



Antenna Test Report

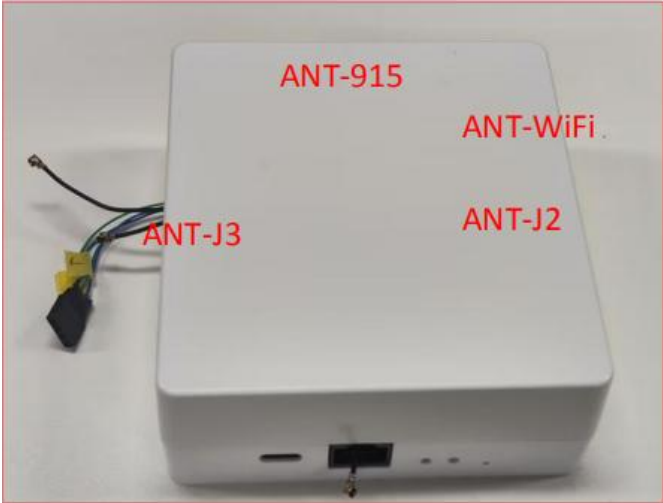
Project No	MNDBPOE1	PCB Version	V0.2
Tester	MoQi	Date	2024.9.6
Auditing		Date	
Approval		Date	

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一、Project Information

- 1. Antenna Coding: ANT-LMIL8024007 (ANT-915) , ANT-BMIL8024008 (ANT-J2/J3) , ANT-WBNCNC24009 (ANT-WiFi)
- 2. Antenna Type: Metal Antenna and onboard Antenna
- 3. Model of the DUT: MNDBPOE1
- 4 .Test Data : 2024.9.2
- 5 .Product picture:

Product appearance	
PCB board and antenna	

二、Technical Specification

ANT-J3

Electrical Specifications	
Frequency Range	2400-2480 MHz
Peak Gain	4.92dBi
Efficiency	74.95%
Return Loss	≤ -15.02 dB (MAX)
VSWR	≤ 1.4 (MAX)
Bandwidth (S11 $\leq$ -10dB)	110 MHz
Input Impedance	50 Ω
Radiation direction	Directional ANT
Polarization Type	Linear
Lightning Protection	DC grounding
Power Capacity	1000mW (30dBm)
Mechanical Specifications	
Antenna Size	18.25 x 17.90 mm
Core Radiator	Copper
Coaxial wire	L=80mm, $\varnothing$ 1.13mm
Connect Type	IPEX-1
Operating Temperature	-40 to +85° C
Storage Temperature	-40 to +85° C

ANT-J2

Electrical Specifications	
Frequency Range	2400-2480 MHz
Peak Gain	5.09dBi
Efficiency	79.06%
Return Loss	≤ -12.0 dB (MAX)
VSWR	≤ 1.8 (MAX)
Bandwidth (S11 ≤ -10 dB)	120 MHz
Input Impedance	50 Ω
Radiation direction	Directional ANT
Polarization Type	Linear
Lightning Protection	DC grounding
Power Capacity	1000mW (30dBm)
Mechanical Specifications	
Antenna Size	18.25 x 17.90 mm
Core Radiator	Copper
Coaxial wire	L=80mm, $\varnothing$ 1.13mm
Connect Type	IPEX-1
Operating Temperature	-40 to +85° C
Storage Temperature	-40 to +85° C

ANT-915

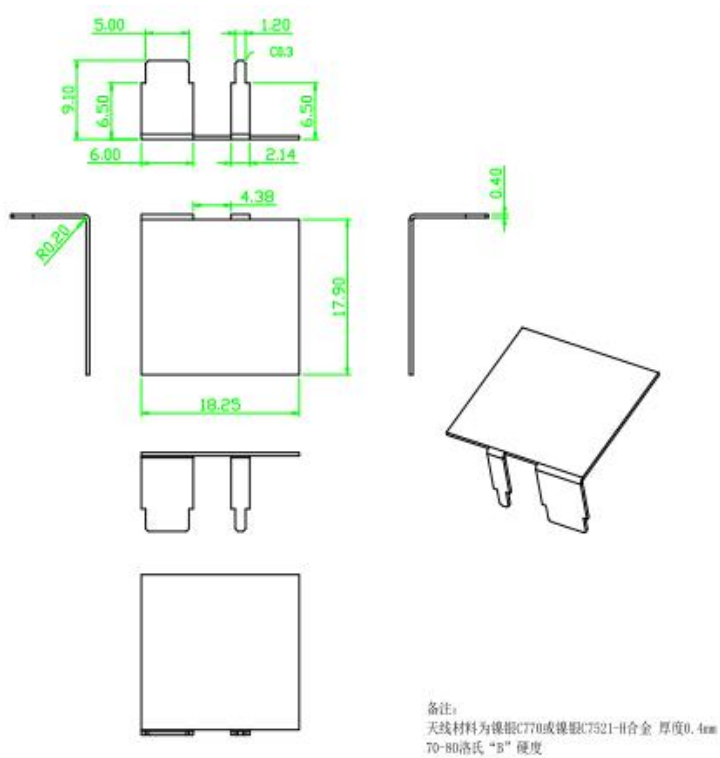
Electrical Specifications	
Frequency Range	900-928 MHz
Peak Gain	3.02 dBi
Efficiency	73.80%
Return Loss	≤ -14.3 dB (MAX)
VSWR	≤ 1.4 (MAX)
Bandwidth (S11 $\leq$ -10dB)	150 MHz
Input Impedance	50 Ω
Radiation direction	Directional ANT
Polarization Type	Linear
Lightning Protection	DC grounding
Power Capacity	1000mW (30dBm)
Mechanical Specifications	
Antenna Size	55x 21 mm
Core Radiator	Copper
Coaxial wire	L=80mm, $\varnothing$ 1.13mm
Connect Type	IPEX-1
Operating Temperature	-40 to +85° C
Storage Temperature	-40 to +85° C

ANT-WIFI

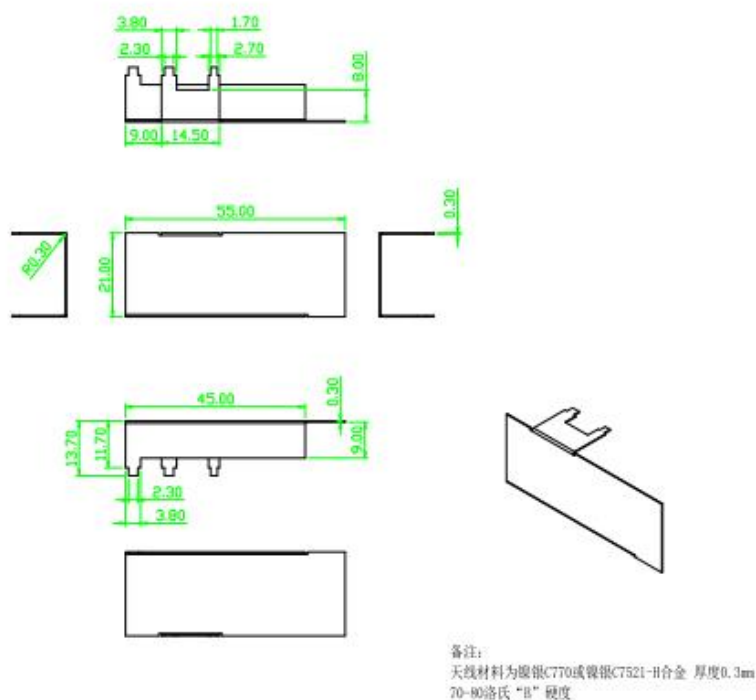
Electrical Specifications	
Frequency Range	2400-2480 MHz
Peak Gain	3.33dBi
Efficiency	64.63%
Return Loss	≤ -12.9 dB (MAX)
VSWR	≤ 1.88 (MAX)
Bandwidth ($S_{11} \leq -10$ dB)	150 MHz
Input Impedance	50 Ω
Radiation direction	Omni
Polarization Type	Linear
Lightning Protection	DC grounding
Power Capacity	1000mW (30dBm)
Mechanical Specifications	
Antenna Size	5.56 x 14.60 mm
Core Radiator	Copper
Substrate material	FR4
Substrate thickness	0.8 mm
Substrate Size (mm)	6.22 x 18 mm
Coaxial wire	板载无, 外接天线需要
Connect Type	板载无, 外接天线需要
Operating Temperature	-40 to +85 ° C
Storage Temperature	-40 to +85 ° C

