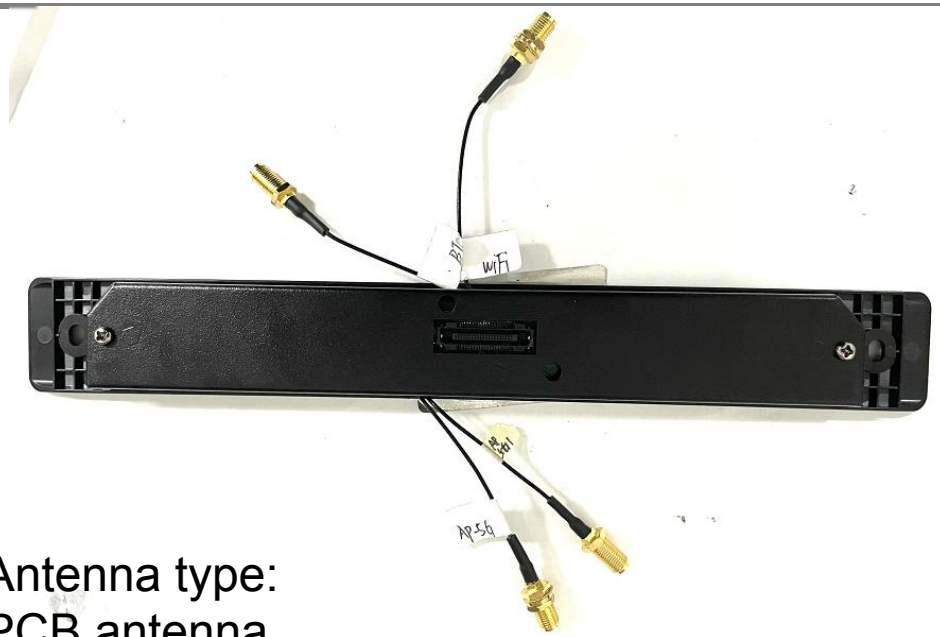
Antenna Test Report-01

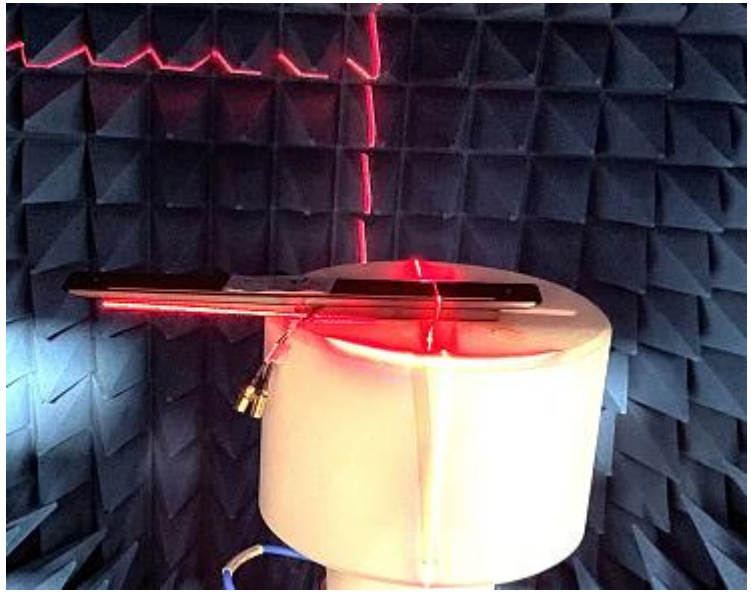
2022-09-09

Confidential

Test Setup



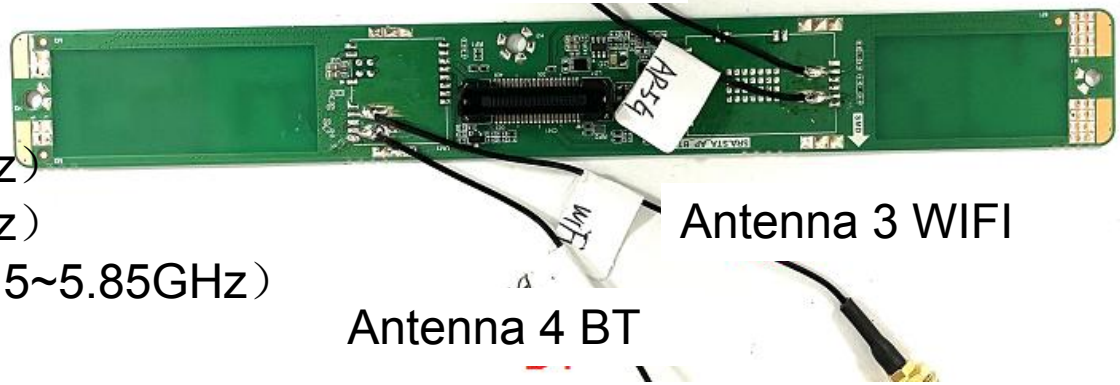
Antenna type:
PCB antenna



Antenna 1 AP

Antenna Dimension : 200mmX24.8mm

Antenna 2 AP



Antenna 3 WIFI

Antenna 4 BT

Antenna 1 AP（5.15~5.85GHz）
Antenna 2 AP（5.15~5.85GHz）
Antenna 3 WIFI（2.4GHz+5.15~5.85GHz）
Antenna 4 BT（2.4GHz）

