

Antenna Test Report

apply for IR02

Shenzhen Phaten Technology CO.,Ltd.
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Community, Matian Street, Guangming District,
Shenzhen, Guangdong

Test Date: 2025/09/11
Issue Date: 2025/12/24

1. Antenna Description

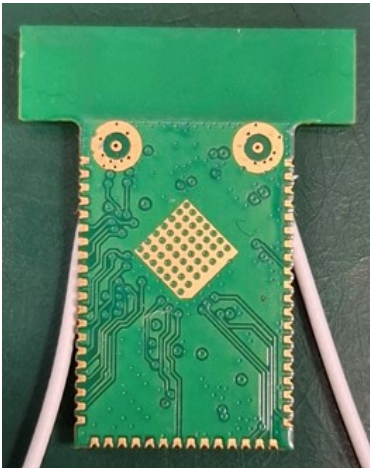
1.1 Antenna List

Antenna Name	Brand	Model	2D Peak Gain(dBi)					Antenna Type
			2400-2483.5MHz	5150-5250MHz	5250-5350MHz	5470-5725MHz	5725-5850MHz	
WLAN ANT1	FOXCONN	IR02	-2.35	3.26	3.26	3.29	3.29	Printing
WLAN/BT ANT2	FOXCONN	IR02	1.49	2.03	2.03	1.14	1.87	Printing

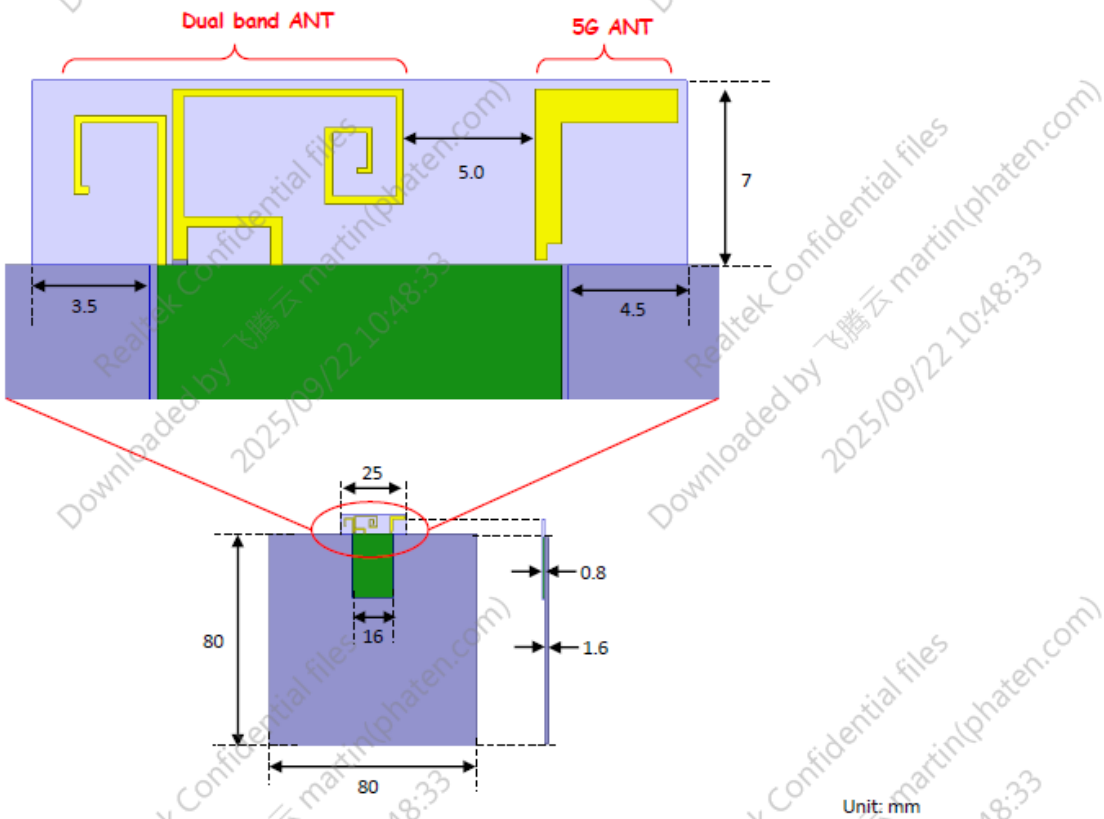
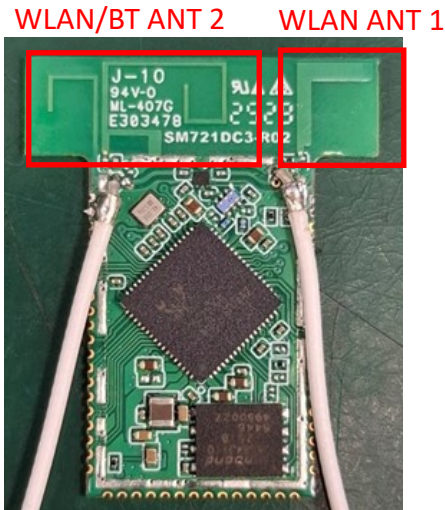
Note:
Gain is included Cable Loss
2GHz=0.2dB
5GHz=0.4dB

1.2 Antenna Location and Pattern

TOP



Bottom



2. Measurement Channel List

1.1 WLAN/BT

WLAN		BT
Frequency	Frequency	Frequency
2412 MHz	5150MHz	2402 MHz
2437 MHz	5200MHz	2426 MHz
2442MHz	5250MHz	2480 MHz
2462 MHz	5300MHz	
2472MHz	5350MHz	
	5470MHz	
	5600MHz	
	5725MHz	
	5785MHz	
	5850MHz	

3. Test Program Used

1. EMQuest 1.08

4. Test Instruments

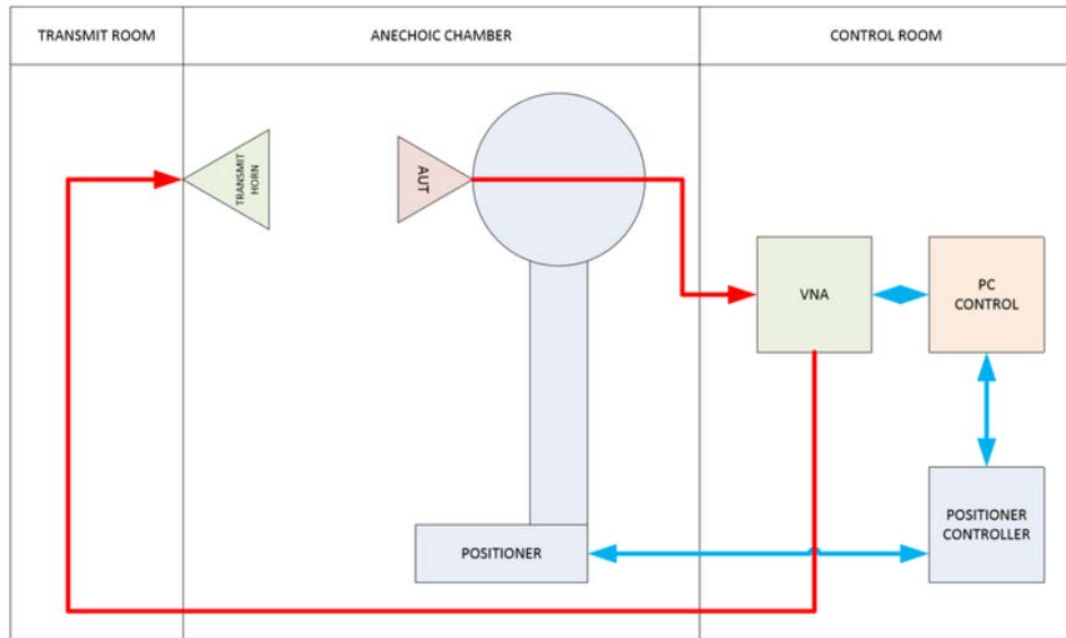
Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
ETS	AMS-8500	N/A	2025/5/15	2026/5/14
Keysight	5071B	N/A	2025/5/20	2026/5/19
Keysight	3499B	N/A	2021/10/30	N/A

