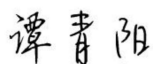


Industrial Internet Innovation Center (Shanghai) Co.,Ltd.**OTA TEST REPORT**

PRODUCT	ESP-Dual Band-Ant A
APPLICANT	ESPRESSIF SYSTEMS (SHANGHAI) CO., LTD
ISSUE DATE	January 8, 2025
STANDARD(S)	IEEE Std 149TM-2008 IEEE Standard Test Procedures for Antennas

Prepared by: *Tan Qingyang*Reviewed by: *Feng Yimin*Approved by: *Zhang Min***CAUTION:**

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1 General Information of The Laboratory

1.1 Testing Laboratory

Lab Name	Industrial Internet Innovation Center (Shanghai) Co.,Ltd.
Address	Building 4,No. 766,Jingang Road,Pudong,Shanghai,China
Telephone	021-68866880

1.2 Laboratory Environmental Requirements

Temperature	19℃~25℃
Relative Humidity	35%RH~75%RH

1.3 Project Information

Project Manager	Wei Hanyu
Test Date	December 5, 2024

2 General Information of The Customer

2.1 Applicant

Company	Espressif System (Shanghai) Co.,Ltd
Address	Suite 204 Block 2, 690 Bibo Road, Zhang Jiang Hi-Tech Park,Shanghai, China
Telephone	N/A

2.2 Manufacturer

Company	Espressif System (Shanghai) Co.,Ltd
Address	Suite 204 Block 2, 690 Bibo Road, Zhang Jiang Hi-Tech Park,Shanghai, China
Telephone	N/A

3 General Information of The Product

3.1 Product Description for Equipment under Test (EUT)

Product	ESP-Dual Band-Ant A
Date of Receipt	December 5,2024
EUT ID*	S01
SN/IMEI	N/A
Hardware Version	v1.1
Antenna Type	PCB Antenna
NOTE: EUT ID is the internal identification code of the laboratory.	

4 Test Configuration Information

4.1 Test Equipments Utilized

No.	Name	Model	S/N	Manufacturer	Cal. Date	Cal. Interval
1	AMS 8923	Fully Anechoic Chamber	CT-0001443-1280	ETS-Lindgren	2024-8-22	5 years
2	E5071C	N/A	MY46523563	Keysight	2024-10-11	1 year

5 Test Results

5.1 Max gain

Frequency(GHz)	Max gain(dBi)
2.4	3.62
5.2	3.07
5.3	1.93
5.5	3.43
5.8	2.80

5.2 2.4G

Frequency	Directivity	Efficiency	Efficiency	Gain (dBi)	Test Angle	Max gain(dBi)
2402	5.08	-1.94	64.00	3.14	15°	3.62
2407	5.10	-1.75	66.85	3.35	15°	
2412	5.17	-1.75	66.77	3.41	15°	
2417	5.14	-1.68	67.85	3.46	15°	
2422	5.12	-1.65	68.43	3.47	15°	
2427	5.00	-1.57	69.68	3.43	15°	
2432	4.97	-1.63	68.69	3.34	15°	
2437	4.91	-1.57	69.74	3.35	15°	
2442	4.97	-1.51	70.61	3.46	15°	
2447	4.98	-1.46	71.46	3.52	15°	
2452	5.10	-1.48	71.09	3.62	15°	
2457	5.08	-1.55	69.97	3.53	15°	
2462	5.11	-1.51	70.66	3.60	15°	
2467	5.10	-1.51	70.70	3.59	15°	
2472	5.09	-1.50	70.81	3.59	15°	
2477	4.94	-1.59	69.34	3.35	15°	
2482	4.87	-1.50	70.72	3.37	15°	
2487	4.86	-1.50	70.86	3.36	15°	
2492	4.85	-1.45	71.55	3.39	15°	
2497	4.87	-1.47	71.35	3.40	15°	

