

1. General Description of Equipment under Test

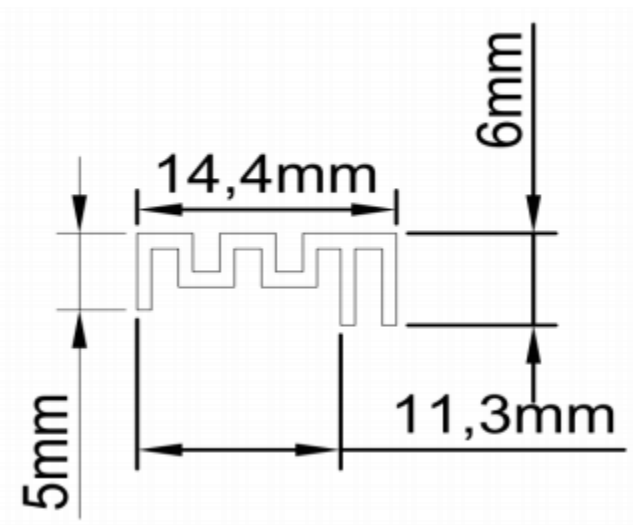
1.1. Applicant Information

Company: Aqua Design Amano Co.,LTD
Address: 8554-1 Urushiyama, Nishikan-ku, Niigata 953-0054, Japan

1.2. Information of EUT

General information

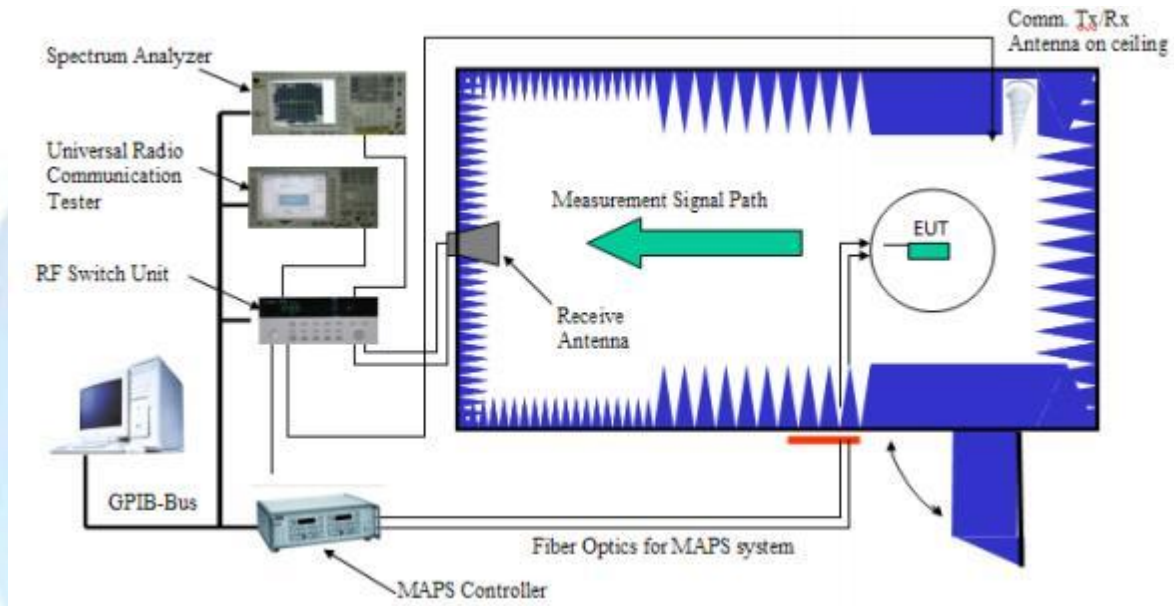
EUT Description	
Product Name:	ESP ANT B
Model	ESP ANT B
HW Version:	/
SW Version:	/
Antenna Type:	PCB Antenna
Antenna Size	As shown in the figure below
Antenna Manufacturer:	Espressif Systems
Test Frequency:	2400MHz ~ 2500MHz



2. Test Conditions

2.1. Test Configuration

Great-Circle-Cut method is used to measure the antenna 3D GAIN of EUT in OTA qualified anechoic chamber. Equipment Under Test (EUT) geometry centre vertical projection at the centre of platform, the distance from EUT to measurement antenna is 5m.



