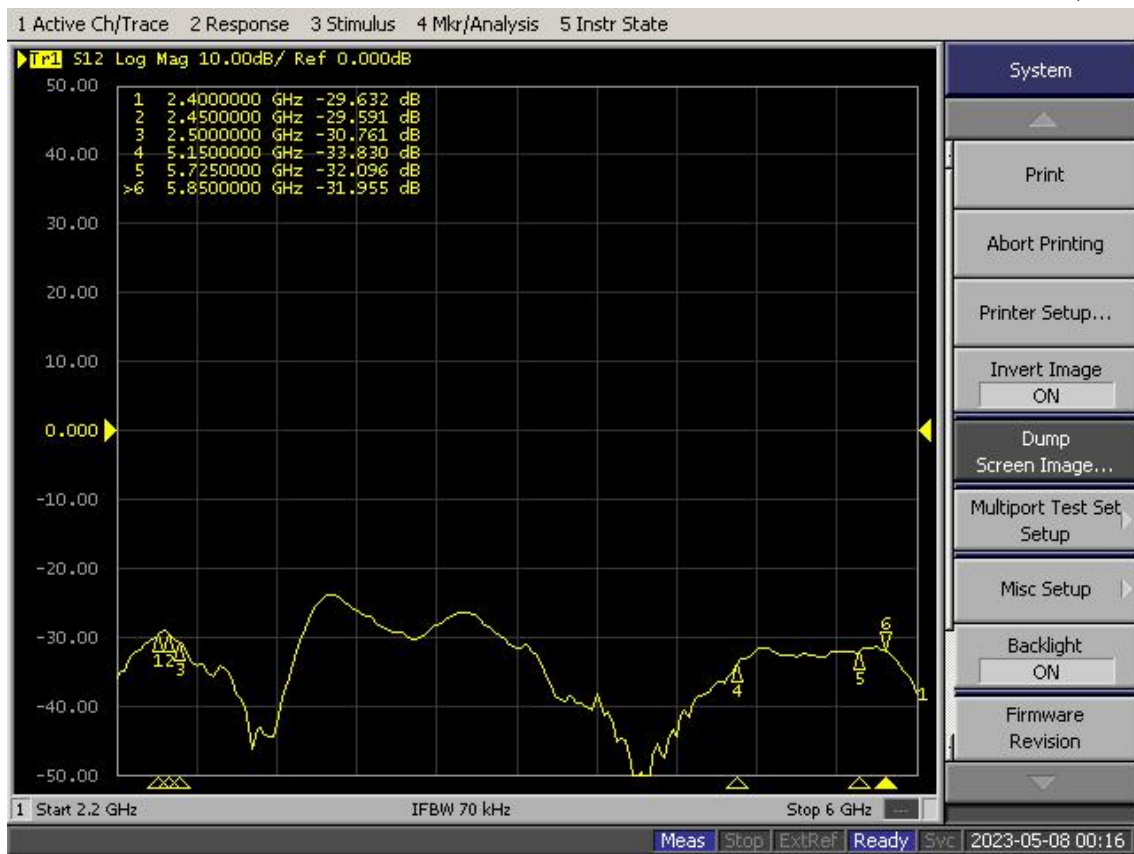
5.8G 短线--双频长线 隔离度( 5.8G (Short line) - (Dual frequency) isolation )



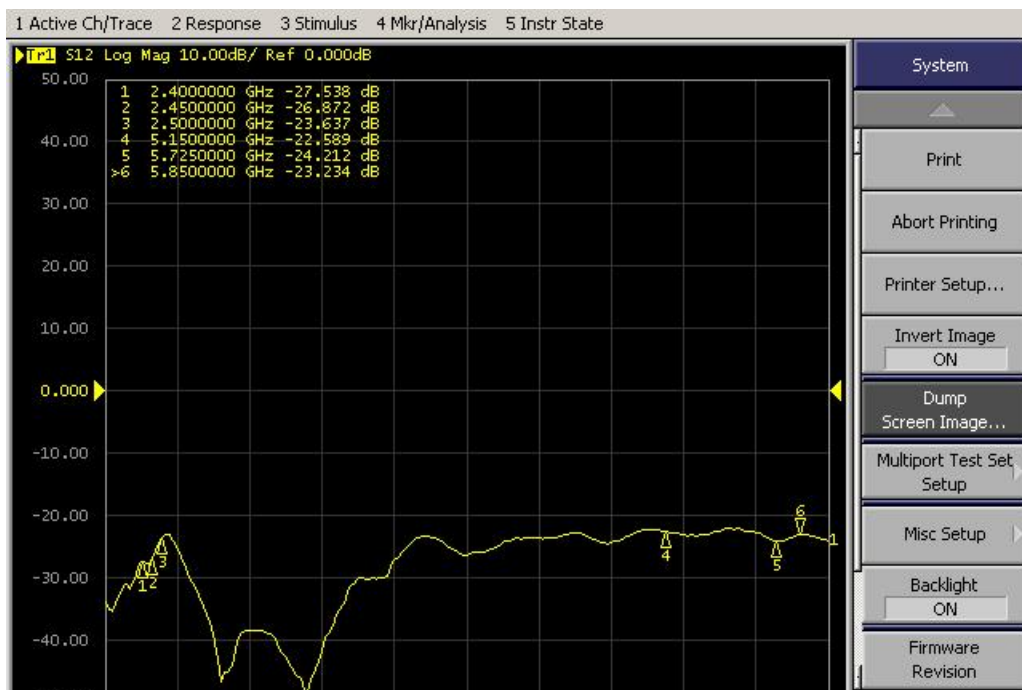
5.8G 短线--双频短线 隔离度 5.8G (short line) - (Double frequency short line) isolation )