Equipment list and test method

1,VSWR&Return loss&Smith-Antenna 4 BT（Equipment：Agilent Network Analyzer）
2，VSWR&Return loss&Smith-Antenna 3Wifi（Equipment：Agilent Network Analyzer）
3，VSWR&Return loss&Smith- Antenna 1 AP（Equipment：Agilent Network Analyzer）
4，VSWR&Return loss&Smith- Antenna 2 AP（Equipment：Agilent Network Analyzer）
5，Passive efficiency and gain -Antenna 4 BT and Antenna 3 WIFI（Equipment： antenna chamber）
6，Passive efficiency and gain - Antenna 1 AP（Equipment： antenna chamber）
7，Passive efficiency and gain - Antenna 2 AP（Equipment： antenna chamber）
8， 2D&3D radiation pattern - Antenna 4 BT and Antenna 3 WIFI（Equipment： antenna chamber）
9， 2D&3D radiation pattern - Antenna 1 AP （Equipment： antenna chamber）
10， 2D&3D radiation pattern- Antenna 2 AP（Equipment： antenna chamber）

Equipment list and test method

Equipment	Manufacturer	Model No.	Serial No.	cal.date	cal.Due
Network Analyzer	Agilent	E5071C	MY42301894	2021.10.12	2022.10.11
Test Chamber	Sunyield	SY-16M			
Test software	PMS V2.8.5				
Computer fixture	Sunyield				

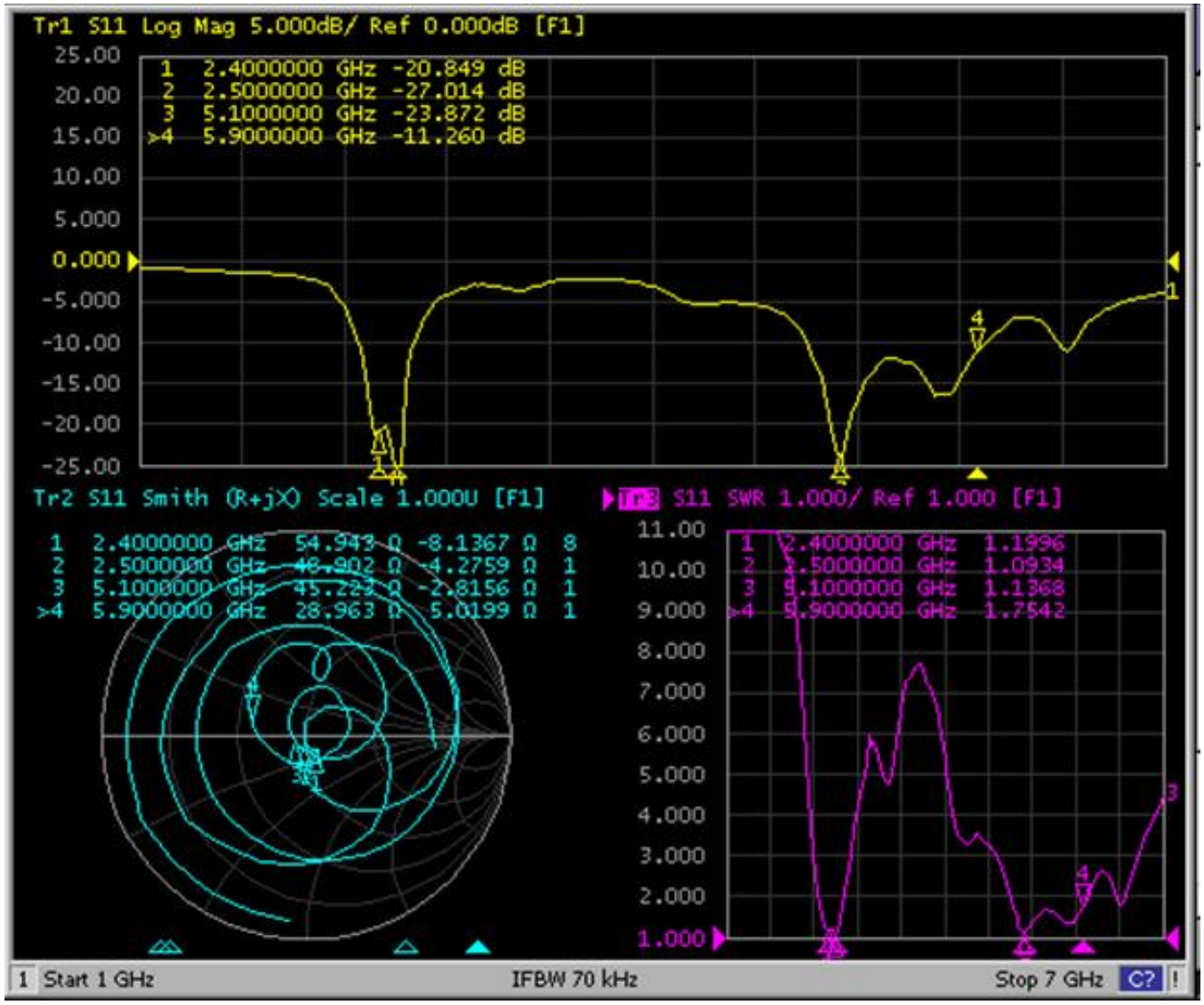
Item 1-4 test：
Turn on the power supply of the network analyzer, set the test frequency band and display items, use the calibration part for network branch registration, determine the network division, test line, test connector stability, connect the PCB antenna SMA port to the network analyzer test line port, directly test VSWR&Return loss&Smith, save the test data.

Item 5-10 test：
Start the antenna chamber test system, operating more than 30 minutes, use the antenna chamber stability calibration antenna test, confirm the antenna chamber stabilized, the tested PCB antenna placed in antenna chamber (block), SMA connector SMA interface connection in the antenna chamber test line, closed antenna chamber door. Set up the passive related test set, start the antenna chamber automatic test software, measuring the efficiency of passive and gain, 2D&3D radiation pattern data, savethe test data.

Note: All PCB layouts were tested and the worst case of all are reported and used for compliance purposes.