三、The shape and size of the antenna

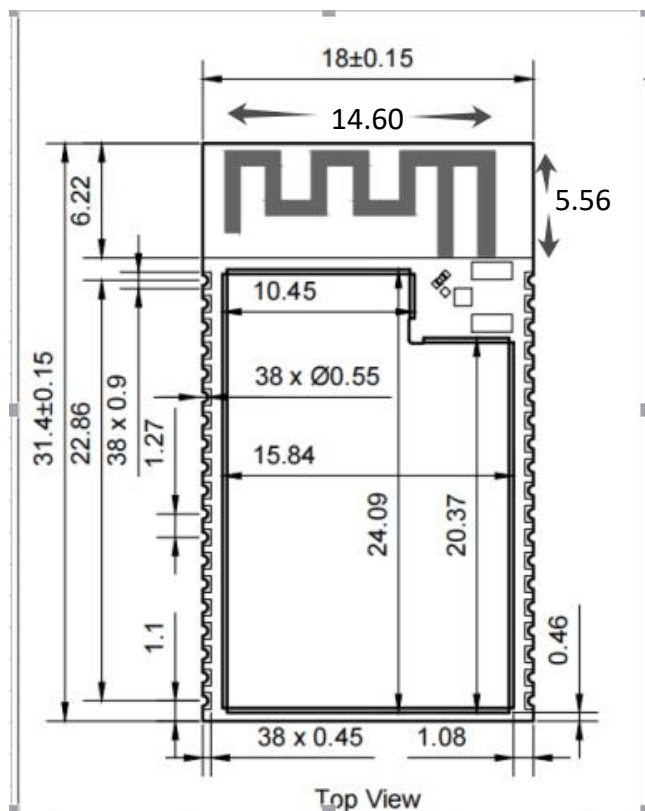
1、ANT-J3&ANT-J2



2、ANT-915



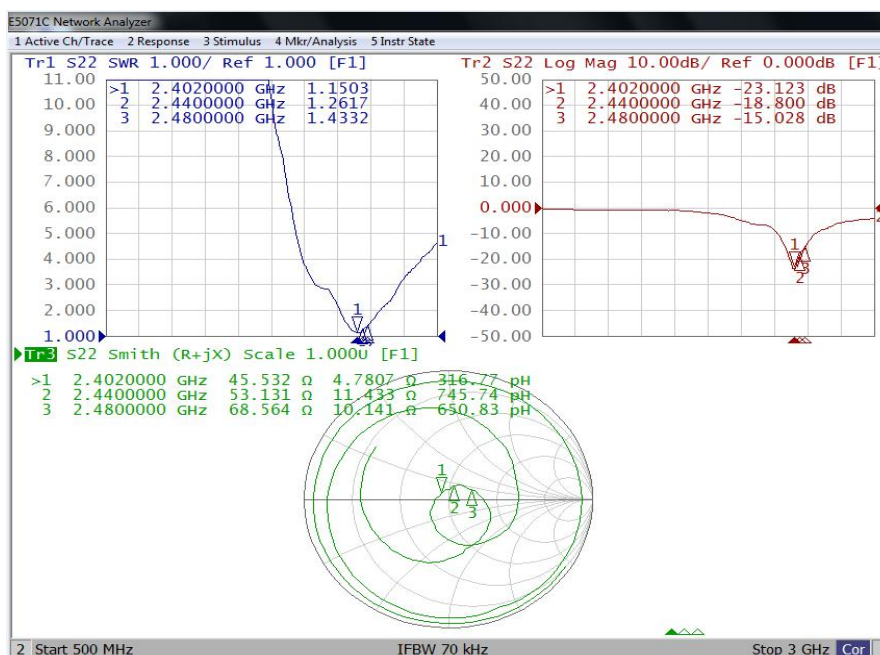
3、ANT-WIFI



四、The result of the test

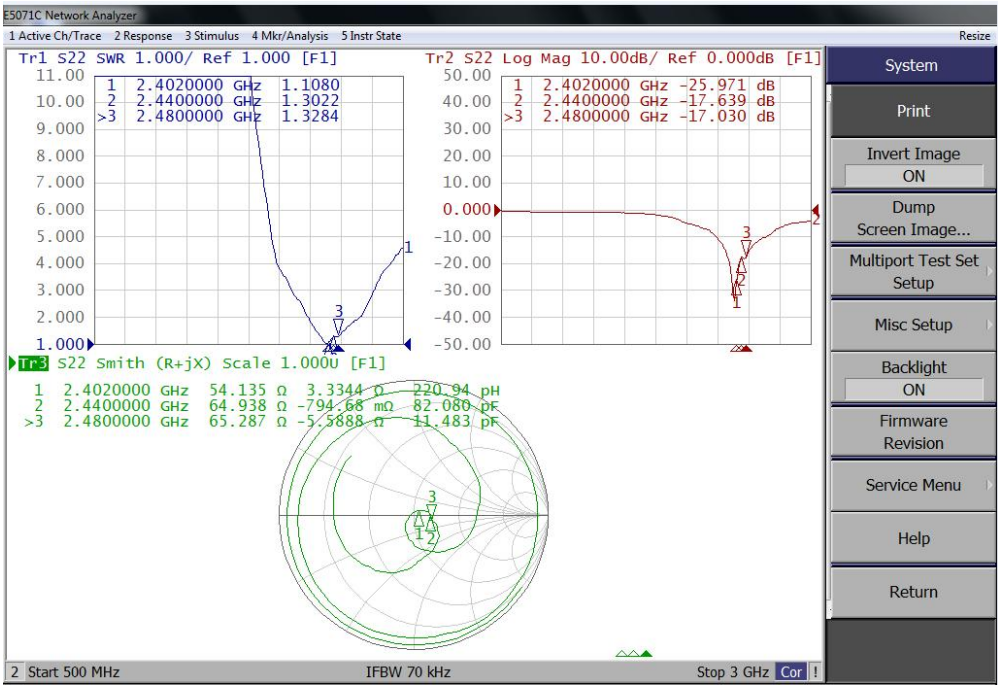
1. VSWR & Return loss & Smith

ANT-J3



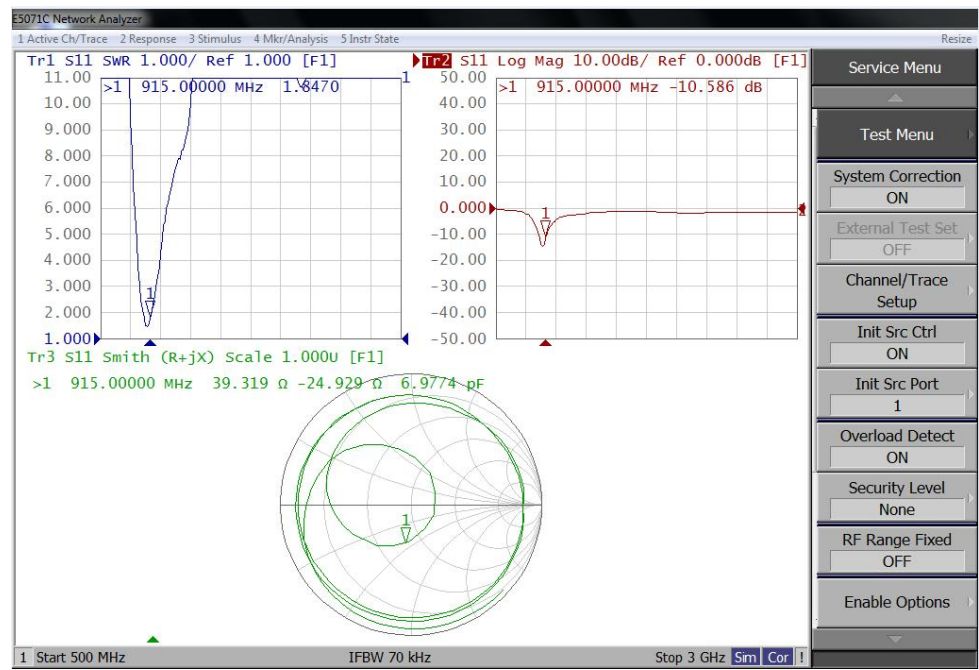
Frequency (MHz)	Return Loss (dB)	VSWR
2402	-23.1	1.15
2440	-18.8	1.26
2480	-15.0	1.43
Bandwidth (S11≤-10dB)	120	