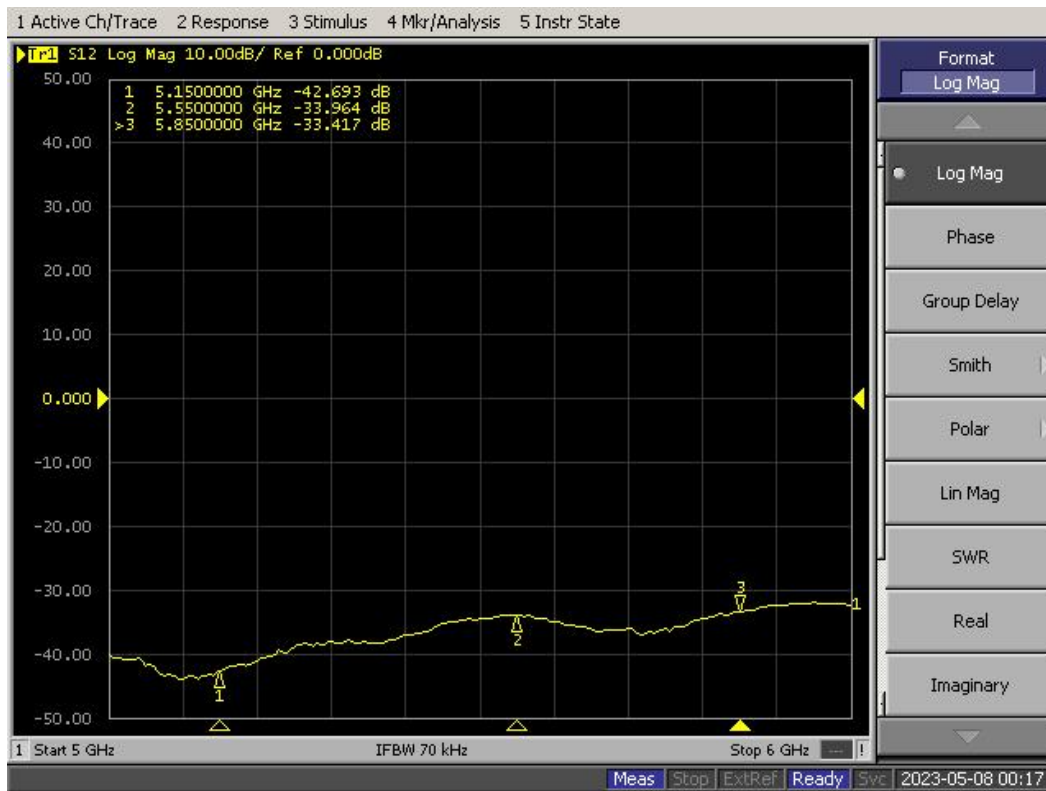
5.8G 短线-5.8G 长线 隔离度 5.8G (short line) -5.8G ((Long line)) isolation )



5.8G 长线--双频长线 隔离度( 5.8G (Long line) - (Dual frequency) isolation )



5.8G 长线--双频短线 隔离度( 5.8G (Long line) - (Double frequency short line) isolation )



5.8G 短线-5.8G 短线 隔离度 5.8G (Long line) -5.8G (short line) isolation )

**3.2 Antenna active test**

Test tools: Microwave Anechoic Chamber+ROHDE&SCHWARZ CMW 500

Standard: As shown in the table

Testing Environment: Same as passive test

OTA active test data statistics:

Item	Measurement	Band	Channel	Frequency	Total
1	TRP	WIFI_B (11M)	1	2412	16.56
2	TRP	WIFI_B (11M)	6	2437	16.81
3	TRP	WIFI_B (11M)	11	2462	16.99