3.2. Test Measurement

Spherical coordinate system

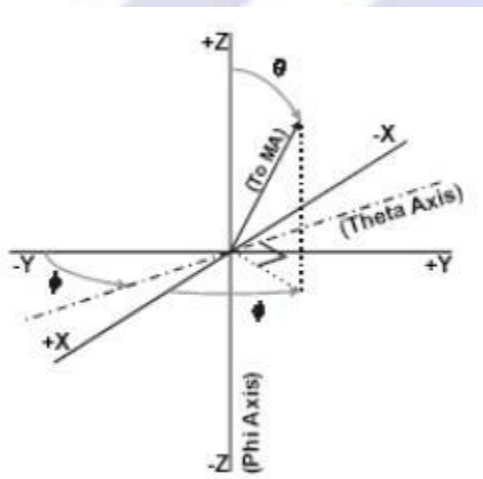


Figure 1 Test coordinate system

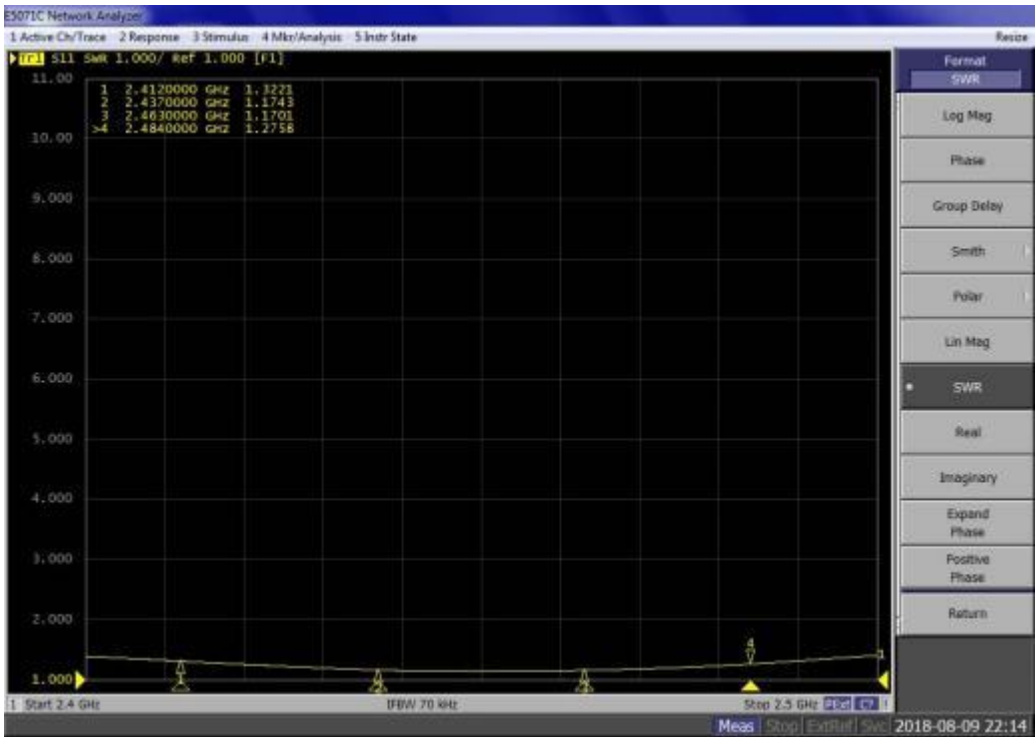
Note: Theta is from 0~180 degree. Phi is from 0~360. Rotate the EUT and record the Data, the step of rotation is 30 degree.