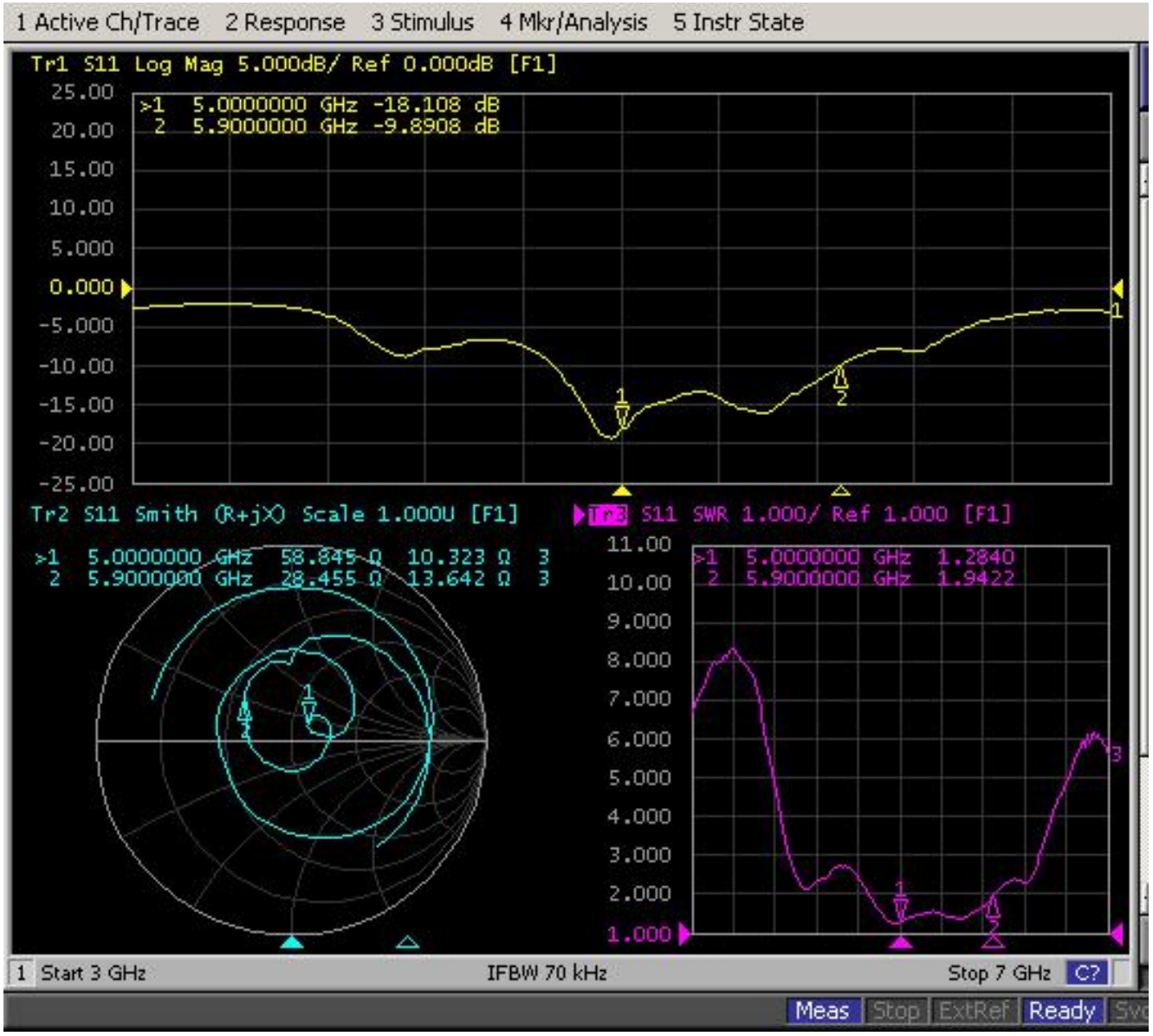
VSWR&Return loss&Smith-Antenna 4 BT

VSWR&Return loss&Smith- Antenna 3 WIFI

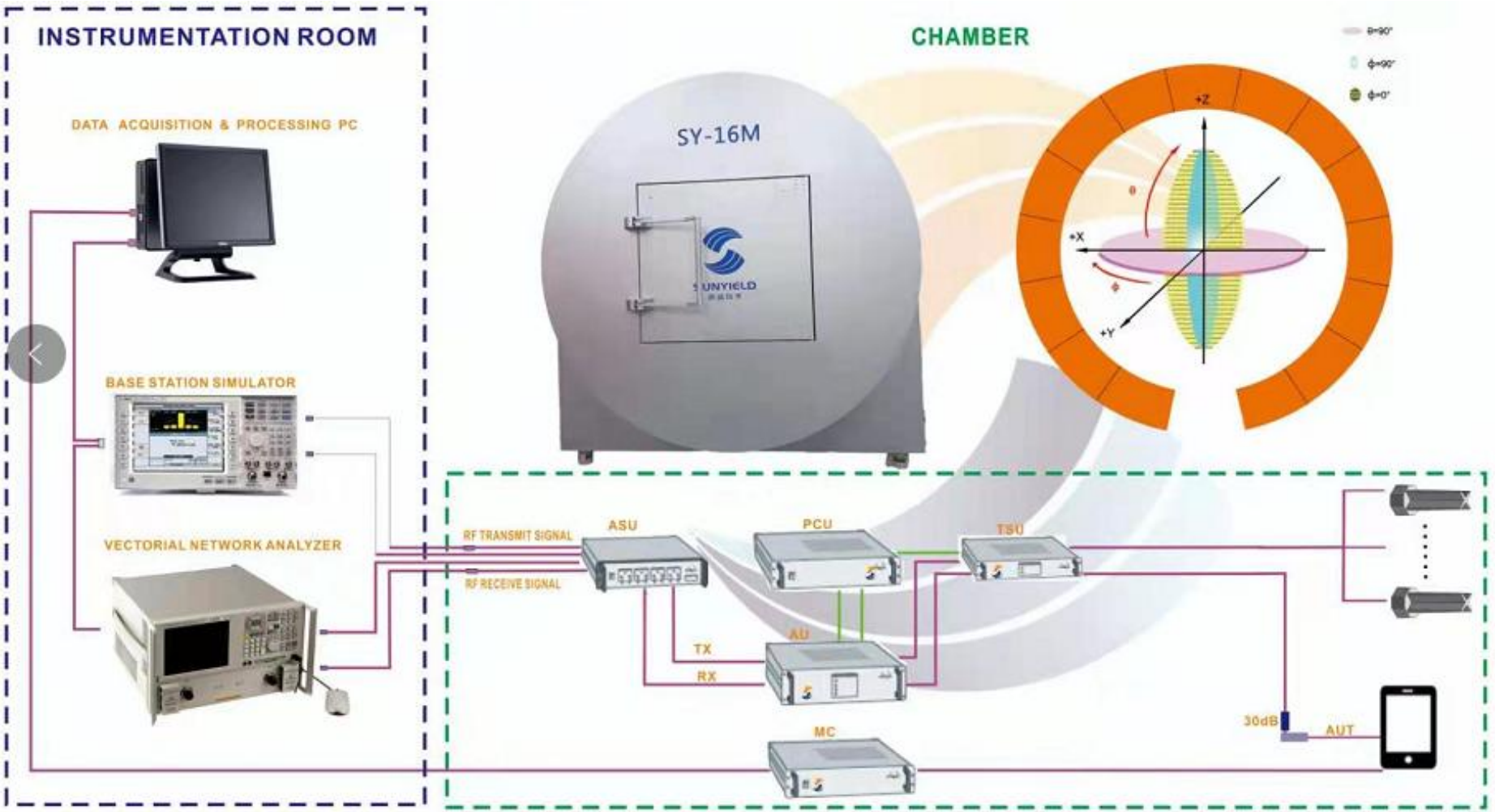


VSWR&Return loss&Smith-Antenna 1 AP

VSWR&Return loss&Smith-Antenna 2 AP



Active and passive test method



Antenna Test System

Passive efficiency and gain -Antenna 4 BT &Antenna 3 WIFI

frequency 频率(MHz)	gain 增益(dBi)	efficiency 效率(dB)	efficiency 效率(%)
2400	-0.17	-4.69	33.95
2410	-0.15	-4.78	33.23
2420	0	-4.57	34.95
2430	-0.1	-4.46	35.84
2440	-0.16	-4.79	33.15
2450	-0.27	-4.82	32.94
2460	-0.36	-4.71	33.8
2470	-0.22	-4.81	33.07
2480	-0.27	-4.9	32.39
2490	-0.45	-5.19	30.29
2500	-0.3	-5.04	31.3

Antenna 4 BT

frequency 频率(MHz)	gain 增益(dBi)	efficiency 效率(dB)	efficiency 效率(%)
2400	0.38	-4.59	34.77
2410	0.43	-4.63	34.42
2420	0.46	-4.43	36.06
2430	0.62	-4.17	38.25
2440	0.58	-4.33	36.88
2450	0.59	-4.21	37.92
2460	0.52	-4.03	39.49
2470	1	-4.03	39.55
2480	0.82	-3.93	40.45
2490	0.71	-4.2	38.01
2500	0.76	-4.16	38.36

Antenna 3 WIFI