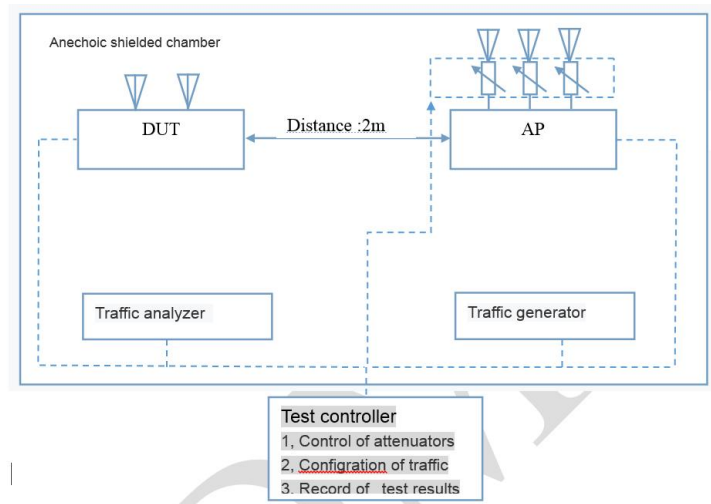


4	TIS(EIRP)	WIFI_B (11M)	1	2412	-73.66
5	TIS(EIRP)	WIFI_B (11M)	6	2437	-75.41
6	TIS(EIRP)	WIFI_B (11M)	11	2462	-78.92
7	TRP	WIFI_G (54M)	1	2412	15.32
8	TRP	WIFI_G (54M)	6	2437	15.09
9	TRP	WIFI_G (54M)	11	2462	15.85
10	TIS(EIRP)	WIFI_G (54M)	1	2412	-65.28
11	TIS(EIRP)	WIFI_G (54M)	6	2437	-64.11
12	TIS(EIRP)	WIFI_G (54M)	11	2462	-65.51
13	TRP	WIFI_N_ISM (65M)	1	2412	15.82
14	TRP	WIFI_N_ISM (65M)	6	2437	15.08
15	TRP	WIFI_N_ISM (65M)	11	2462	17.33
16	TIS(EIRP)	WIFI_N_ISM (65M)	1	2412	-61.89
17	TIS(EIRP)	WIFI_N_ISM (65M)	6	2437	-59.6
18	TIS(EIRP)	WIFI_N_ISM (65M)	11	2462	-60.53
19	TRP	WIFI_A (54M)	36	5180	24.42
20	TRP	WIFI_A (54M)	149	5745	24.1
21	TRP	WIFI_A (54M)	165	5825	24.63
22	TIS(EIRP)	WIFI_A (54M)	36	5180	-74.99
23	TIS(EIRP)	WIFI_A (54M)	149	5745	-79.04
24	TIS(EIRP)	WIFI_A (54M)	165	5825	-77.34

## 4.Throughput Test

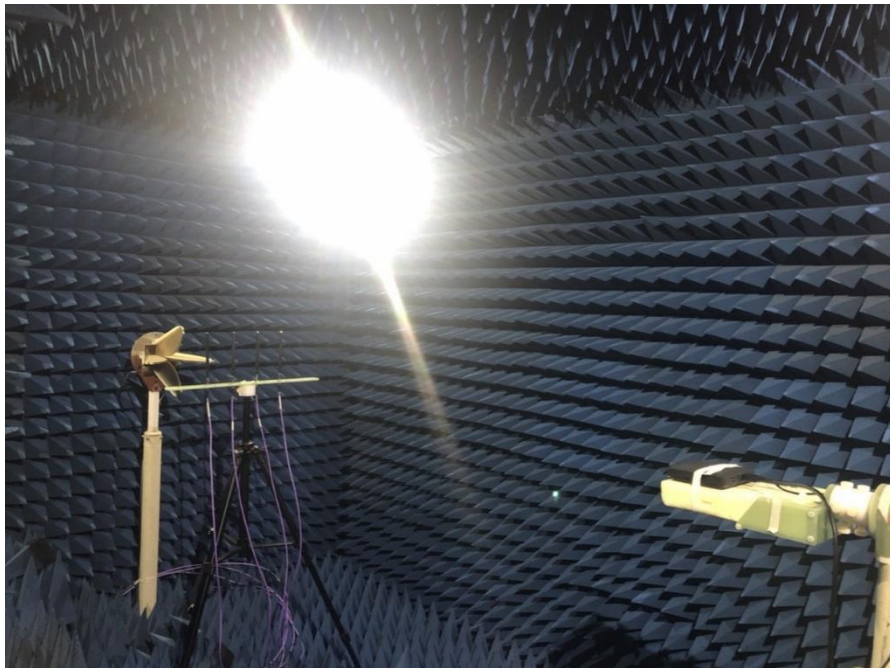
### 4.1 Test Setup





1. The test setup SHALL locate in the anechoic shielded chamber.
2. A Traffic Generator/Analyzer, sending the Ethernet packets, connects to the LAN interface of the AP. The peer AP antenna is located in 2 meter to the DUT.
3. Additional attenuation is added in each RF chain of AP to simulate the incremental distance.
4. The host SHALL send the Ethernet packet at the maximum rate which the DUT can achieve theoretically.
5. TCP connection SHALL be used for Ethernet packet transmission in the test.

## 4.2 Testing Environment



### 4.3 Test data



WiFi throughput  
test record table.}