Note:

1. The test was performed in AMS-8500 anechoic chamber
2. Tested Date: 2025/09/11

5. Test Arrangements

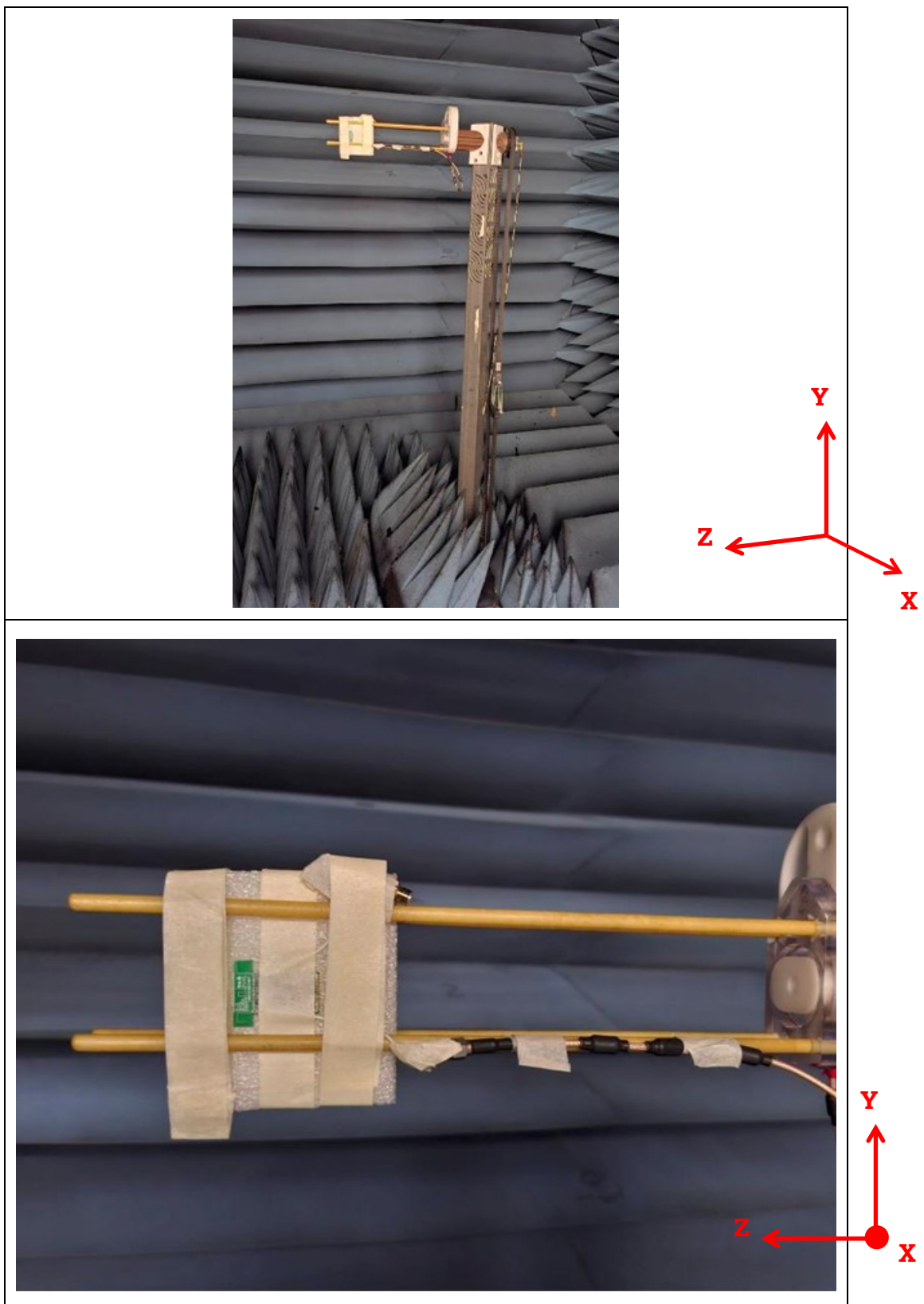
5.1 Test setup



5.2 Test Procedure

- Setup DUT into the antenna chamber and place the DUT in the center of table, and
- Connect it to the test equipment through the IPEX connector;
- Open the EMQuest software, set the test frequency band, and start the test;
- In EMQuest Perform data post-processing, generate the required data, and export the data.

5.3 Test Setup Photo



5.4 VSWR Test Setup Photo



1.Remove resistors R26 and R27

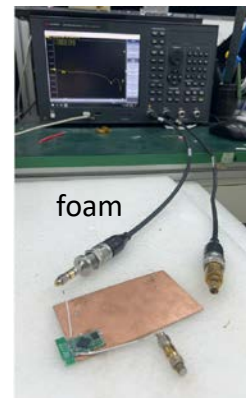
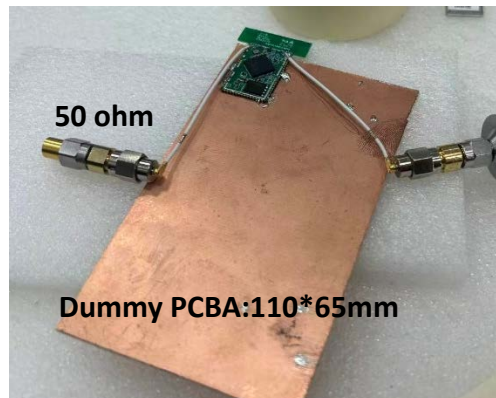
2.Connect the cable to the pad that leads to the antenna.

3.Measuring VSWR with ANT1 connected to the network analyzer, ANT 2 should be terminated with a 50 ohm load.

4.Measuring VSWR with ANT 2 connected to the network analyzer, ANT 1 should be terminated with a 50 ohm load.

1.The distance between the antenna area and the dummy PCBA is 1.5 mm.

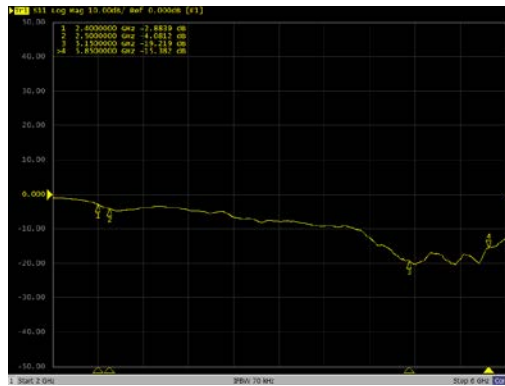
2.For the measurements, the table consisted of non-metallic and the foam is 10 cm thick.