frequency 频率(MHz)	gain 增益(dBi)	efficiency 效率(dB)	efficiency 效率(%)
5000	1.32	-4.04	39.43
5050	1.54	-3.80	41.69
5100	1.66	-4.08	39.04
5150	1.7	-3.77	42.01
5200	1.43	-3.83	41.43
5250	1.66	-4.44	35.98
5300	1.32	-4.33	36.86
5350	1.2	-4.22	37.81
5400	1.11	-4.02	39.66
5450	1.17	-4.10	38.93
5500	1.01	-4.13	38.6
5550	0.77	-4.40	36.3
5600	0.87	-4.29	37.23
5650	0.91	-4.08	39.08
5700	0.45	-4.43	36.08
5750	0.68	-4.14	38.52
5800	0.96	-4.35	36.72
5850	0.55	-4.46	35.85
5900	0.35	-4.47	35.7

Passive efficiency and gain -Antenna 1 AP &Antenna 2 AP

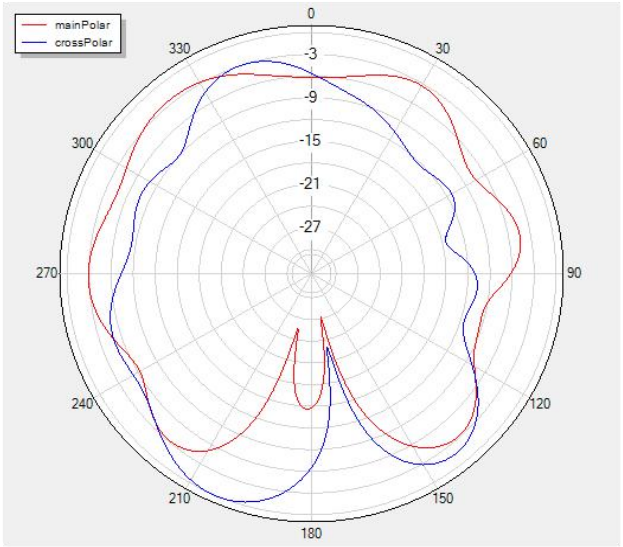
frequency 频率(MHz)	gain 增益(dBi)	efficiency 效率(dB)	efficiency 效率(%)
5000	1.66	-3.95	40.32
5050	1.37	-4.02	39.63
5100	1.7	-3.78	41.88
5150	1.64	-3.67	43
5200	1.51	-4.14	38.51
5250	1.7	-3.88	40.97
5300	1.41	-3.94	40.4
5350	1.35	-3.91	40.6
5400	1.5	-3.98	40.03
5450	0.76	-4.00	39.78
5500	0.9	-3.80	41.68
5550	0.78	-4.07	39.17
5600	0.37	-4.45	35.92
5650	0.55	-4.50	35.47
5700	0.17	-4.66	34.17
5750	0.23	-4.59	34.77
5800	0.15	-5.16	30.49
5850	0.8	-4.84	32.81
5900	1.18	-4.59	34.72