ANT-J2



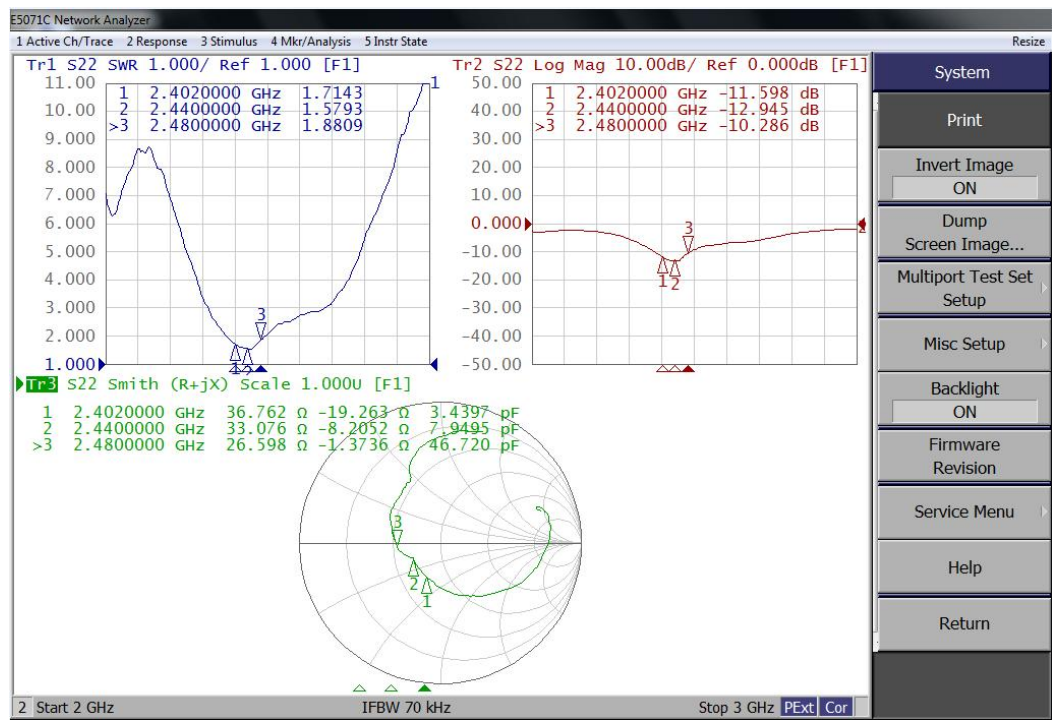
Frequency (MHz)	Return Loss (dB)	VSWR
2402	-25.9	1.10
2440	-17.6	1.30
2480	-17.0	1.32
Bandwidth (S11≤-10dB)	170	

ANT-915



Frequency (MHz)	Return Loss (dB)	VSWR
915	-10.58	1.84
Bandwidth (S11≤-10dB)	30	

ANT-WIFI



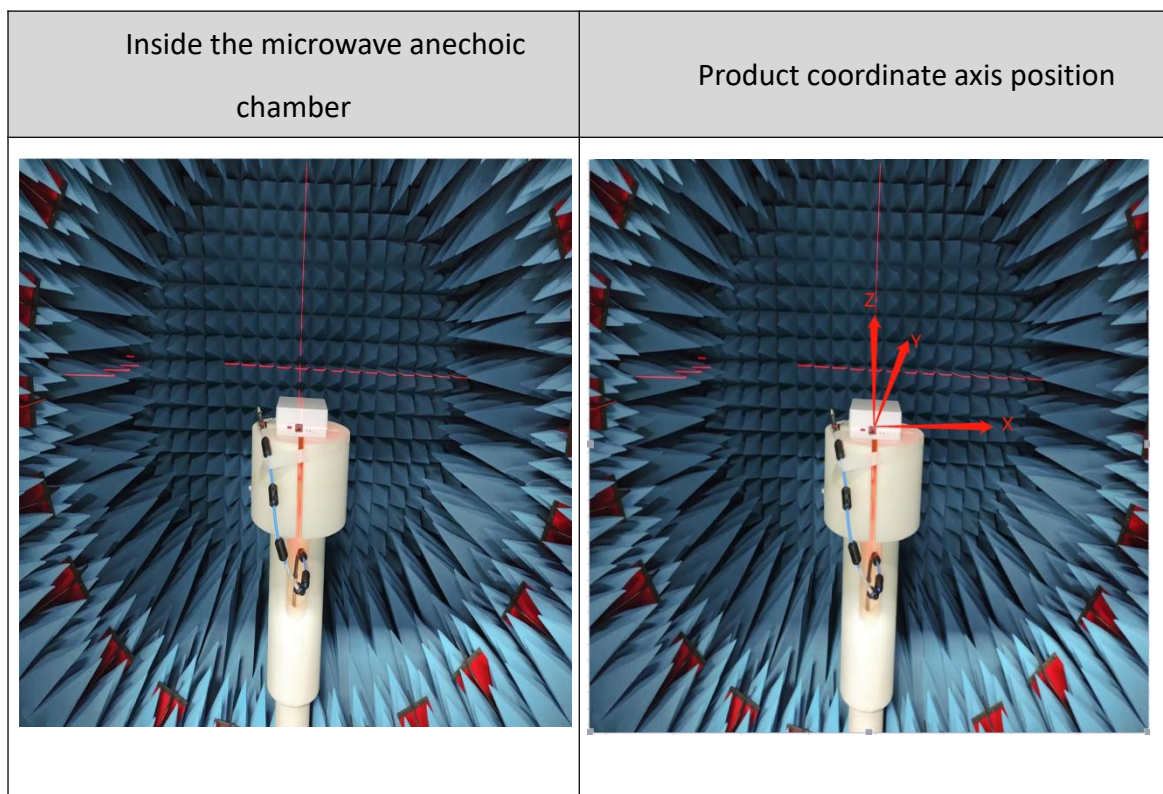
Frequency (MHz)	Return Loss (dB)	VSWR
2402	-11.5	1.71
2440	-12..9	1.57
2480	-10.2	1.88
Bandwidth ($S_{11} \leq -10\text{dB}$)	120	

2. Antenna Testing Environment

(1).Test Equipment : SY-24M, Agilent-E5071C

(2).Test Engineer : MoQi

(3).Test Environment : The microwave unreflected chamber

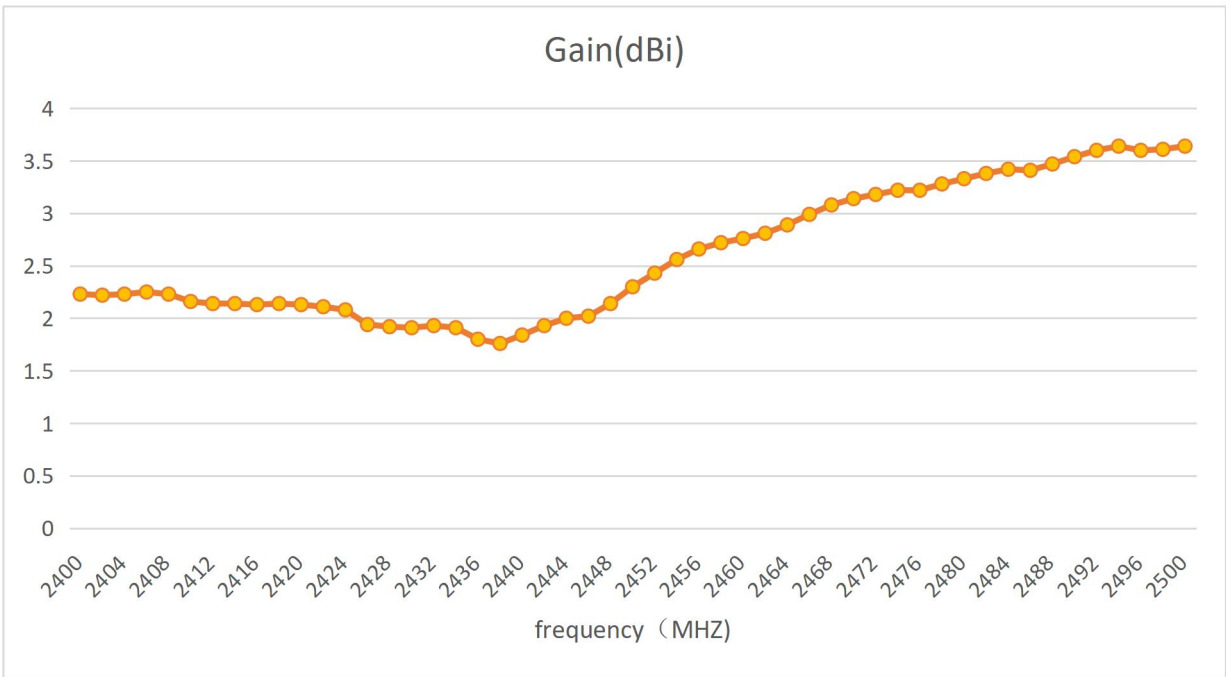
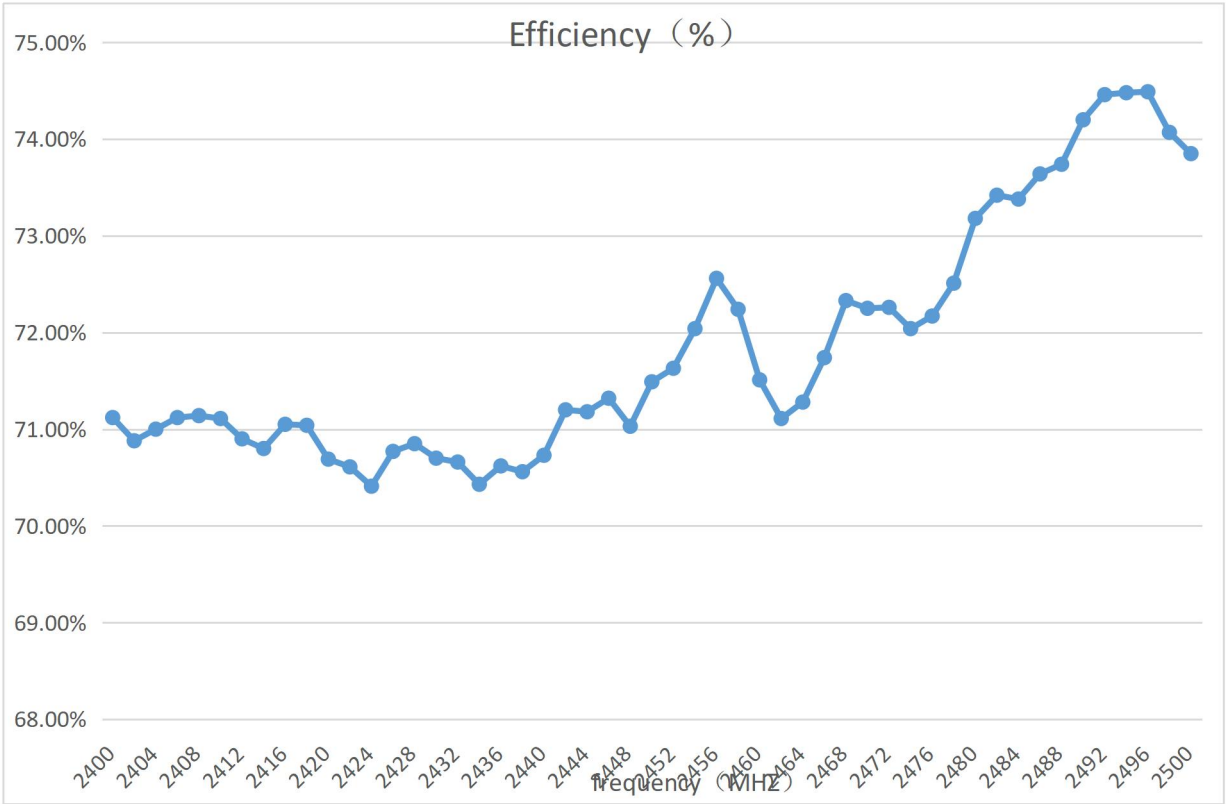