5.3 5G

Frequency	Directivity	Efficiency	Efficiency	Gain (dBi)	Test Angle	Max gain(dBi)
5140	4.20	-2.49	56.35	1.71	15°	N/A
5160	4.57	-2.29	58.99	2.28	15°	N/A
5180	5.13	-2.34	58.39	2.79	15°	3.07
5200	5.50	-2.42	57.23	3.07	15°	
5220	4.96	-2.78	52.70	2.18	15°	
5240	5.18	-3.02	49.91	2.16	15°	
5260	4.65	-3.33	46.45	1.32	15°	
5280	4.73	-3.08	49.15	1.65	15°	1.93
5300	4.66	-2.95	50.66	1.71	15°	
5320	5.01	-3.08	49.24	1.93	15°	
5340	4.93	-3.01	50.03	1.92	15°	N/A
5360	4.63	-2.83	52.09	1.79	15°	N/A
5380	4.36	-3.27	47.05	1.09	15°	N/A
5400	4.12	-2.86	51.75	1.26	15°	N/A
5420	3.94	-2.93	50.92	1.00	15°	N/A
5440	4.02	-3.33	46.50	0.70	15°	N/A
5460	4.11	-3.27	47.05	0.83	15°	N/A
5480	4.32	-3.10	48.94	1.21	15°	N/A
5500	4.77	-3.18	48.07	1.59	15°	3.43
5520	4.68	-3.38	45.87	1.29	15°	
5540	4.30	-3.38	45.97	0.93	15°	
5560	4.72	-2.15	61.00	2.57	15°	
5580	4.19	-2.69	53.78	1.50	15°	
5600	4.89	-2.56	55.50	2.33	15°	
5620	4.89	-2.02	62.83	2.87	15°	
5640	5.26	-1.83	65.60	3.43	15°	
5660	4.83	-2.46	56.73	2.37	15°	
5680	4.76	-2.68	53.99	2.08	15°	
5700	4.66	-2.62	54.65	2.03	15°	
5720	4.42	-2.06	62.23	2.36	15°	
5725	4.36	-2.21	60.16	2.15	15°	2.80
5745	4.96	-2.45	56.92	2.51	15°	
5765	4.87	-2.50	56.27	2.37	15°	
5785	5.30	-2.64	54.48	2.66	15°	
5805	5.77	-2.98	50.39	2.80	15°	
5825	5.30	-3.16	48.31	2.14	15°	
5845	4.57	-3.17	48.22	1.40	15°	N/A
5865	5.74	-3.28	46.98	2.46	15°	N/A
5885	4.44	-3.13	48.69	1.31	15°	N/A
5905	4.88	-2.84	51.99	2.04	15°	N/A
5925	5.40	-2.09	61.85	3.32	15°	N/A
5945	4.45	-2.19	60.45	2.26	15°	N/A
5965	4.53	-2.09	61.85	2.45	15°	N/A