Antenna 1 AP

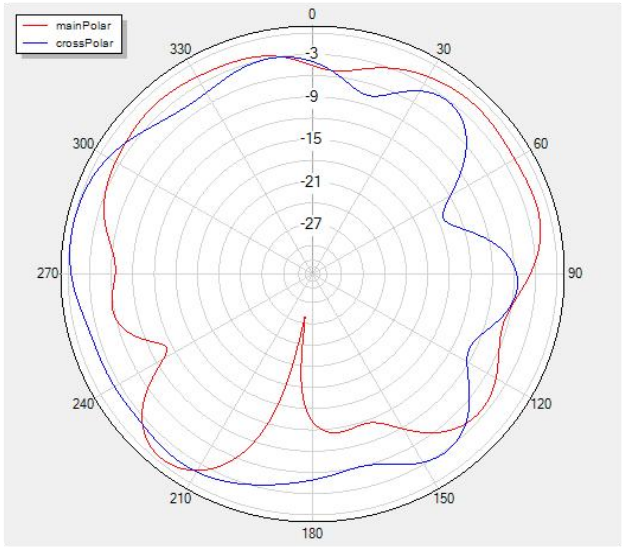
frequency 频率(MHz)	gain 增益(dBi)	efficiency 效率(dB)	efficiency 效率(%)
5000	0.91	-4.3	37.13
5050	1.04	-4.05	39.39
5100	1.53	-3.63	40.38
5150	1.65	-3.28	41.01
5200	1.62	-3.33	41.43
5250	0.97	-3.87	40.98
5300	1.66	-3.78	41.86
5350	1.54	-3.68	42.81
5400	1.7	-3.5	44.66
5450	1.52	-3.95	40.27
5500	1.51	-4.06	39.24
5550	1.47	-4.21	37.94
5600	1.37	-4.22	37.87
5650	1.21	-4.21	37.96
5700	1.25	-4.09	38.96
5750	0.92	-4.41	36.22
5800	0.94	-4.39	36.42
5850	0.95	-4.36	36.62
5900	0.85	-4.50	35.47