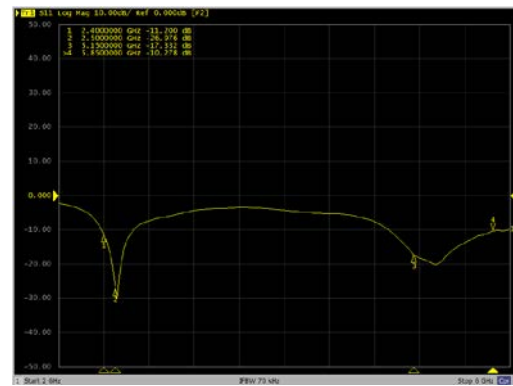
6. Test Results

6.1 RETURN LOSS

WLAN ANT1



WLAN/BT ANT2



6.2 Antenna Gain Summary Table

6.2.1 WLAN ANT1

	XY Plane		ZY Plane		ZX Plane	
Frequency [MHz]	Average Gain [dBi]	Peak Gain [dBi]	Average Gain [dBi]	Peak Gain [dBi]	Average Gain [dBi]	Peak Gain [dBi]
2412	-4.82	-3.16	-7.59	-3.03	-6.48	-4.42
2437	-4.68	-3.31	-7.17	-2.39	-6.15	-3.39
2442	-4.51	-3.18	-6.89	-2.68	-6.26	-3.28
2462	-4.47	-3.43	-6.74	-2.47	-5.89	-3.52
2472	-4.98	-3.65	-6.56	-2.35	-6.11	-3.17
5150	-11.87	-8.51	-2.51	1.90	-2.72	2.35
5200	-10.19	-7.79	-2.82	1.74	-2.26	2.79
5250	-8.22	-5.38	-2.47	1.59	-2.58	3.26
5300	-7.84	-6.04	-3.18	1.94	-2.75	2.02
5350	-7.75	-5.25	-2.87	1.57	-2.92	2.58
5470	-6.86	-4.85	-3.13	1.48	-2.64	3.16
5600	-6.02	-4.67	-3.29	1.62	-2.19	2.28
5725	-5.41	-3.78	-2.93	1.39	-1.68	3.29
5785	-6.29	-4.14	-2.95	1.21	-2.43	2.03
5850	-5.64	-3.27	-3.45	1.19	-2.21	2.52

6.2.2 WLAN ANT2

	XY Plane		ZY Plane		ZX Plane	
Frequency [MHz]	Average Gain [dBi]	Peak Gain [dBi]	Average Gain [dBi]	Peak Gain [dBi]	Average Gain [dBi]	Peak Gain [dBi]
2412	-5.73	-4.46	-5.12	-0.74	-3.78	-0.73
2437	-5.25	-4.29	-4.68	0.21	-3.15	0.52
2442	-5.14	-4.47	-4.51	0.32	-2.89	0.91
2462	-5.27	-3.58	-4.29	0.58	-2.52	1.05
2472	-5.03	-3.67	-4.27	0.62	-2.45	1.49
5150	-2.19	-1.79	-3.54	1.71	-1.63	1.57
5200	-1.75	-1.13	-3.18	1.36	-1.98	1.32
5250	-1.51	-0.82	-3.28	1.73	-2.16	2.03
5300	-2.58	-1.05	-3.17	1.37	-2.29	0.94
5350	-2.57	-1.12	-3.04	1.03	-2.11	1.65
5470	-2.17	-0.83	-3.45	0.38	-2.68	1.14
5600	-4.13	-1.89	-4.25	-1.20	-3.76	0.69
5725	-3.89	-1.49	-4.13	0.71	-2.61	0.92
5785	-5.03	-2.84	-4.57	0.47	-3.82	-0.35
5850	-5.42	-3.28	-3.68	0.64	-3.57	1.87

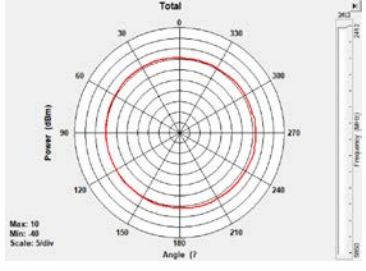
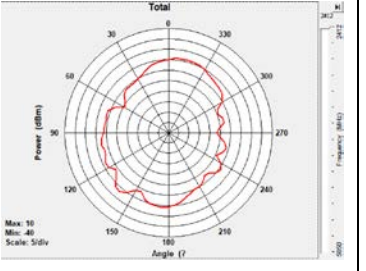
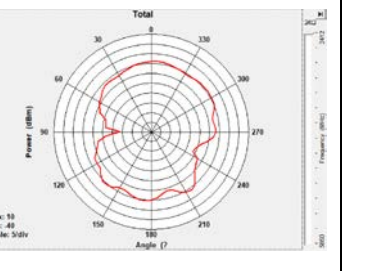
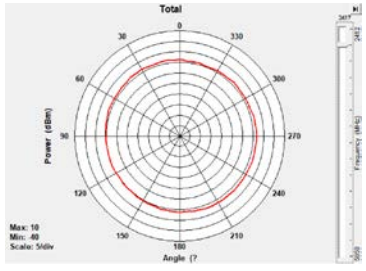
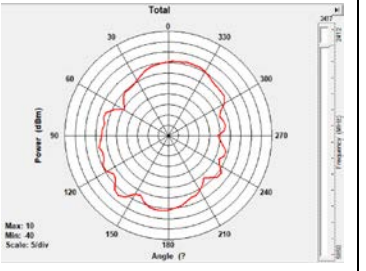
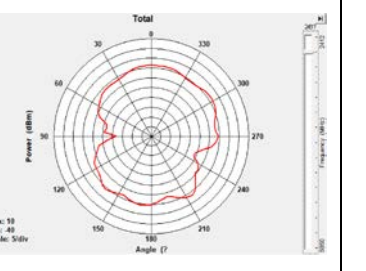
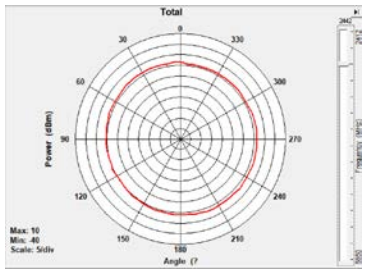
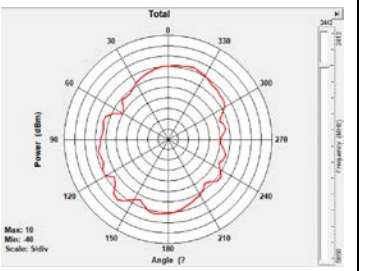
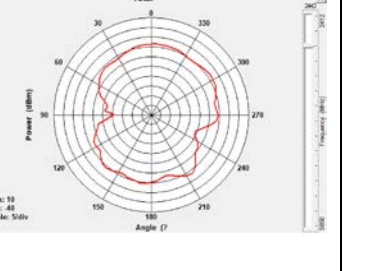
6.2.3 BT ANT2

	XY Plane		ZY Plane		ZX Plane	
Frequency [MHz]	Average Gain [dBi]	Peak Gain [dBi]	Average Gain [dBi]	Peak Gain [dBi]	Average Gain [dBi]	Peak Gain [dBi]
2402	-5.57	-3.80	-5.17	-0.98	-3.56	-0.40
2426	-4.98	-3.38	-4.78	-0.25	-3.04	0.36
2480	-4.40	-2.68	-4.56	0.27	-2.59	1.05