4. Test Results

4.1. Gain and Efficiency

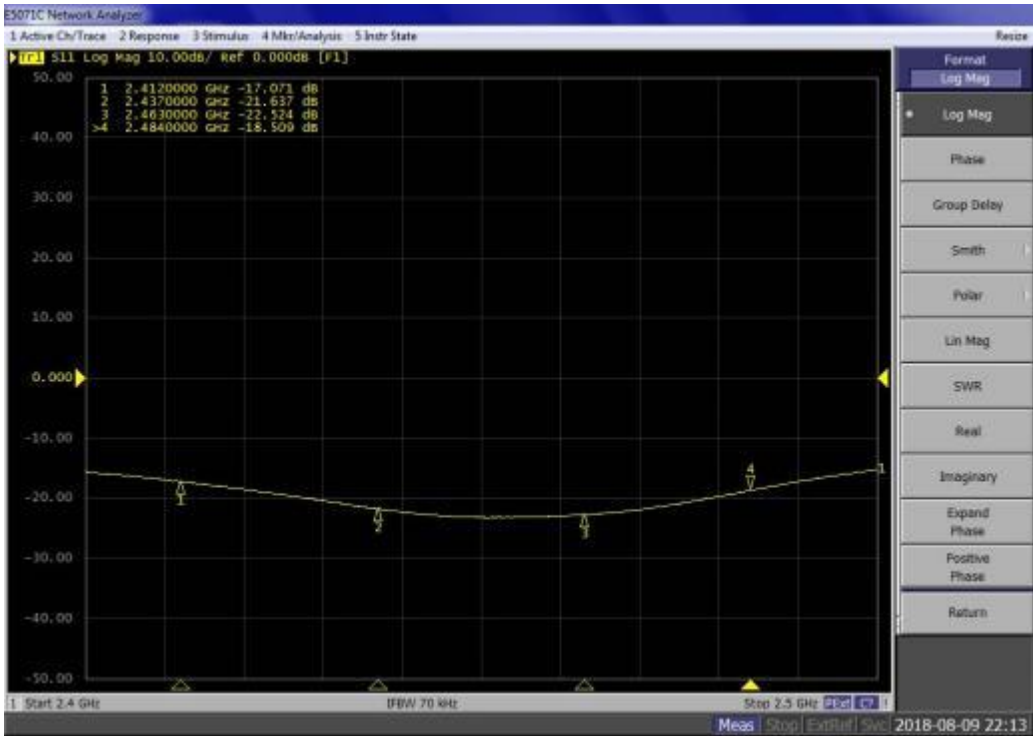
Test Item	Test State	Frequency (MHz)	Efficiency (%)	Gain (dBi)	Note
Gain	Free Space	2400	72.68	3.76	Vertical 30°
		2412	73.79	2.39	
		2417	77.04	2.97	
		2422	79.83	2.80	
		2427	81.19	2.89	
		2432	80.54	3.04	
		2437	76.86	2.86	
		2442	76.17	2.99	
		2447	73.99	2.96	
		2452	72.00	2.80	
		2457	70.71	2.72	
		2462	71.31	2.94	
		2467	71.32	3.12	
		2472	72.03	3.28	
		2477	72.71	3.24	
		2482	75.42	3.42	
		2490	85.32	3.57	
		2500	86.78	3.28	
Note: comment variation is +/- 0.02dBi					