3. Gain and Efficiency

(1).ANT-J3

频率(MHz)	增益(dBi)	效率(dB)	效率(%)
2400	4.92	-1.48	71.12
2402	4.89	-1.49	70.88
2404	4.88	-1.49	71.00
2406	4.91	-1.48	71.12
2408	4.90	-1.48	71.14
2410	4.88	-1.48	71.11
2412	4.86	-1.49	70.90
2414	4.83	-1.50	70.80
2416	4.87	-1.48	71.05
2418	4.85	-1.48	71.04
2420	4.81	-1.51	70.69
2422	4.79	-1.51	70.61
2424	4.77	-1.52	70.41
2426	4.78	-1.50	70.77
2428	4.77	-1.50	70.85
2430	4.76	-1.51	70.70
2432	4.76	-1.51	70.66
2434	4.76	-1.52	70.43
2436	4.77	-1.51	70.62
2438	4.76	-1.51	70.56
2440	4.76	-1.50	70.73
2442	4.78	-1.48	71.20
2444	4.77	-1.48	71.18
2446	4.74	-1.47	71.32
2448	4.72	-1.49	71.03
2450	4.73	-1.46	71.49
2452	4.71	-1.45	71.63
2454	4.70	-1.42	72.04
2456	4.68	-1.39	72.56
2458	4.64	-1.41	72.24
2460	4.57	-1.46	71.51
2462	4.55	-1.48	71.11
2464	4.57	-1.47	71.28
2466	4.59	-1.44	71.74
2468	4.64	-1.41	72.33
2470	4.66	-1.41	72.25

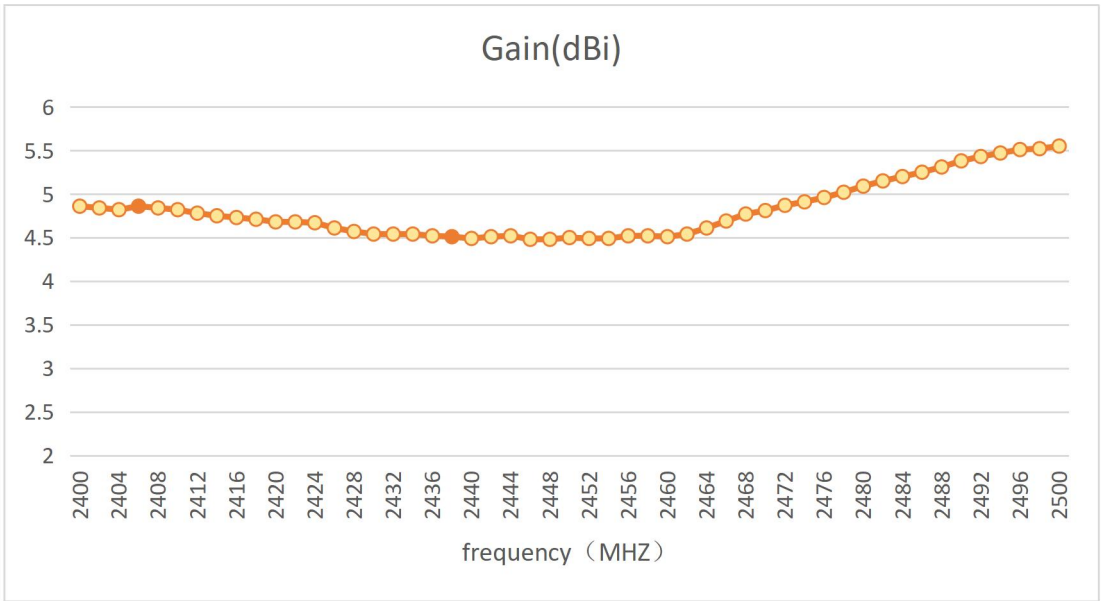
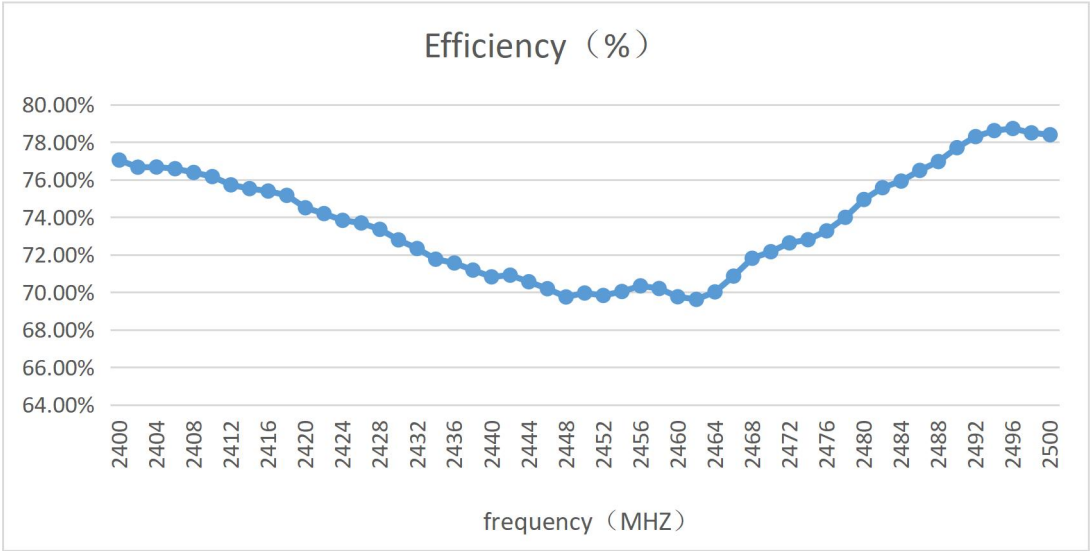
2472	4.69	-1.41	72.26
2474	4.71	-1.42	72.04
2476	4.69	-1.42	72.17
2478	4.73	-1.40	72.51
2480	4.78	-1.36	73.18



(2). ANT-J2

频率 (MHz)	增益 (dBi)	效率 (dB)	效率 (%)
2400	4.86	-1.13	77.04
2402	4.84	-1.15	76.66
2404	4.82	-1.15	76.67
2406	4.86	-1.16	76.58
2408	4.84	-1.17	76.38
2410	4.82	-1.18	76.16
2412	4.78	-1.21	75.72
2414	4.75	-1.22	75.52
2416	4.73	-1.23	75.39
2418	4.71	-1.24	75.16
2420	4.68	-1.28	74.50
2422	4.68	-1.30	74.19
2424	4.67	-1.32	73.83
2426	4.61	-1.33	73.69
2428	4.57	-1.35	73.35
2430	4.54	-1.38	72.79
2432	4.54	-1.41	72.33
2434	4.54	-1.44	71.76
2436	4.52	-1.45	71.56
2438	4.51	-1.48	71.18
2440	4.49	-1.50	70.82
2442	4.51	-1.49	70.91
2444	4.52	-1.51	70.56
2446	4.48	-1.54	70.19
2448	4.48	-1.56	69.75
2450	4.50	-1.55	69.96
2452	4.49	-1.56	69.83
2454	4.49	-1.55	70.04
2456	4.52	-1.53	70.34
2458	4.52	-1.54	70.20
2460	4.51	-1.56	69.76
2462	4.54	-1.57	69.62
2464	4.61	-1.55	70.02
2466	4.69	-1.50	70.86
2468	4.77	-1.44	71.81
2470	4.81	-1.42	72.16
2472	4.87	-1.39	72.63
2474	4.91	-1.38	72.80