Antenna 2 AP

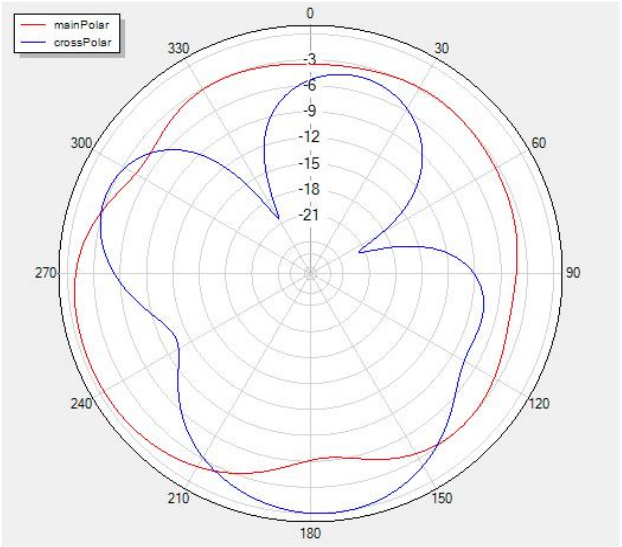
2D&3D radiation pattern -Antenna 4 BT



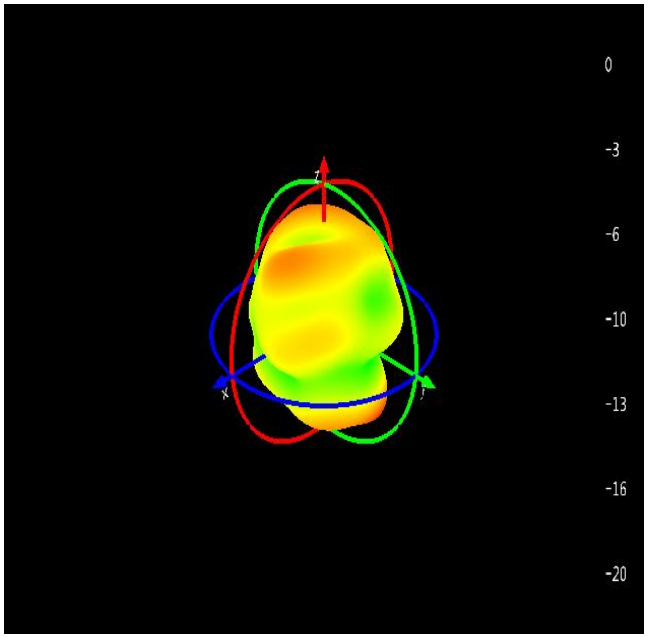
Phi=90



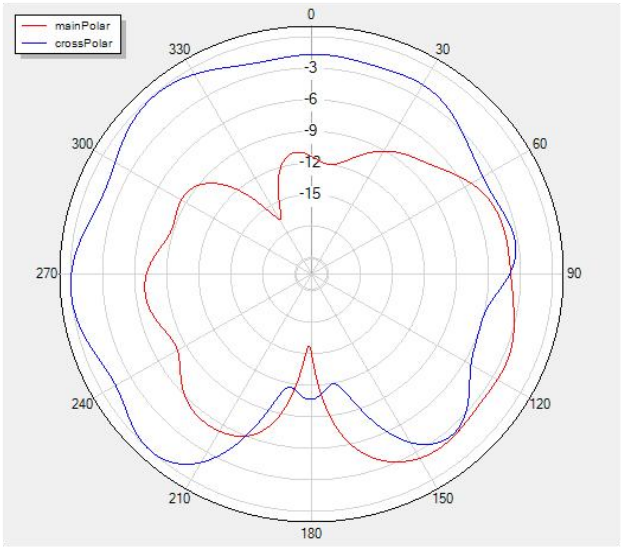
Phi=0



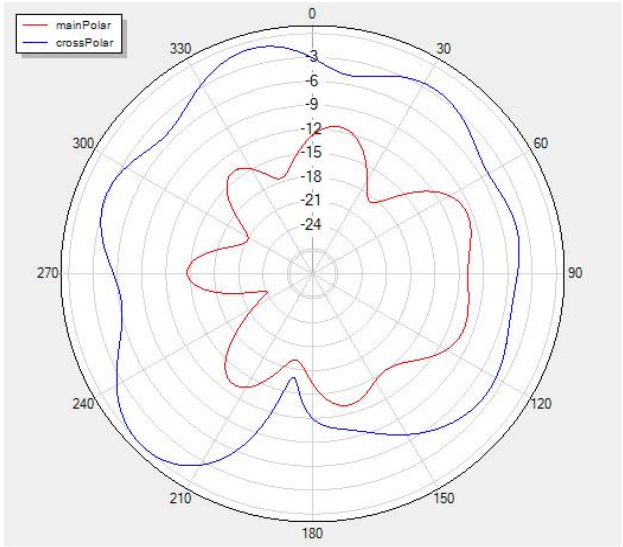
Theta=90



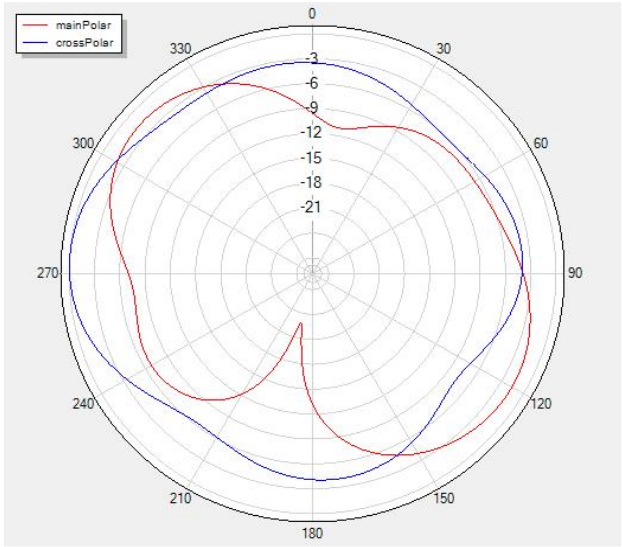