4.2. Voltage Standing Wave Ratio (VSWR)



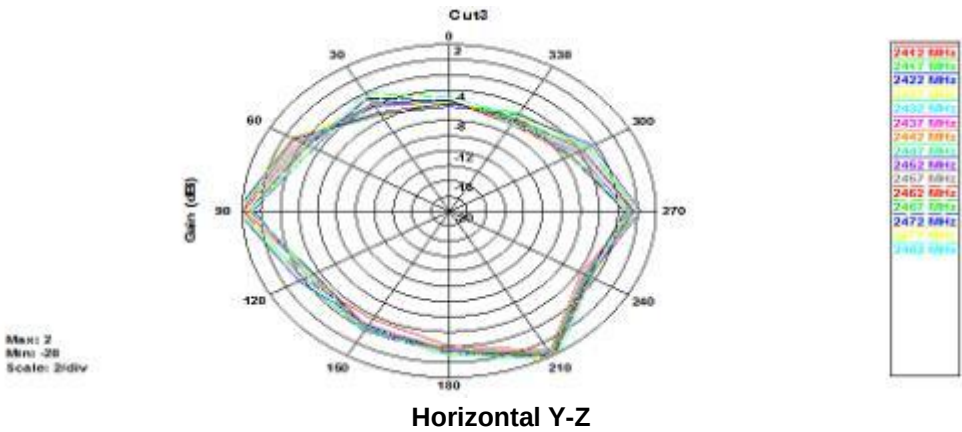
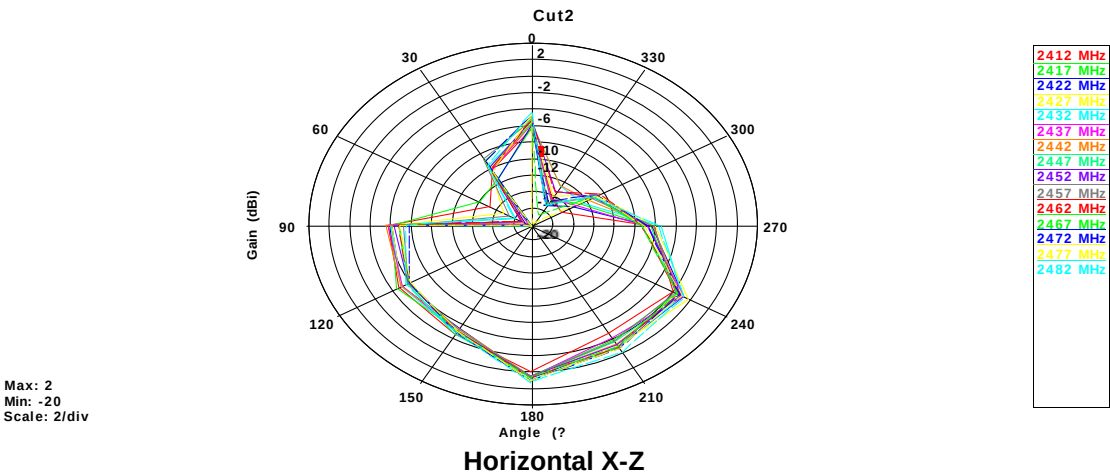
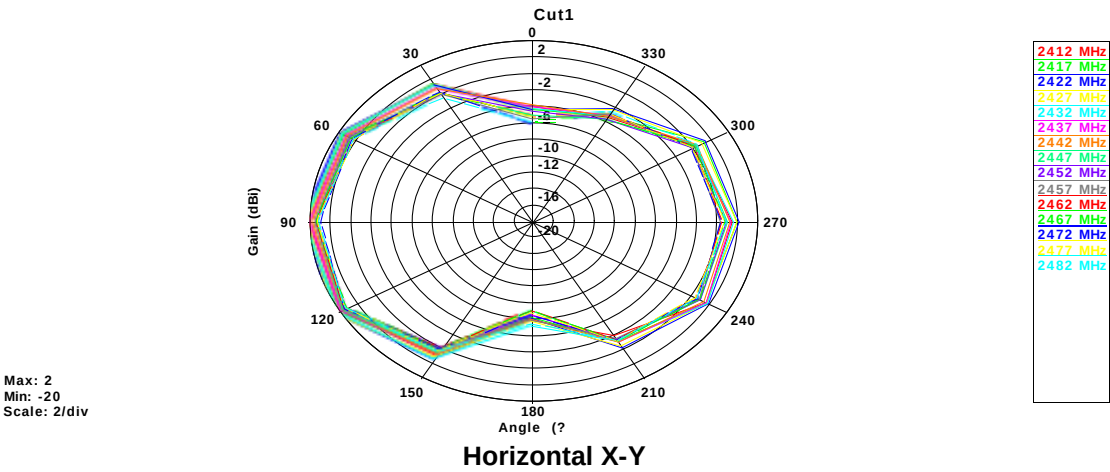
Frequency (MHz)	2412	2437	2463	2484
VSWR	1.32	1.17	1.17	1.28