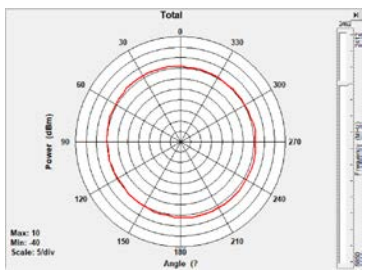
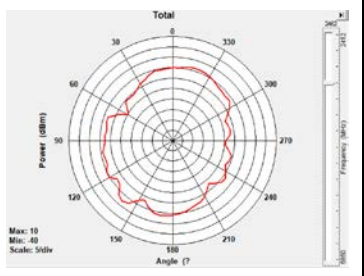
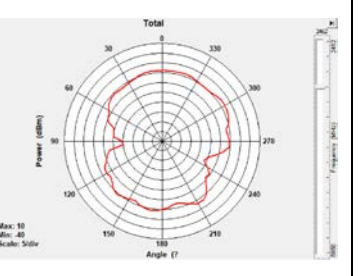
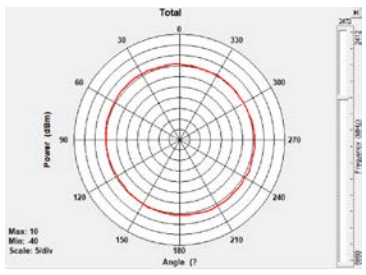
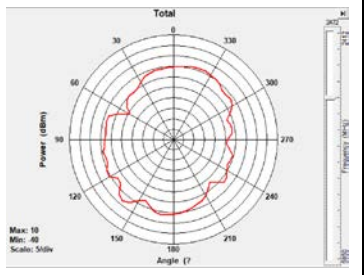
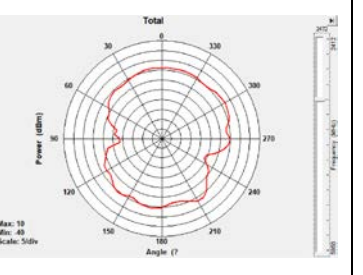
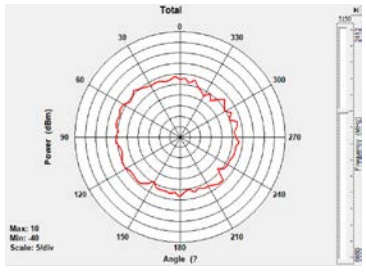
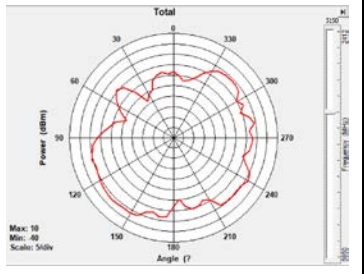
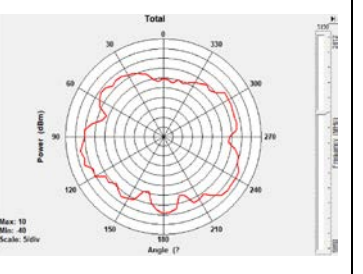
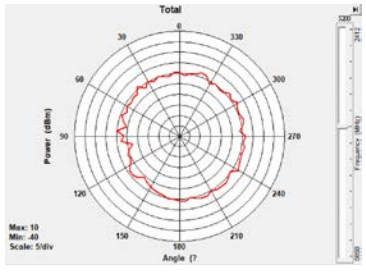
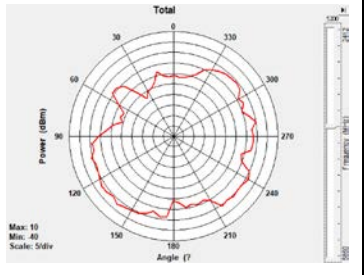
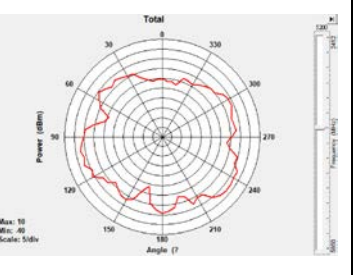
6.3 Measurement Pattern

6.3.1 WLAN ANT1

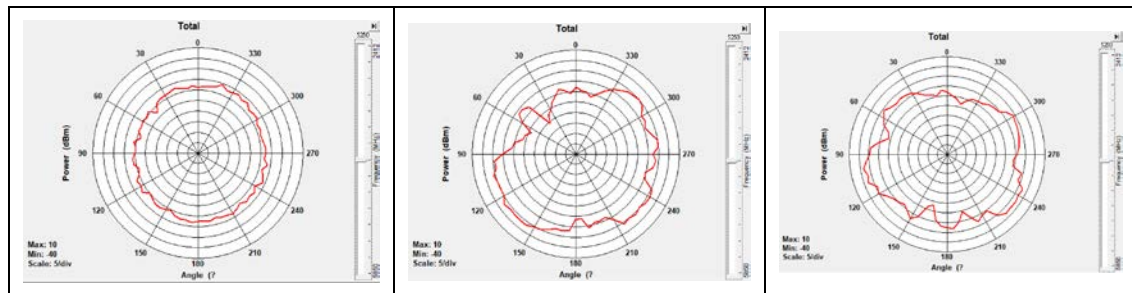
Environmental Conditions:	25 °C, 55%RH	Brand/Model	FOXCONN/IR02	Tested By:	YY
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Plane	XY	Plane	ZY	Plane	ZX
Frequency	2412MHz	Frequency	2412MHz	Frequency	2412MHz
Peak Gain(dBi)	-3.16	Peak Gain(dBi)	-3.03	Peak Gain(dBi)	-4.42
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	2437MHz	Frequency	2437MHz	Frequency	2437MHz
Peak Gain(dBi)	-3.31	Peak Gain(dBi)	-2.39	Peak Gain(dBi)	-3.39
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	2442MHz	Frequency	2442MHz	Frequency	2442MHz
Peak Gain(dBi)	-3.18	Peak Gain(dBi)	-2.68	Peak Gain(dBi)	-3.28

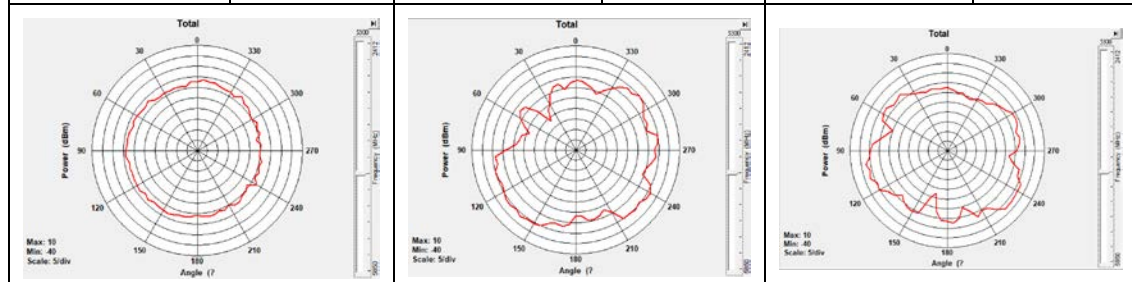
Environmental Conditions:	25 °C, 55%RH	Brand/ Model	FOXCONN/ IR02	Tested By:	YY
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Plane	XY	Plane	ZY	Plane	ZX
Frequency	2462MHz	Frequency	2462MHz	Frequency	2462MHz
Peak Gain(dBi)	-3.43	Peak Gain(dBi)	-2.47	Peak Gain(dBi)	-3.52
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	2472MHz	Frequency	2472MHz	Frequency	2472MHz
Peak Gain(dBi)	-3.65	Peak Gain(dBi)	-2.35	Peak Gain(dBi)	-3.17
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5150MHz	Frequency	5150MHz	Frequency	5150MHz
Peak Gain(dBi)	-8.51	Peak Gain(dBi)	1.9	Peak Gain(dBi)	2.35
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5200MHz	Frequency	5200MHz	Frequency	5200MHz
Peak Gain(dBi)	-7.79	Peak Gain(dBi)	1.74	Peak Gain(dBi)	2.79