2D&3D radiation pattern -Antenna 3 WIFI



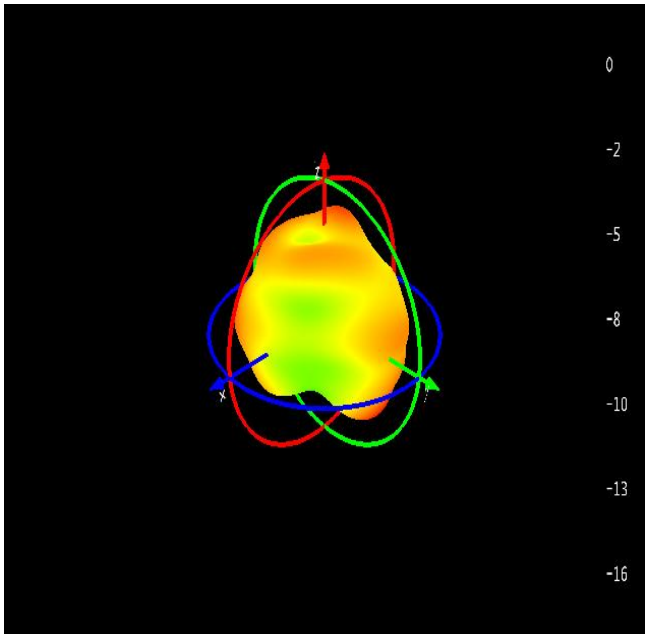
Phi=90



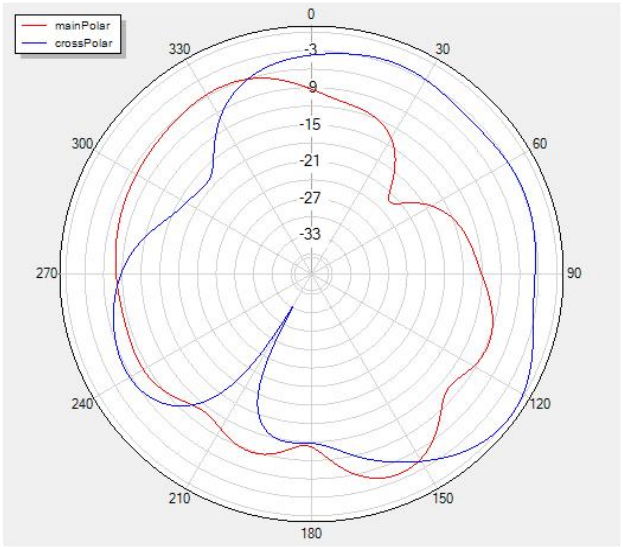
Phi=0



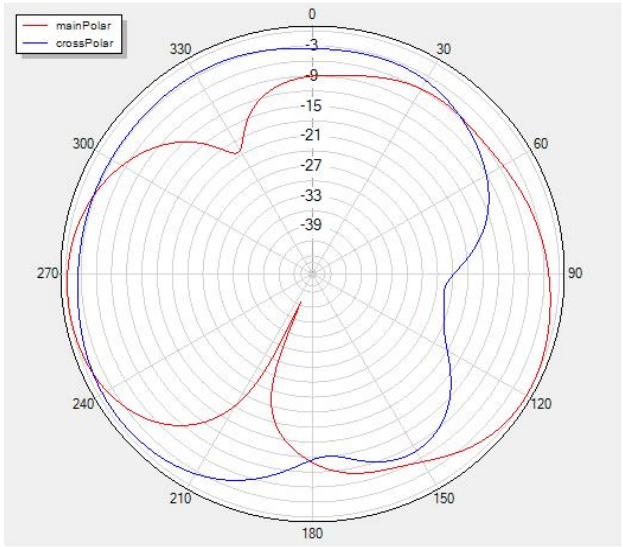
Theta=90



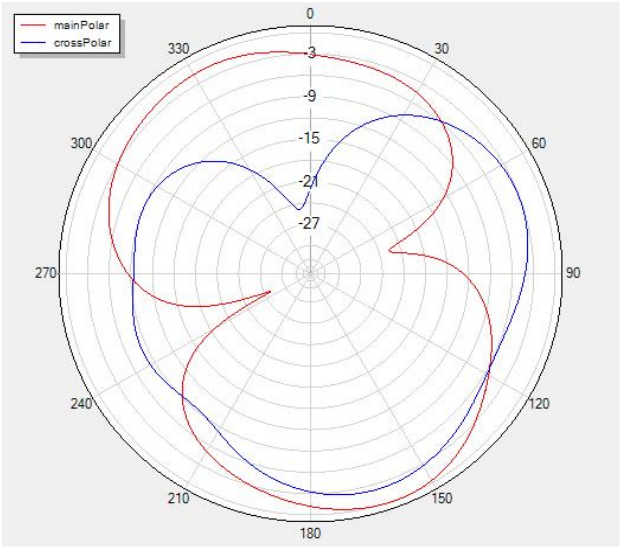
2D&3D radiation pattern -Antenna 3 WIFI (5G)