6 Free Space Measurement Information

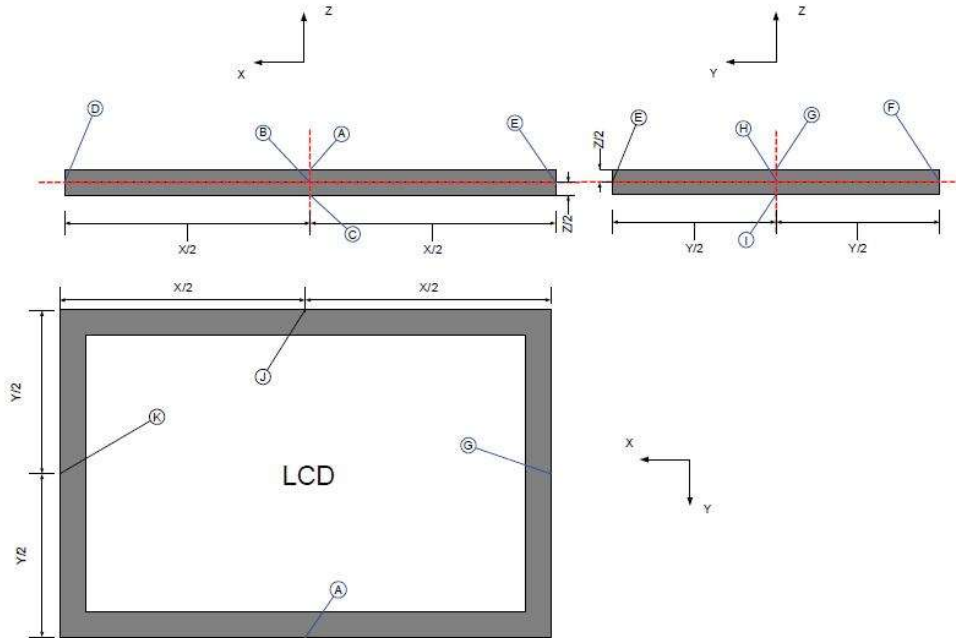


FIGURE P-1 INTERNAL ANTENNA

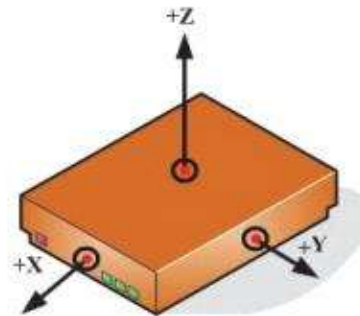
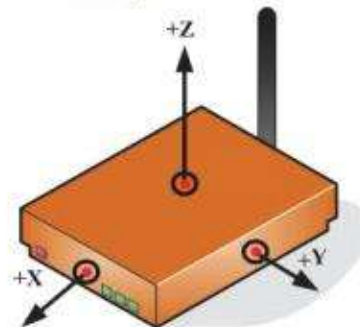


FIGURE P-2 DIRECT CONNECT EXTERNAL ANTENNA (IT DOES NOT MATTER WHERE THE ANTENNA IS LOCATED AS YOU WILL CENTER ON THE DEVICE)



Annex A: EUT Photos

Please refer to Internal Photos for antenna photos

Picture A-1: Front view photo

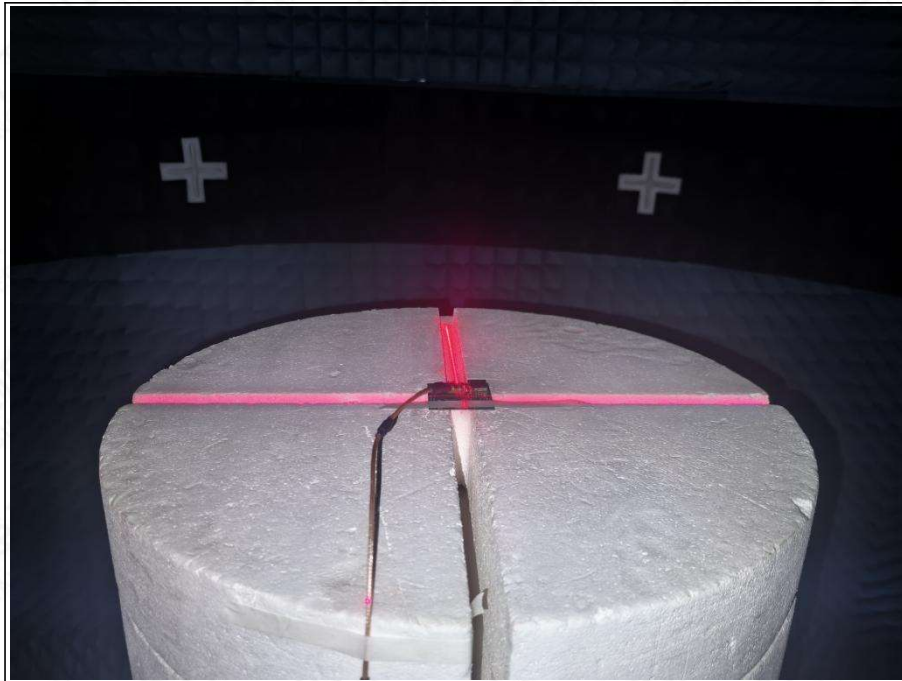
Please refer to Internal Photos for antenna photos

Picture A-2: Rear view photo

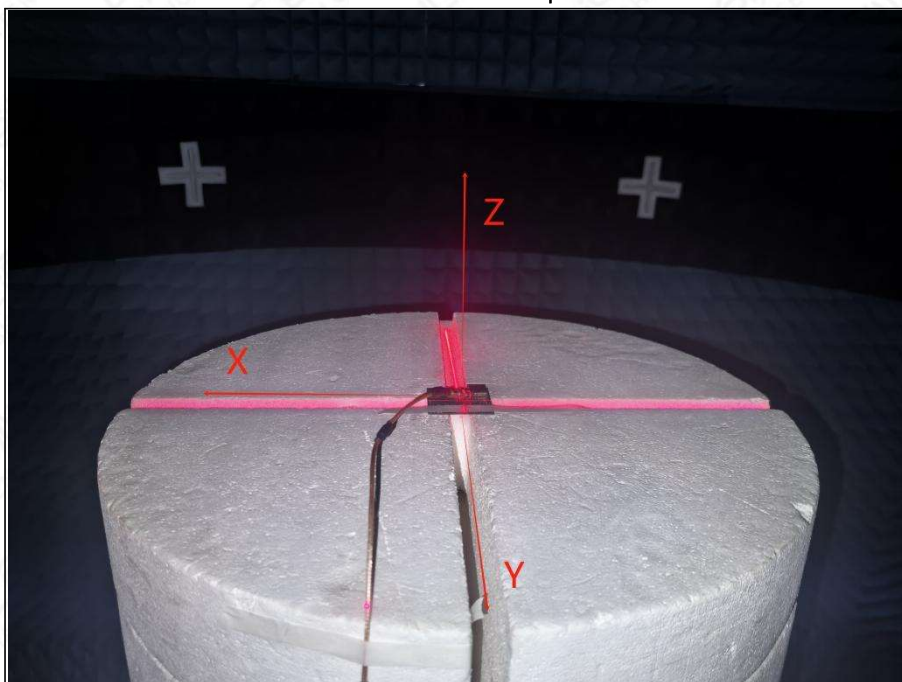
Please refer to Internal Photos for antenna photos