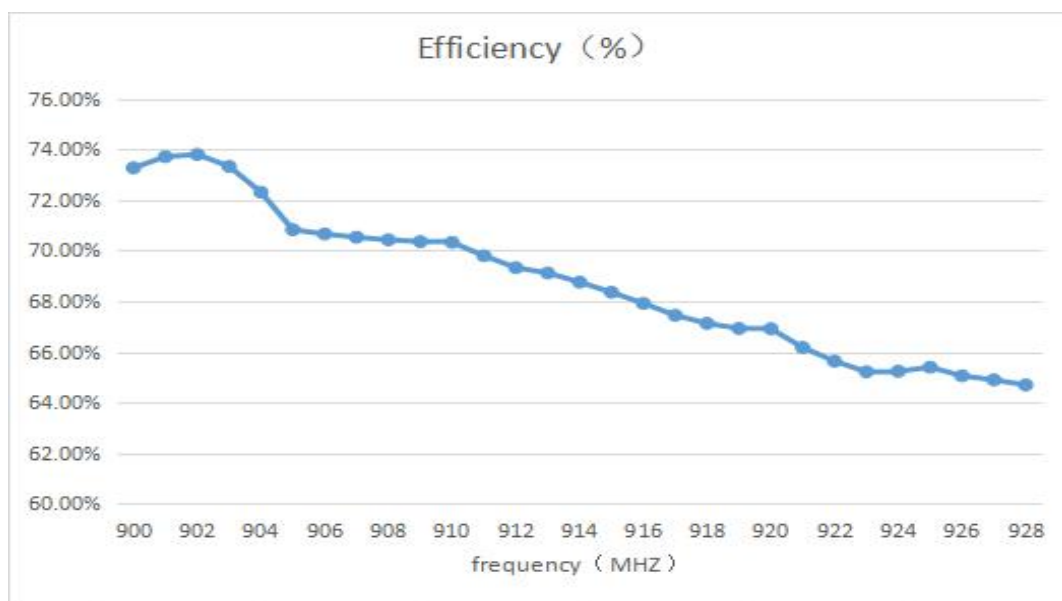
2476	4.96	-1.35	73.27
2478	5.02	-1.31	73.99
2480	5.09	-1.25	74.94

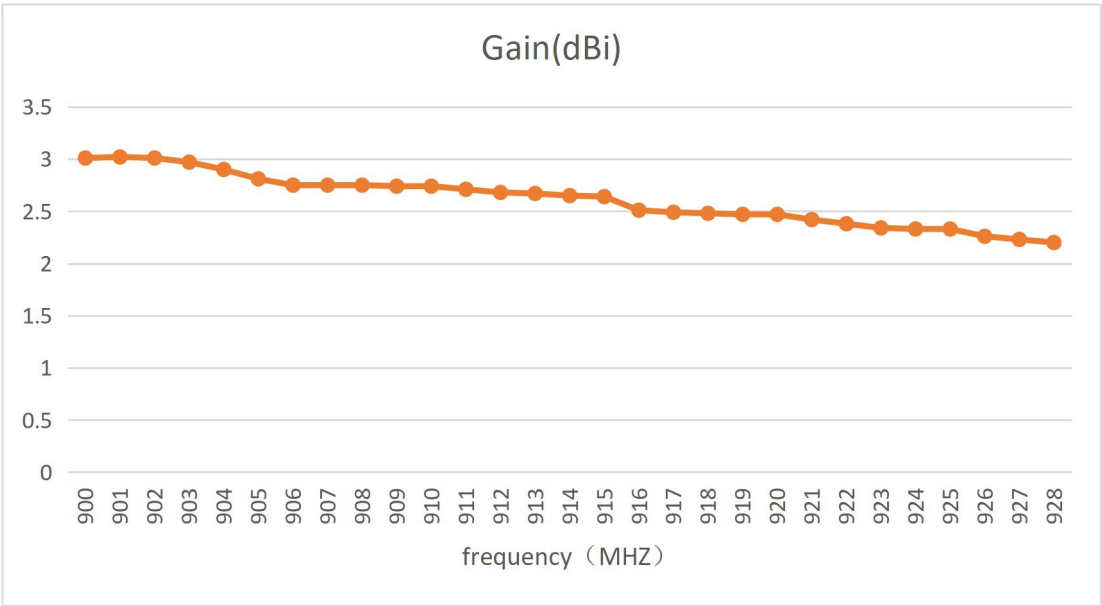


(3). ANT-915

频率(MHz)	增益(dBi)	效率(dB)	效率(%)
900	3.01	-1.35	73.27
901	3.02	-1.32	73.71
902	3.01	-1.32	73.80
903	2.97	-1.35	73.33
904	2.90	-1.41	72.31
905	2.81	-1.50	70.83

906	2.75	-1.51	70.66
907	2.75	-1.52	70.53
908	2.75	-1.52	70.43
909	2.74	-1.53	70.36
910	2.74	-1.53	70.33
911	2.71	-1.56	69.80
912	2.68	-1.59	69.33
913	2.67	-1.60	69.12
914	2.65	-1.63	68.76
915	2.64	-1.65	68.36
916	2.51	-1.68	67.92
917	2.49	-1.71	67.45
918	2.48	-1.73	67.13
919	2.47	-1.74	66.93
920	2.47	-1.74	66.92
921	2.42	-1.79	66.18
922	2.38	-1.83	65.64
923	2.34	-1.86	65.22
924	2.33	-1.85	65.24
925	2.33	-1.84	65.40
926	2.26	-1.87	65.06
927	2.23	-1.88	64.90
928	2.20	-1.89	64.70

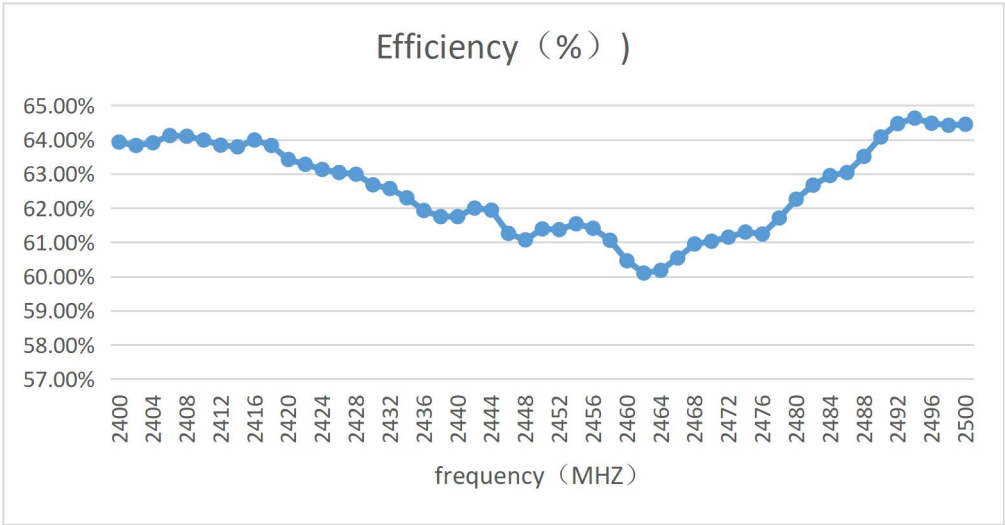
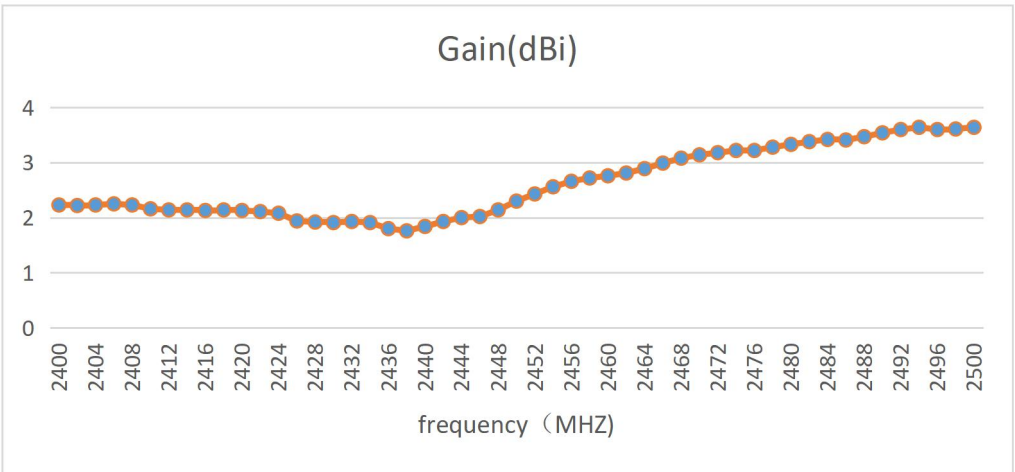