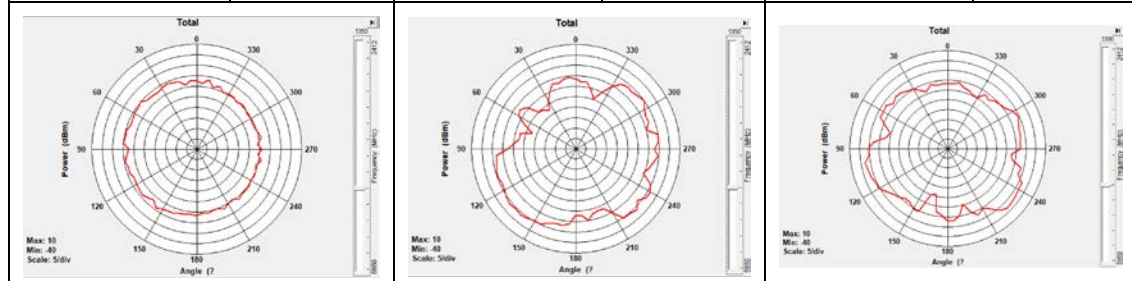
Environmental Conditions:	25 °C, 55%RH	Brand/ Model	FOXCONN/ IRO2	Tested By:	YY
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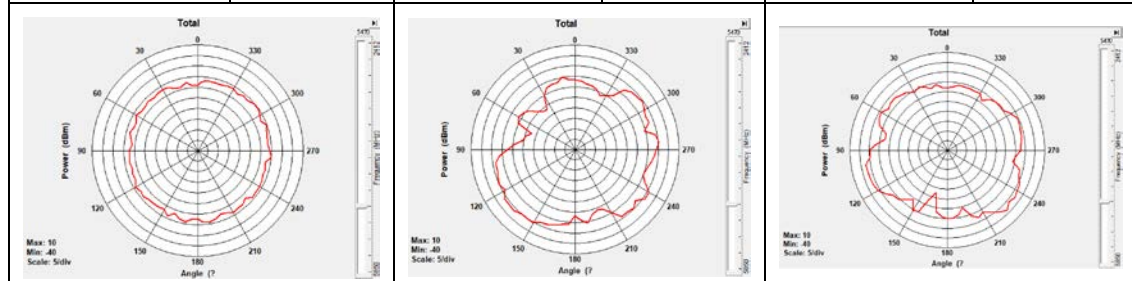
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5250MHz	Frequency	5250MHz	Frequency	5250MHz
Peak Gain(dBi)	-5.38	Peak Gain(dBi)	1.59	Peak Gain(dBi)	3.26



Plane	XY	Plane	ZY	Plane	ZX
Frequency	5300MHz	Frequency	5300MHz	Frequency	5300MHz
Peak Gain(dBi)	-6.04	Peak Gain(dBi)	1.94	Peak Gain(dBi)	2.02

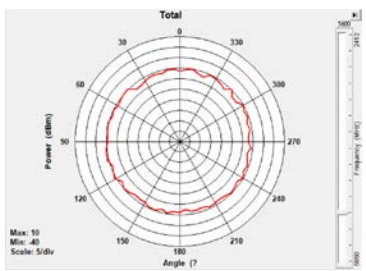
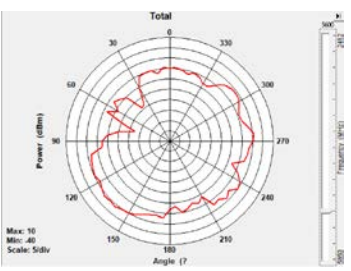
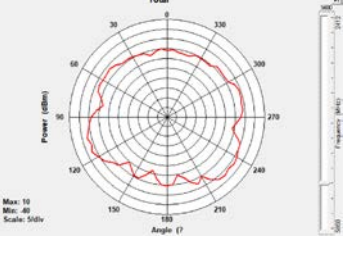
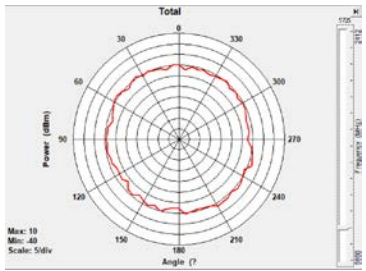
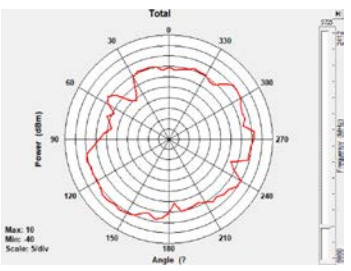
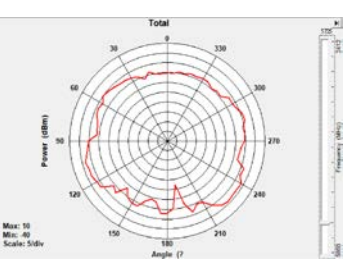
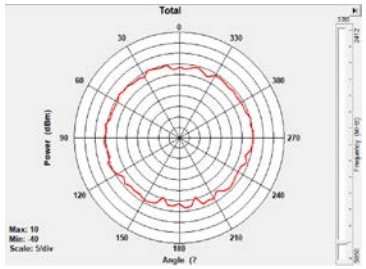
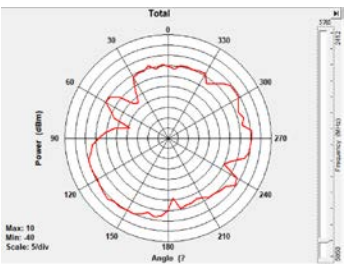
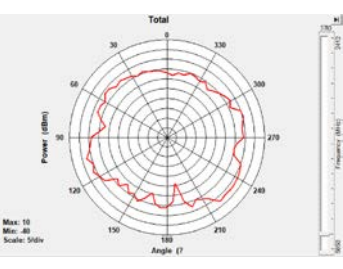
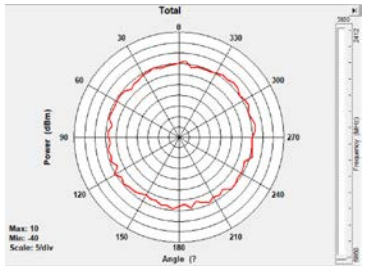
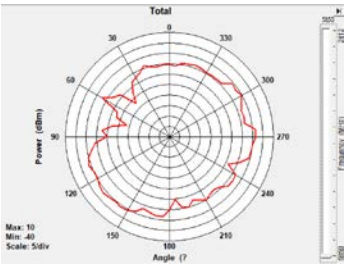
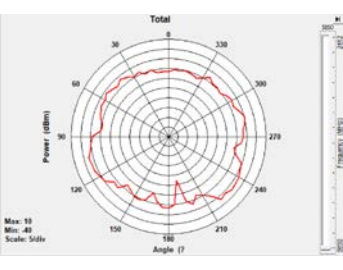