Picture A-3: Antenna photo

Annex B: Test Configuration Photos

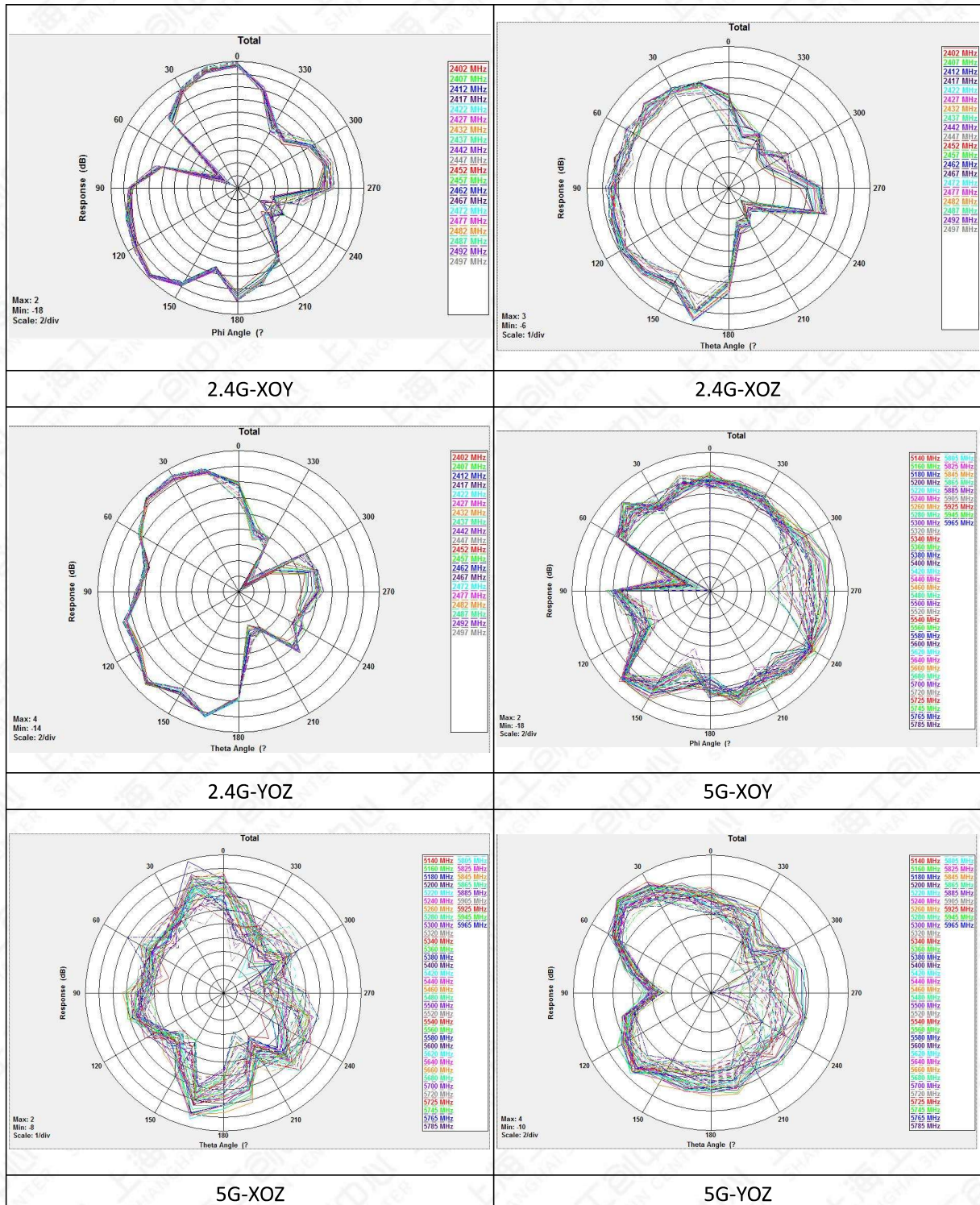


Picture B-1: Free Space

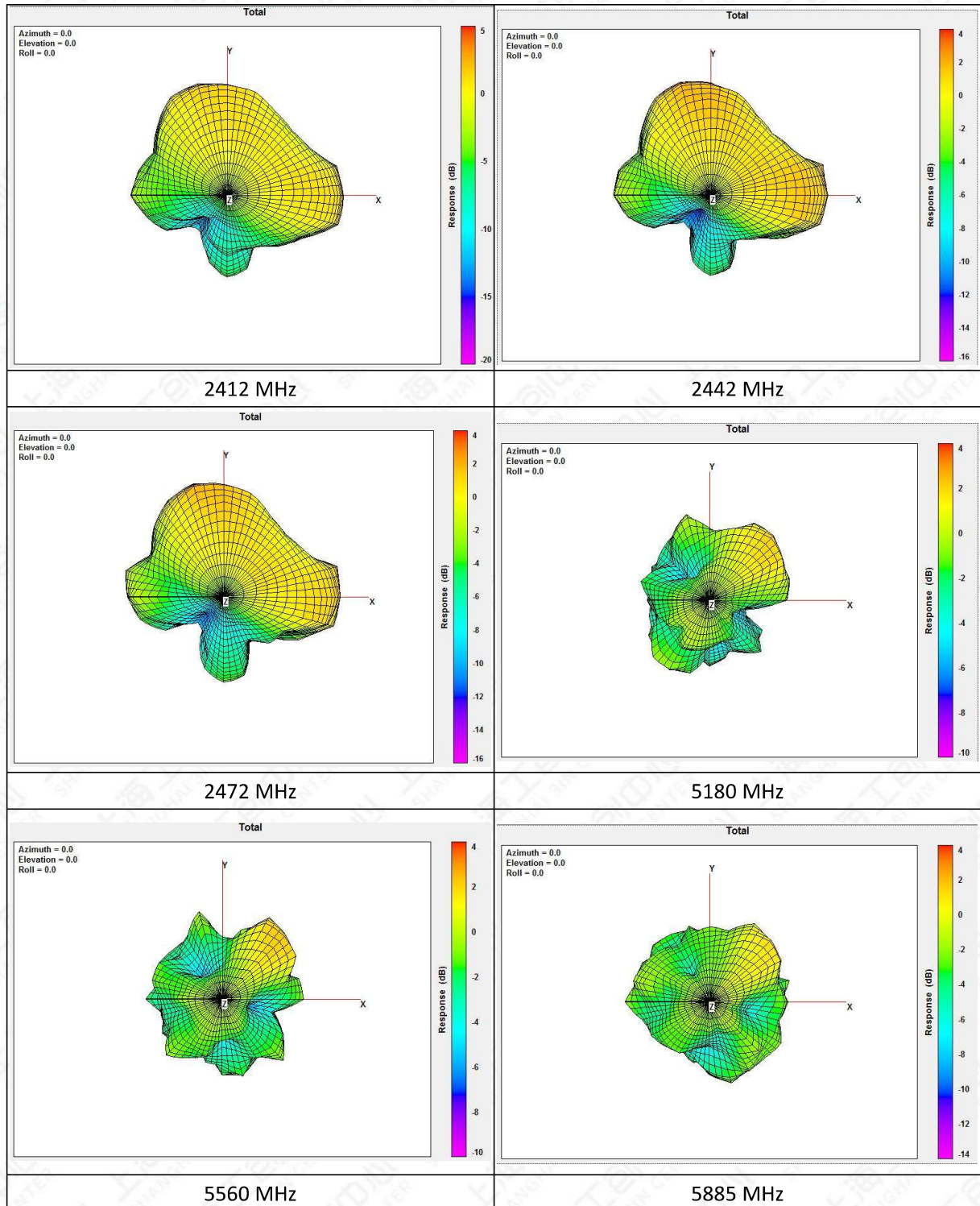


Picture B-2: Coordinate Graph

Annex C: Detailed 2D Pattern Plots Results



Annex D: Detailed 3D Pattern Plots Results



Annex D: Revised History

Version	Revised Content
V1	Update 2D Pattern Plots Results Delete Model

END OF REPORT