(4). ANT-WIFI

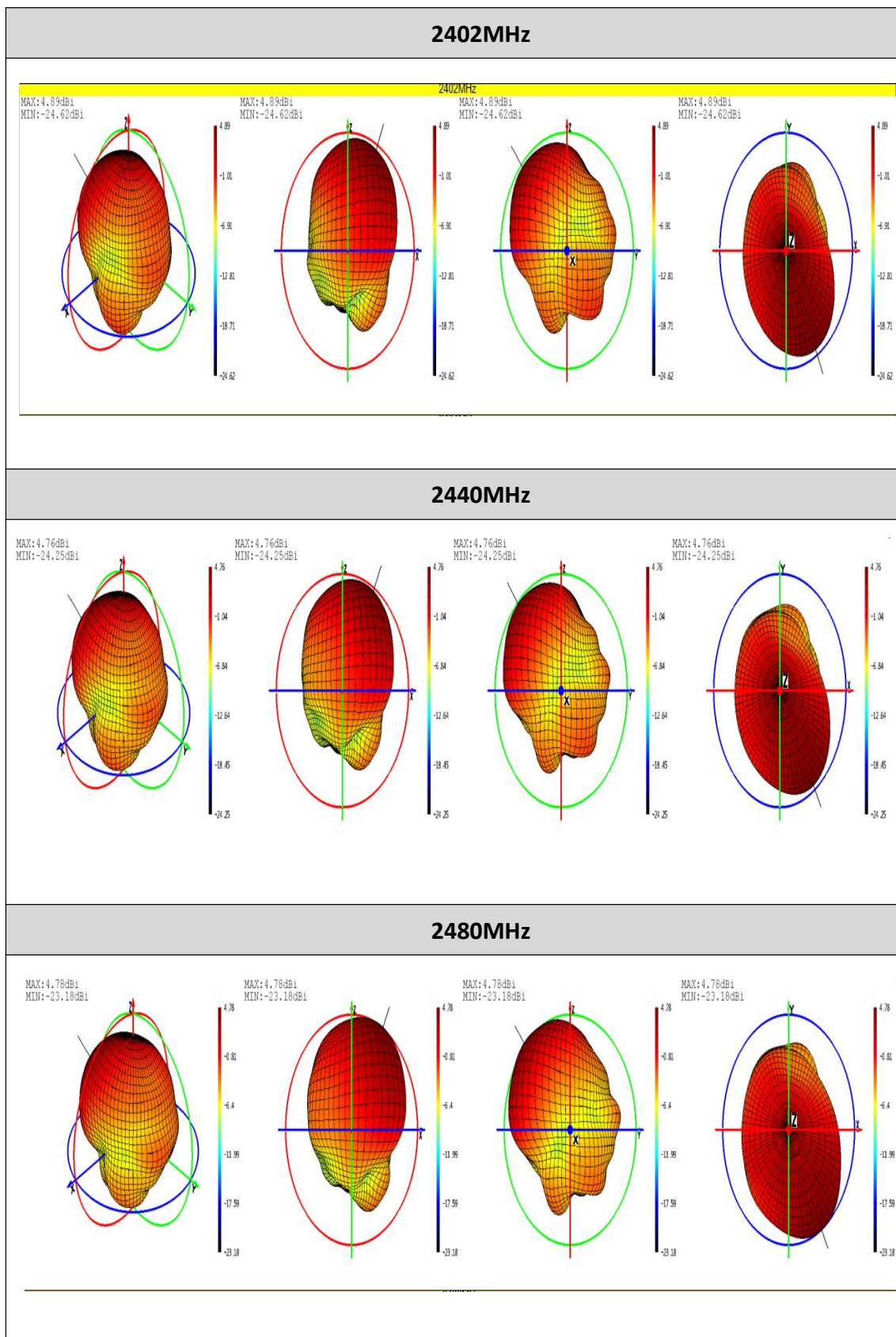
频率(MHz)	增益(dBi)	效率(dB)	效率(%)
2400	2.23	-1.94	63.93
2402	2.22	-1.95	63.83
2404	2.23	-1.94	63.91
2406	2.25	-1.93	64.12
2408	2.23	-1.93	64.10
2410	2.16	-1.94	63.99
2412	2.14	-1.95	63.84
2414	2.14	-1.95	63.79
2416	2.13	-1.94	63.99
2418	2.14	-1.95	63.83
2420	2.13	-1.98	63.42
2422	2.11	-1.99	63.28
2424	2.08	-2.00	63.13
2426	1.94	-2.00	63.04
2428	1.92	-2.01	62.99
2430	1.91	-2.03	62.68
2432	1.93	-2.04	62.57
2434	1.91	-2.06	62.30
2436	1.80	-2.08	61.93
2438	1.76	-2.09	61.75
2440	1.84	-2.09	61.75
2442	1.93	-2.08	62.00
2444	2.00	-2.08	61.94
2446	2.02	-2.13	61.26

2448	2.14	-2.14	61.07
2450	2.30	-2.12	61.39
2452	2.43	-2.12	61.37
2454	2.56	-2.11	61.54
2456	2.66	-2.12	61.41
2458	2.72	-2.14	61.06
2460	2.76	-2.19	60.46
2462	2.81	-2.21	60.10
2464	2.89	-2.21	60.18
2466	2.99	-2.18	60.54
2468	3.08	-2.15	60.95
2470	3.14	-2.14	61.03
2472	3.18	-2.14	61.15
2474	3.22	-2.13	61.30
2476	3.22	-2.13	61.24
2478	3.28	-2.10	61.71
2480	3.33	-2.06	62.26