Plane	XY	Plane	ZY	Plane	ZX
Frequency	5350MHz	Frequency	5350MHz	Frequency	5350MHz
Peak Gain(dBi)	-5.25	Peak Gain(dBi)	1.57	Peak Gain(dBi)	2.58



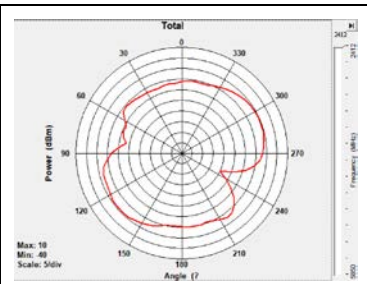
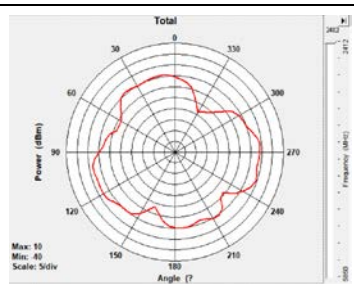
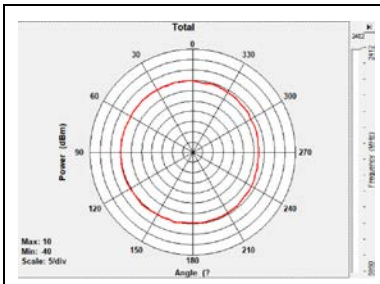
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5470MHz	Frequency	5470MHz	Frequency	5470MHz
Peak Gain(dBi)	-4.85	Peak Gain(dBi)	1.48	Peak Gain(dBi)	3.16

Environmental Conditions:	25 °C, 55%RH	Brand/ Model	FOXCONN/ IR02	Tested By:	YY
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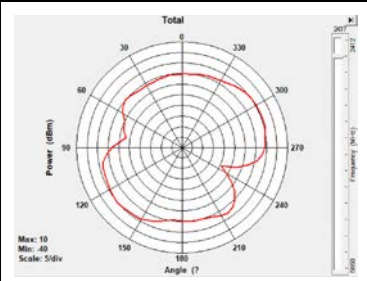
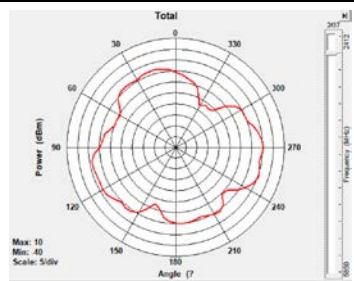
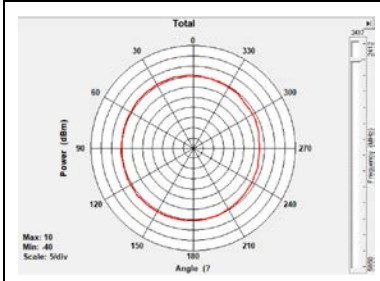
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5600MHz	Frequency	5600MHz	Frequency	5600MHz
Peak Gain(dBi)	-4.67	Peak Gain(dBi)	1.62	Peak Gain(dBi)	2.28
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5725MHz	Frequency	5725MHz	Frequency	5725MHz
Peak Gain(dBi)	-3.78	Peak Gain(dBi)	1.39	Peak Gain(dBi)	3.29
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5785MHz	Frequency	5785MHz	Frequency	5785MHz
Peak Gain(dBi)	-4.14	Peak Gain(dBi)	1.21	Peak Gain(dBi)	2.03
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5850MHz	Frequency	5850MHz	Frequency	5850MHz
Peak Gain(dBi)	-3.27	Peak Gain(dBi)	1.19	Peak Gain(dBi)	2.52

6.3.2 WLAN ANT2

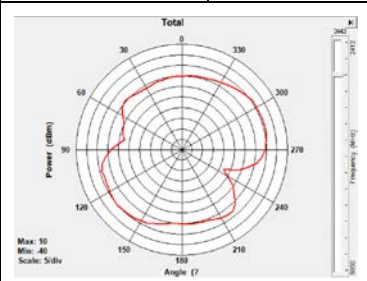
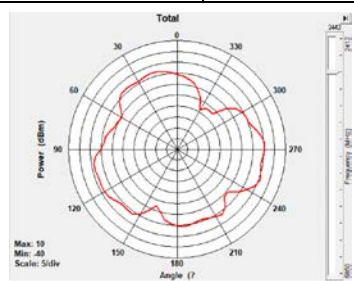
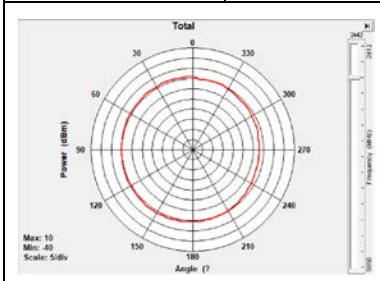
Environmental Conditions:	25 °C, 55%RH	Brand/Model	FOXCONN/IR02	Tested By:	YY
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Plane	XY	Plane	ZY	Plane	ZX
Frequency	2412MHz	Frequency	2412MHz	Frequency	2412MHz
Peak Gain(dBi)	-4.46	Peak Gain(dBi)	-0.74	Peak Gain(dBi)	-0.73

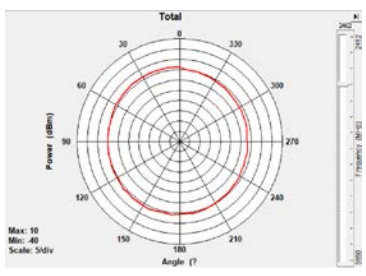
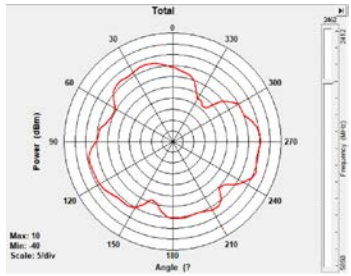
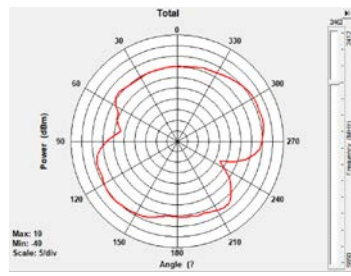
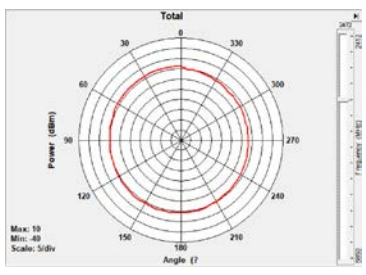
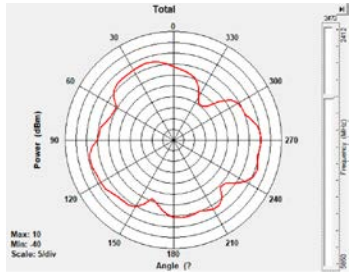
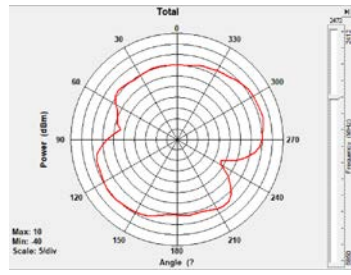
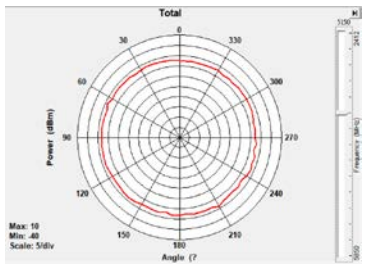
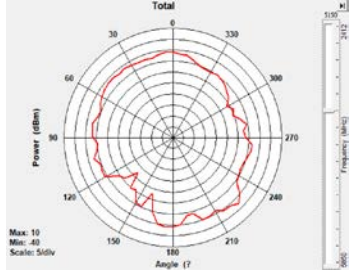
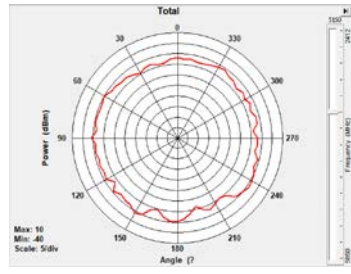
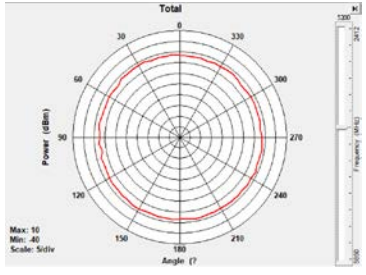
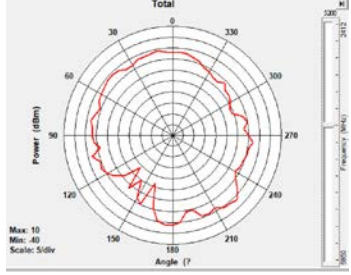
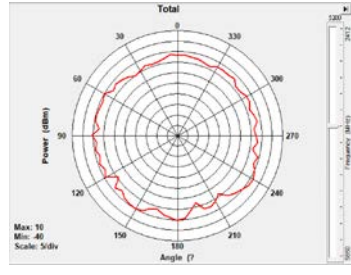