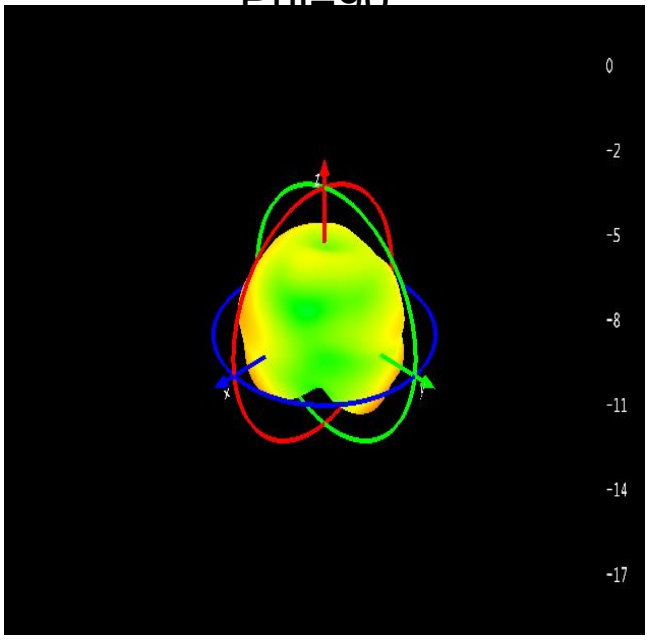
Phi=90



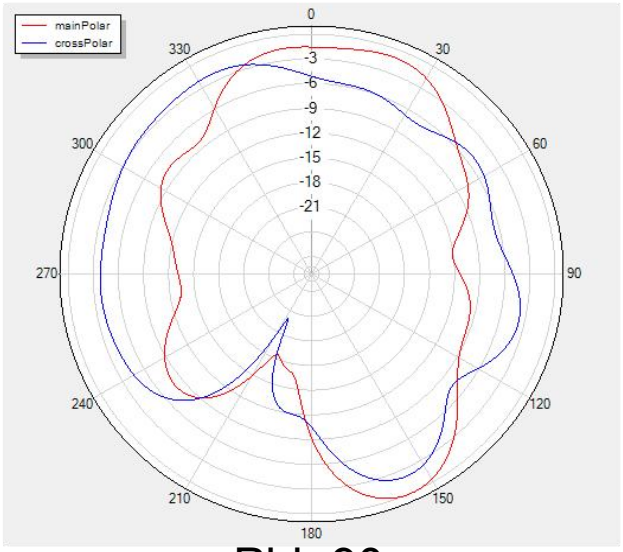
Phi=0



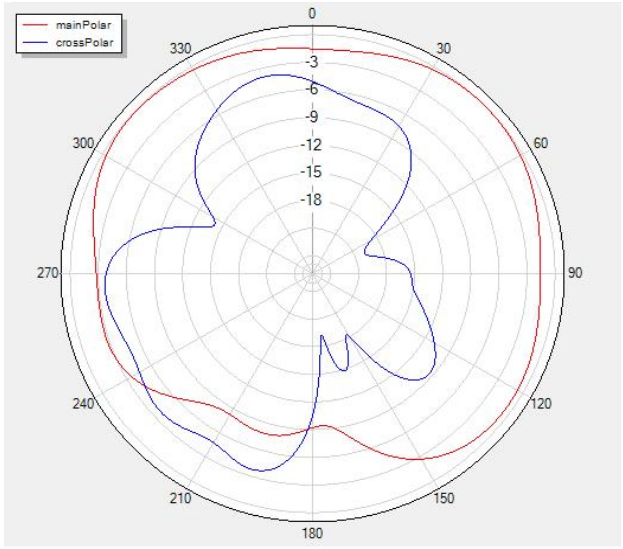
Theta=90



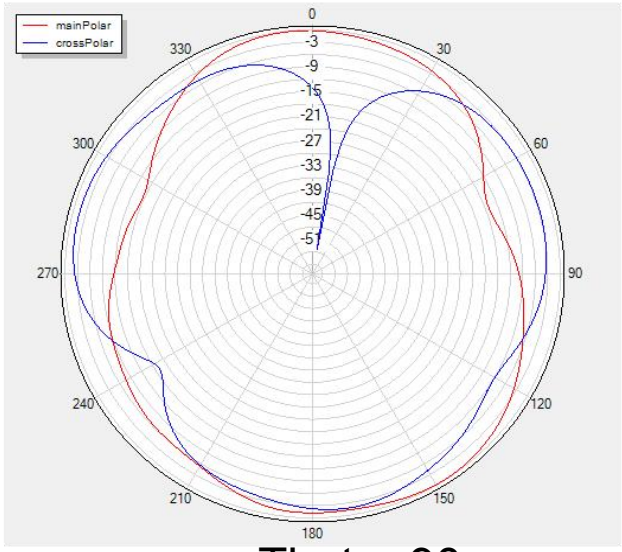
2D&3D radiation pattern -Antenna 1 AP



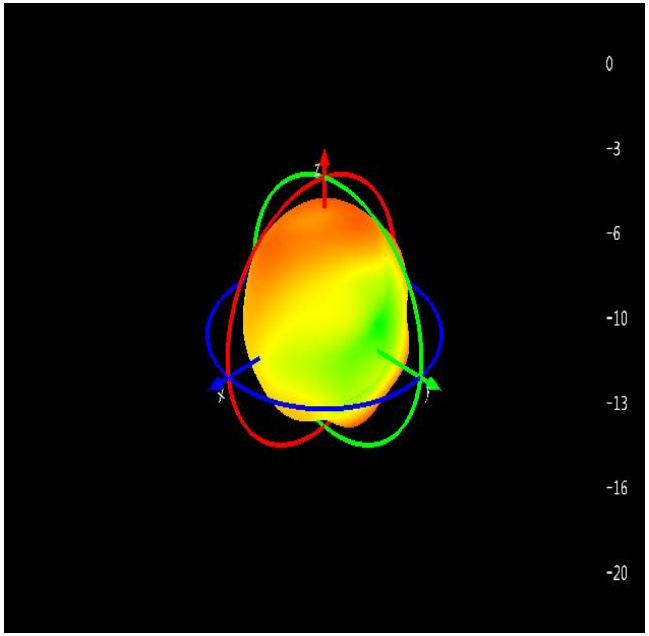
Phi=90



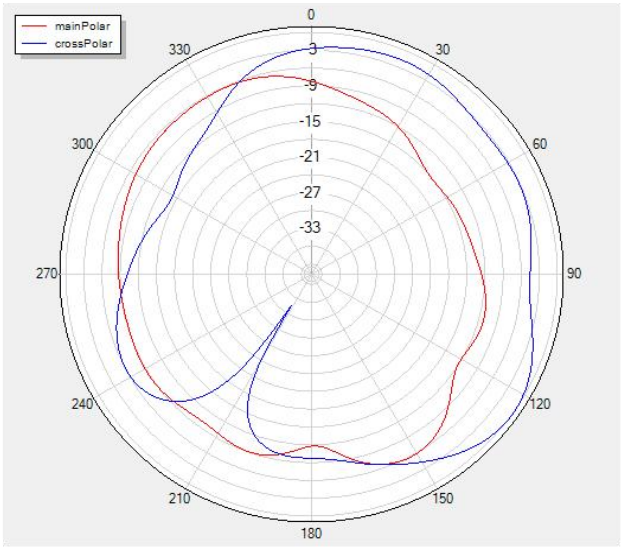
Phi=0



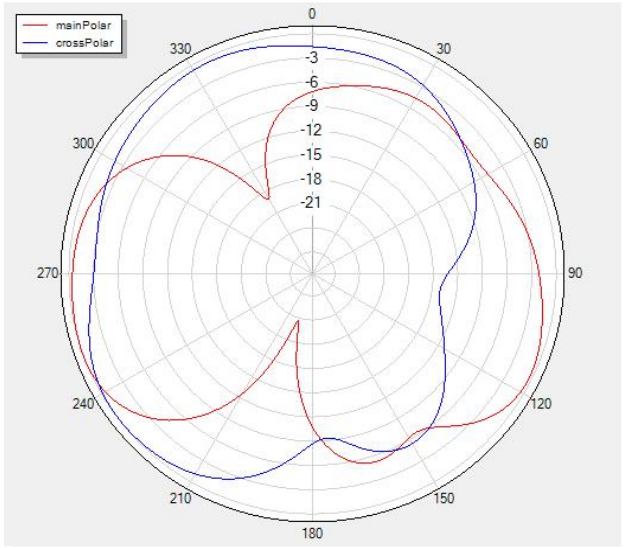
Theta=90



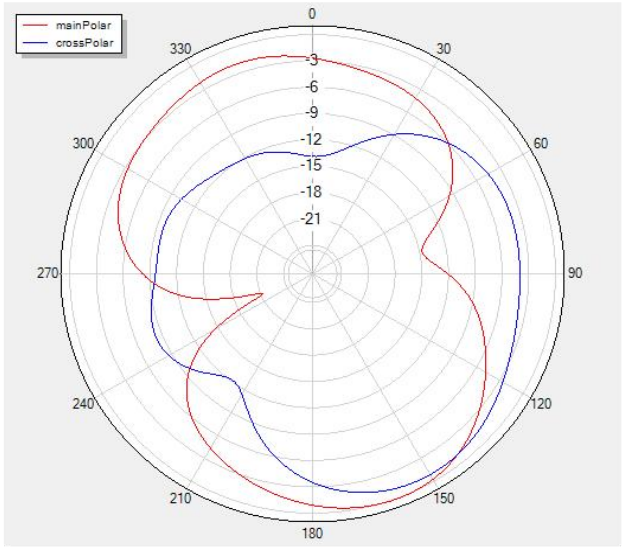
2D&3D radiation pattern -Antenna 2 AP



Phi=90



Phi=0



Theta=90