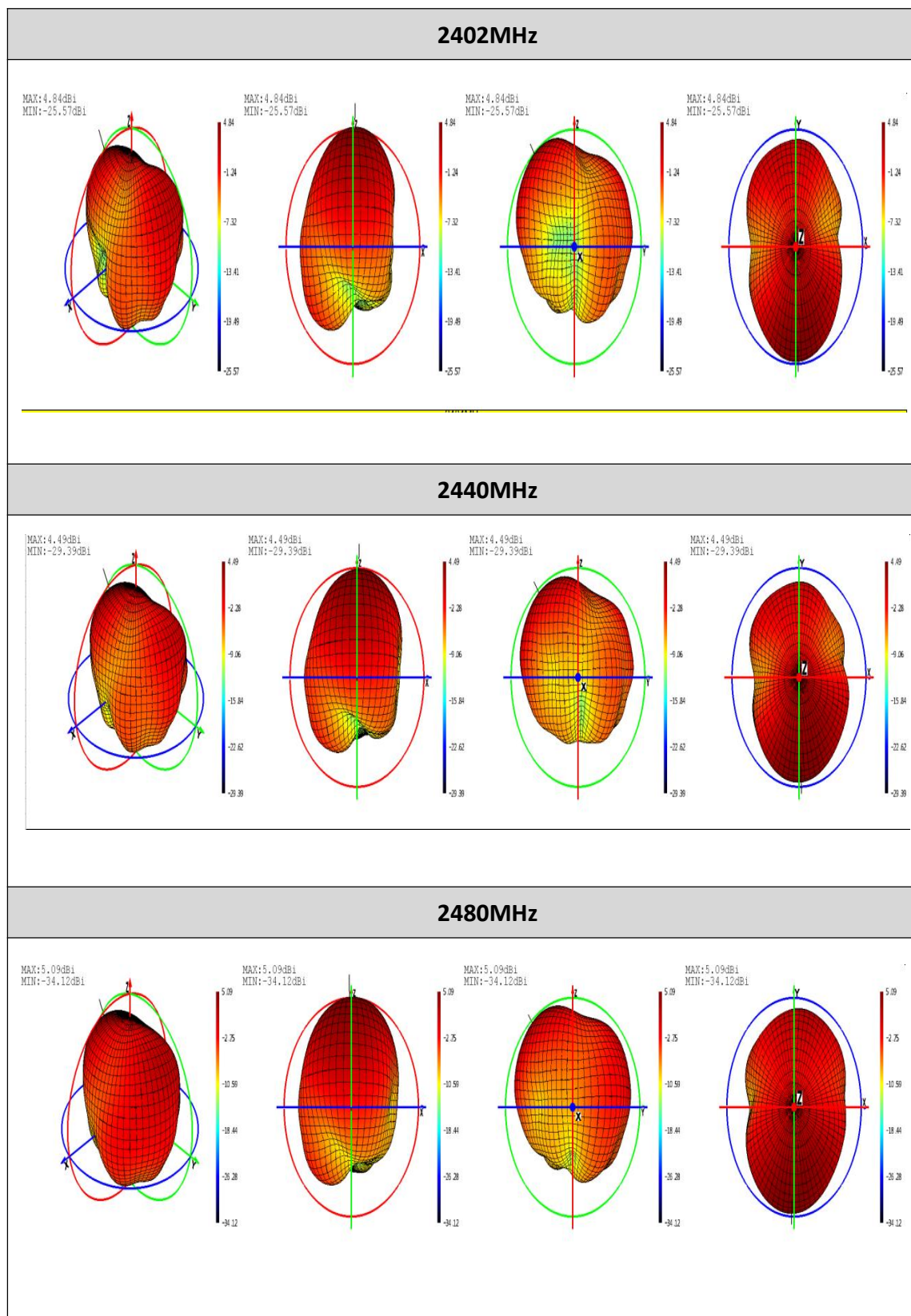


4. 3D Radiation Pattern

ANT-J3

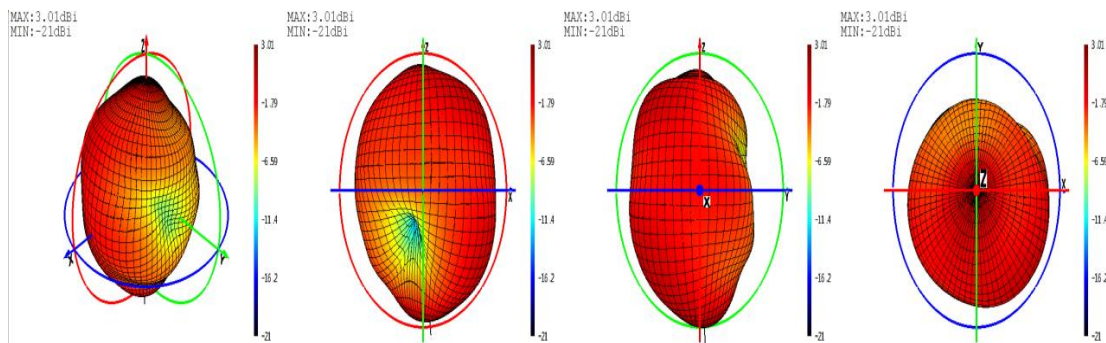


ANT-J2

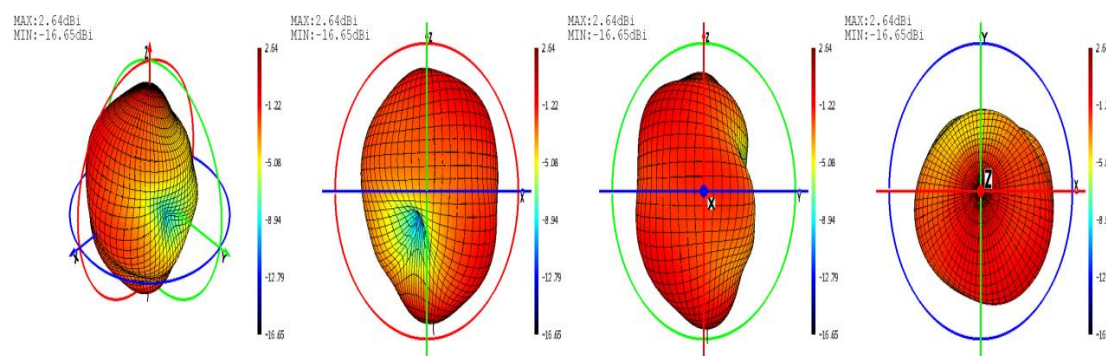


ANT-915

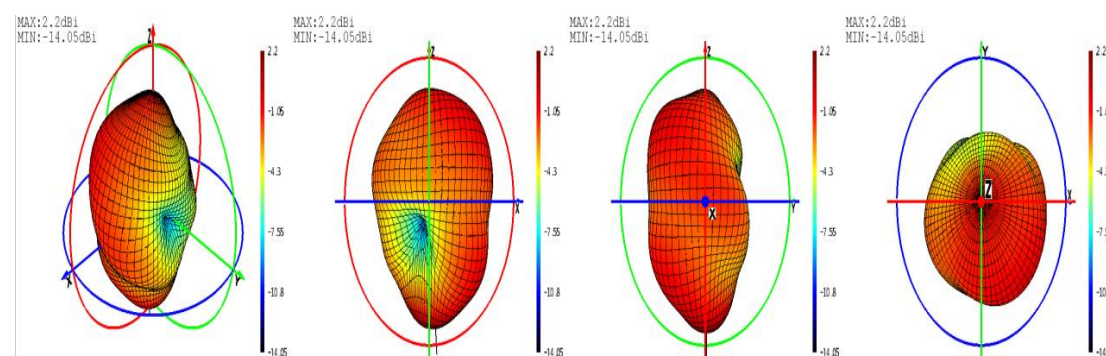
900MHz



915MHz

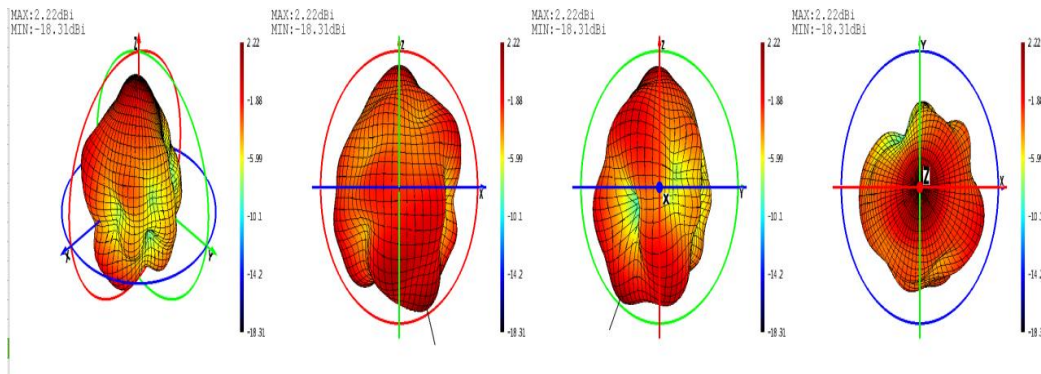


928MHz

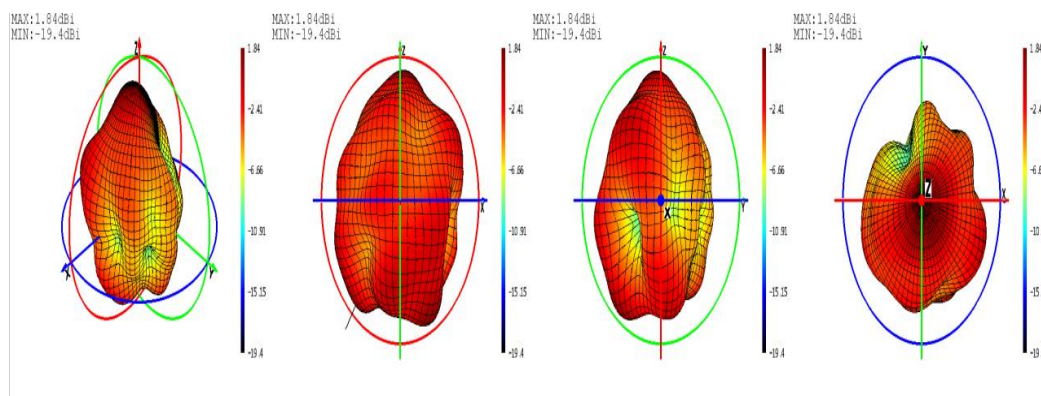


ANT -WIFI

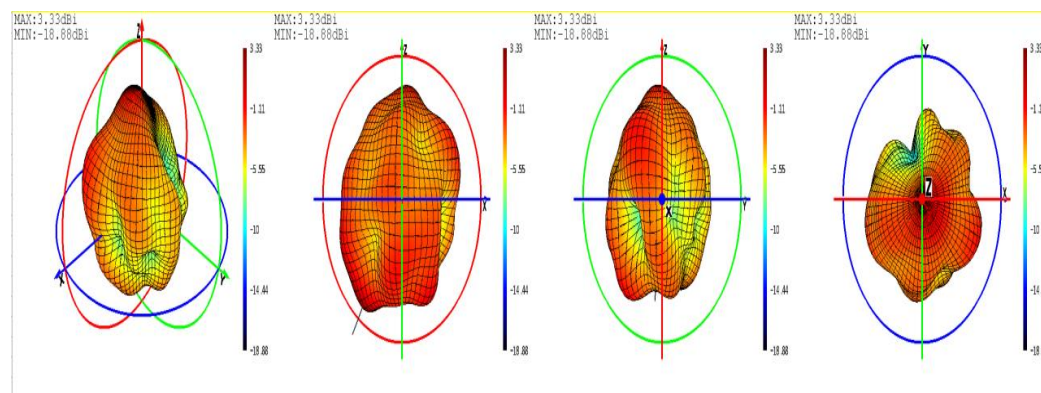
2402MHz



2440MHz

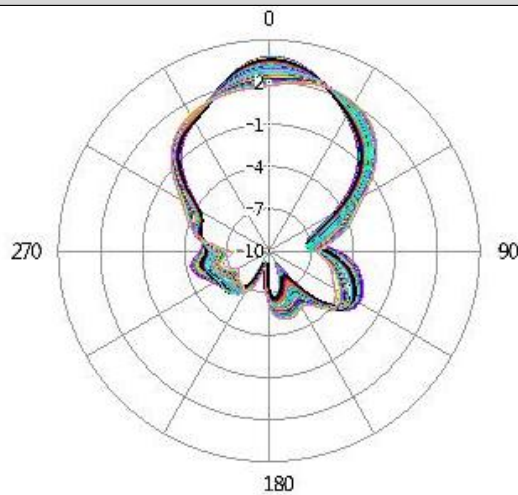
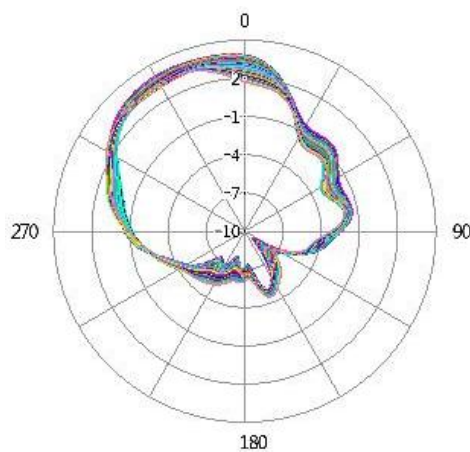
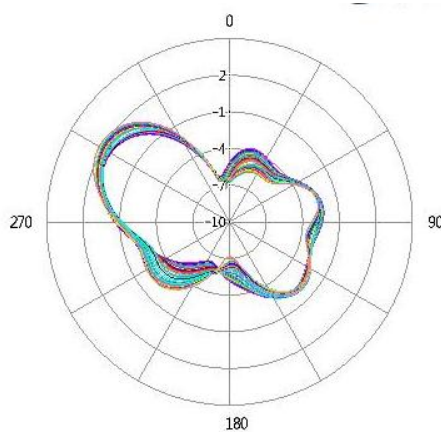


2480MHz



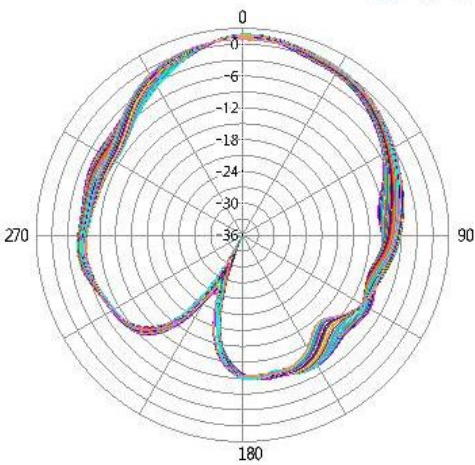
5. 2D Radiation Pattern

ANT-J3