Plane	XY	Plane	ZY	Plane	ZX
Frequency	2437MHz	Frequency	2437MHz	Frequency	2437MHz
Peak Gain(dBi)	-4.29	Peak Gain(dBi)	0.21	Peak Gain(dBi)	0.52

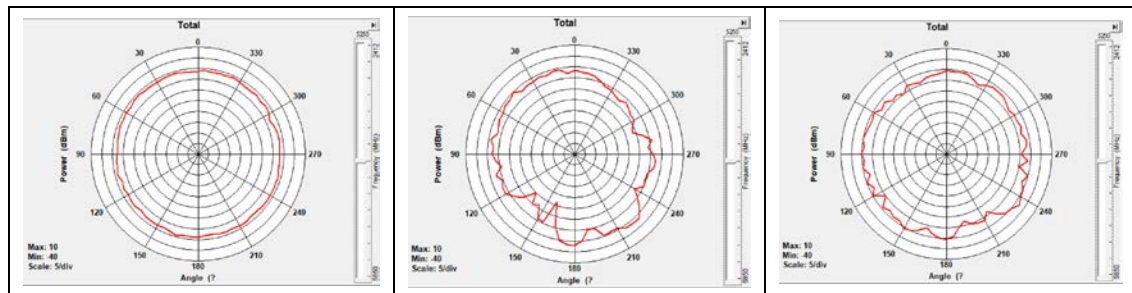


Plane	XY	Plane	ZY	Plane	ZX
Frequency	2442MHz	Frequency	2442MHz	Frequency	2442MHz
Peak Gain(dBi)	-4.47	Peak Gain(dBi)	0.32	Peak Gain(dBi)	0.91

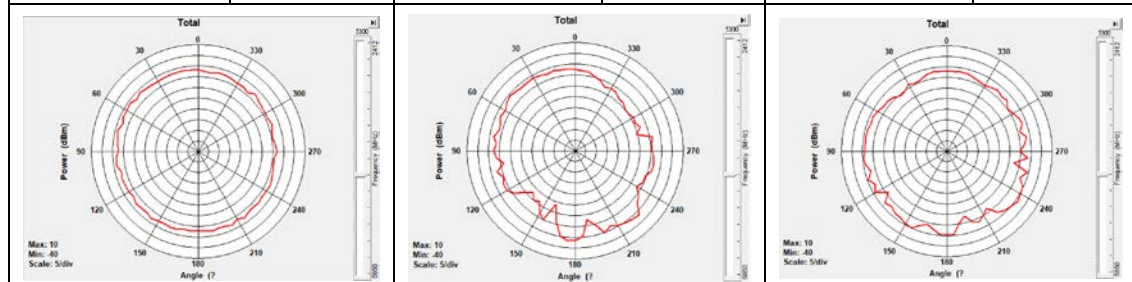
Environmental Conditions:	25 °C, 55%RH	Brand/ Model	FOXCONN/ IR02	Tested By:	YY
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Plane	XY	Plane	ZY	Plane	ZX
Frequency	2462MHz	Frequency	2462MHz	Frequency	2462MHz
Peak Gain(dBi)	-3.58	Peak Gain(dBi)	0.58	Peak Gain(dBi)	1.05
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	2472MHz	Frequency	2472MHz	Frequency	2472MHz
Peak Gain(dBi)	-3.67	Peak Gain(dBi)	0.62	Peak Gain(dBi)	1.49
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5150MHz	Frequency	5150MHz	Frequency	5150MHz
Peak Gain(dBi)	-1.79	Peak Gain(dBi)	1.71	Peak Gain(dBi)	1.57
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5200MHz	Frequency	5200MHz	Frequency	5200MHz
Peak Gain(dBi)	-1.13	Peak Gain(dBi)	1.36	Peak Gain(dBi)	1.32

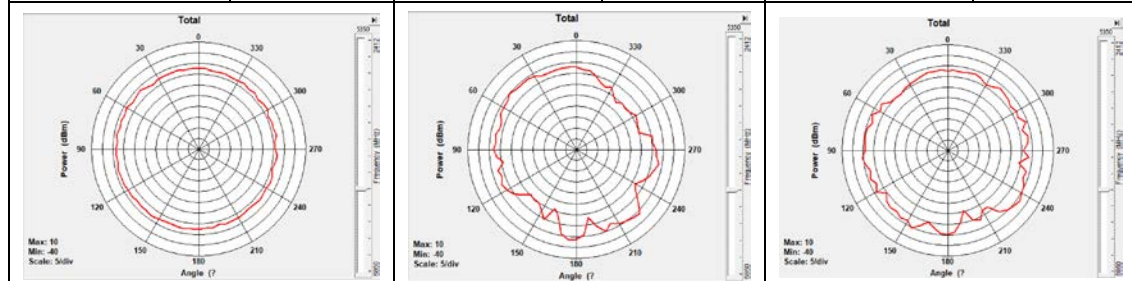
Environmental Conditions:	25 °C, 55%RH	Brand/ Model	FOXCONN/ IRO2	Tested By:	YY
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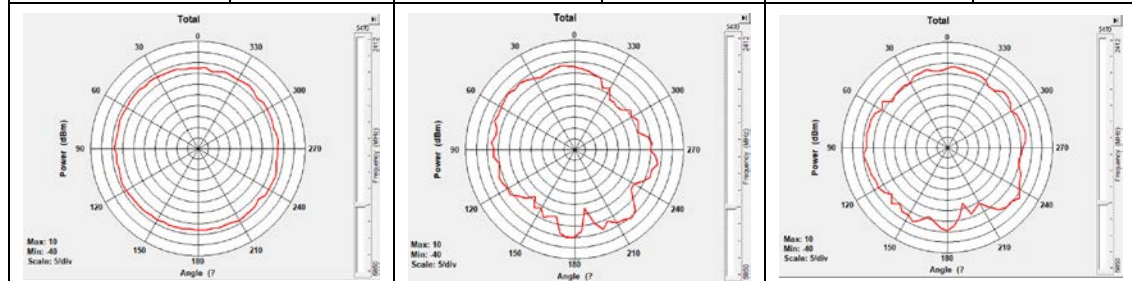
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5250MHz	Frequency	5250MHz	Frequency	5250MHz
Peak Gain(dBi)	-0.82	Peak Gain(dBi)	1.73	Peak Gain(dBi)	2.03