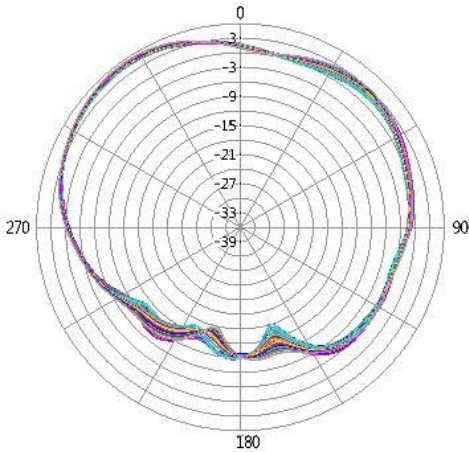
E1, XZ-Face, $\phi=0^\circ$; (E1, $\theta=0^\circ\sim 360^\circ$, $\phi=0^\circ$)E2, YZ-Face, $\phi=90^\circ$; (E2, $\theta=0^\circ\sim 360^\circ$, $\phi=90^\circ$)H, XY-Face, $\theta=90^\circ$; (H, $\phi=0^\circ\sim 360^\circ$, $\theta=90^\circ$)

ANT-J2

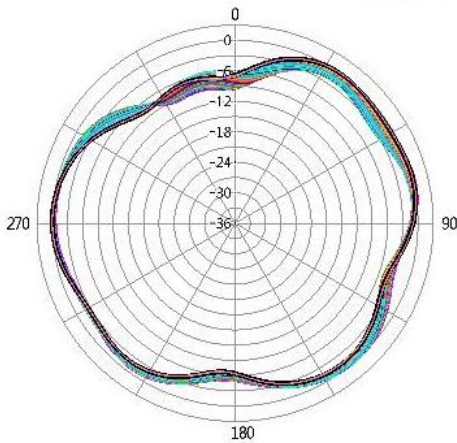
E1, XZ-Face, $\phi=0^\circ$; (E1, $\theta=0\sim360^\circ$, $\phi=0^\circ$)



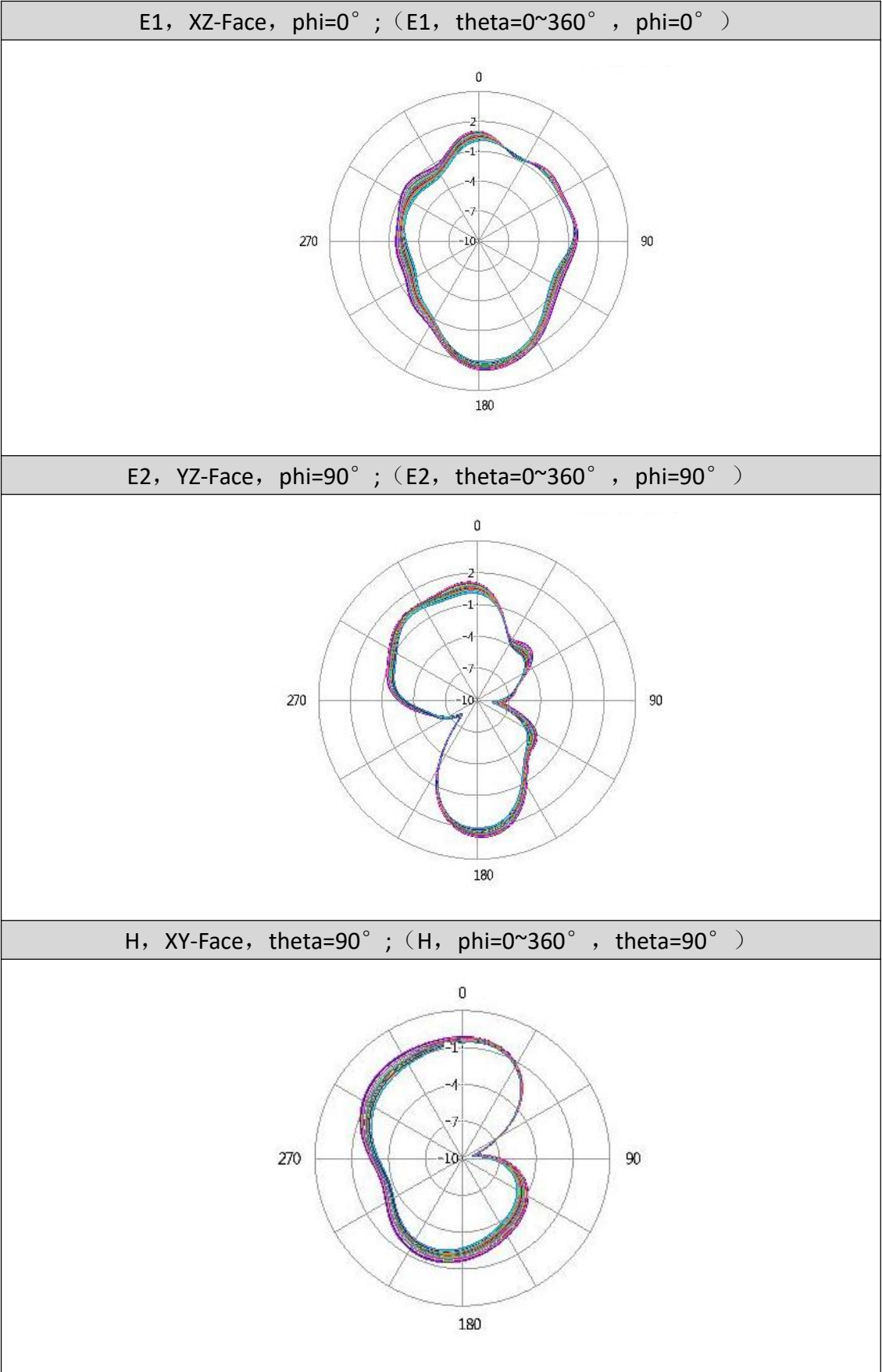
E2, YZ-Face, $\phi=90^\circ$; (E2, $\theta=0\sim360^\circ$, $\phi=90^\circ$)



H, XY-Face, $\theta=90^\circ$; (H, $\phi=0\sim360^\circ$, $\theta=90^\circ$)



ANT-915



ANT-WIFI