Plane	XY	Plane	ZY	Plane	ZX
Frequency	5300MHz	Frequency	5300MHz	Frequency	5300MHz
Peak Gain(dBi)	-1.05	Peak Gain(dBi)	1.37	Peak Gain(dBi)	0.94



Plane	XY	Plane	ZY	Plane	ZX
Frequency	5350MHz	Frequency	5350MHz	Frequency	5350MHz
Peak Gain(dBi)	-1.12	Peak Gain(dBi)	1.03	Peak Gain(dBi)	1.65



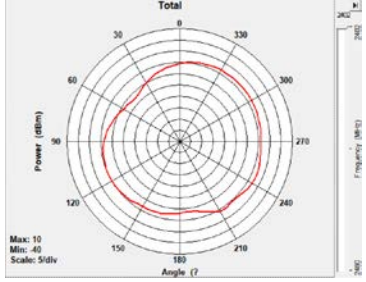
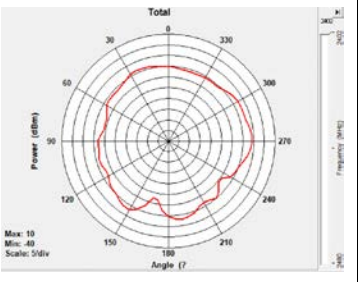
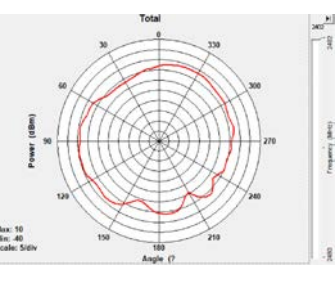
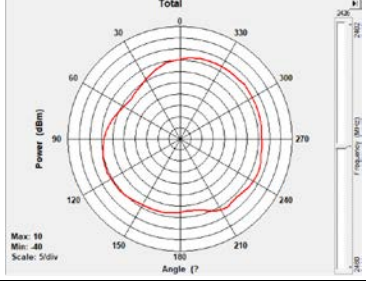
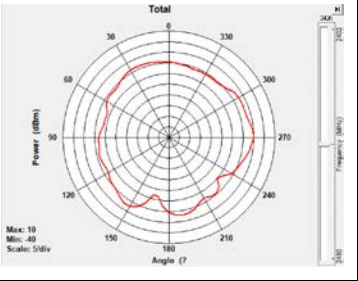
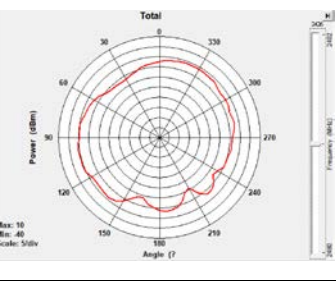
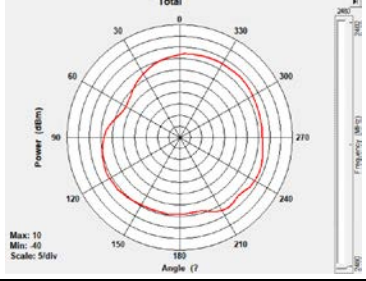
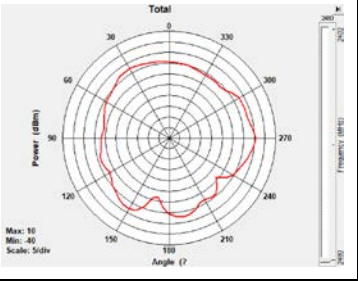
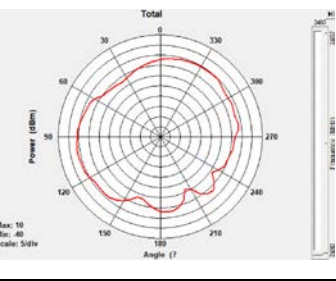
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5470MHz	Frequency	5470MHz	Frequency	5470MHz
Peak Gain(dBi)	-0.83	Peak Gain(dBi)	0.38	Peak Gain(dBi)	1.14

Environmental Conditions:	25 °C, 55%RH	Brand/ Model	FOXCONN/ IR02	Tested By:	YY
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Plane	XY	Plane	ZY	Plane	ZX
Frequency	5600MHz	Frequency	5600MHz	Frequency	5600MHz
Peak Gain(dBi)	-1.89	Peak Gain(dBi)	-1.2	Peak Gain(dBi)	0.69
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5725MHz	Frequency	5725MHz	Frequency	5725MHz
Peak Gain(dBi)	-1.49	Peak Gain(dBi)	0.71	Peak Gain(dBi)	0.92
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5785MHz	Frequency	5785MHz	Frequency	5785MHz
Peak Gain(dBi)	-2.84	Peak Gain(dBi)	0.47	Peak Gain(dBi)	-0.35
Plane	XY	Plane	ZY	Plane	ZX
Frequency	5850MHz	Frequency	5850MHz	Frequency	5850MHz
Peak Gain(dBi)	-3.28	Peak Gain(dBi)	0.64	Peak Gain(dBi)	1.87

6.3.3 BT ANT2

Environmental Conditions:	25 °C, 55%RH	Brand/ Model	FOXCONN/ IR02	Tested By:	YY
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Plane	XY	Plane	ZY	Plane	ZX
Frequency	2402MHz	Frequency	2402MHz	Frequency	2402MHz
Peak Gain(dBi)	-3.8	Peak Gain(dBi)	-0.98	Peak Gain(dBi)	-0.4
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	2426MHz	Frequency	2426MHz	Frequency	2426MHz
Peak Gain(dBi)	-3.38	Peak Gain(dBi)	-0.25	Peak Gain(dBi)	0.36
					
Plane	XY	Plane	ZY	Plane	ZX
Frequency	2480MHz	Frequency	2480MHz	Frequency	2480MHz
Peak Gain(dBi)	-2.68	Peak Gain(dBi)	0.27	Peak Gain(dBi)	1.05

6.4 3D Efficiency

	Frequency (MHz)	2412	2437	2442	2462	2472	5150	5200	5250
WLAN ANT1	Efficiency (%)	13.88	15.36	15.94	17.11	17.60	70.37	71.63	68.46
		5300	5350	5470	5600	5725	5785	5850	
		67.69	69.55	67.09	65.88	65.87	69.83	71.09	
	Frequency (MHz)	2412	2437	2442	2462	2472	5150	5200	5250
WLAN ANT2	Efficiency (%)	46.97	51.12	52.42	56.20	56.63	62.15	66.61	63.41
		5300	5350	5470	5600	5725	5785	5850	
		65.61	64.40	62.38	59.92	54.09	53.12	64.08	
	Frequency (MHz)	2402	2426	2480					
BT ANT2	Efficiency (%)	47.32	50.63	52.33					