4.3. Antenna S11

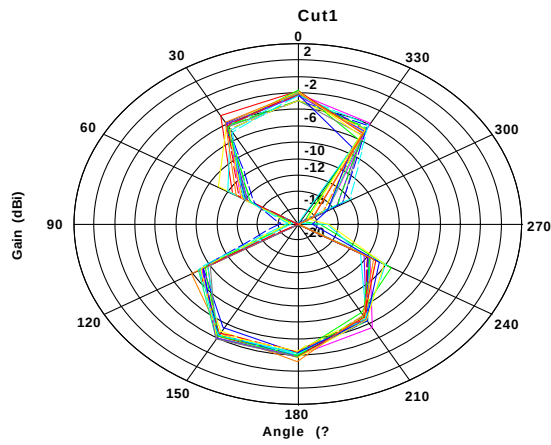


Frequency (MHz)	2412	2437	2463	2484
S11(dB)	-17.07	-21.64	-22.52	-18.51

APPENDIX A: 2-D Pattern Plots



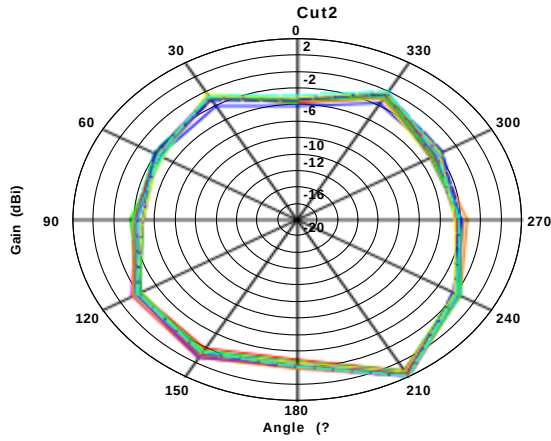
Max: 2
Min: -20
Scale: 2/div



2412 MHz
2417 MHz
2422 MHz
2427 MHz
2432 MHz
2437 MHz
2442 MHz
2447 MHz
2452 MHz
2457 MHz
2462 MHz
2467 MHz
2472 MHz
2477 MHz
2482 MHz

Vertical X-Y

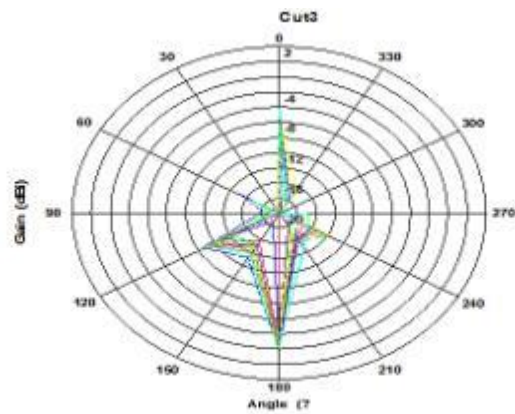
Max: 2
Min: -20
Scale: 2/div



2412 MHz
2417 MHz
2422 MHz
2427 MHz
2432 MHz
2437 MHz
2442 MHz
2447 MHz
2452 MHz
2457 MHz
2462 MHz
2467 MHz
2472 MHz
2477 MHz
2482 MHz

Vertical X-Z

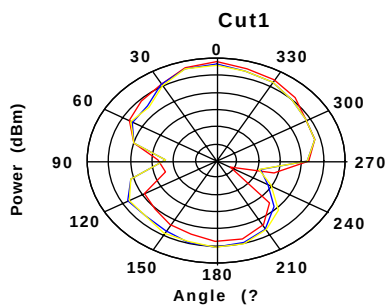
Max: 2
Min: -20
Scale: 2/div



2412 MHz
2417 MHz
2422 MHz
2427 MHz
2432 MHz
2437 MHz
2442 MHz
2447 MHz
2452 MHz
2457 MHz
2462 MHz
2467 MHz
2472 MHz
2477 MHz
2482 MHz

Vertical Y-Z

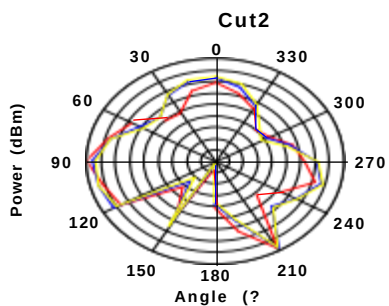
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Min: -25
Scale: 5/div



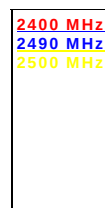
Horizontal X-Y



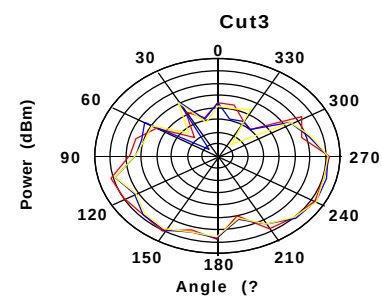
Max: 4
Min: -14
Scale: 2/div



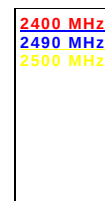
Horizontal X-Z



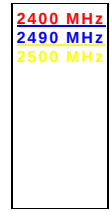
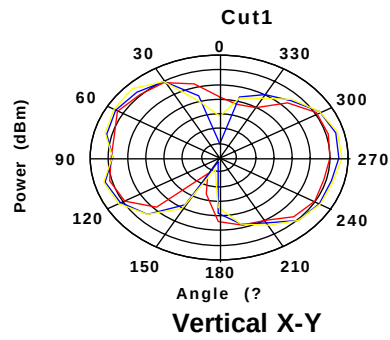
Max: 0
Min: -40
Scale: 5/div



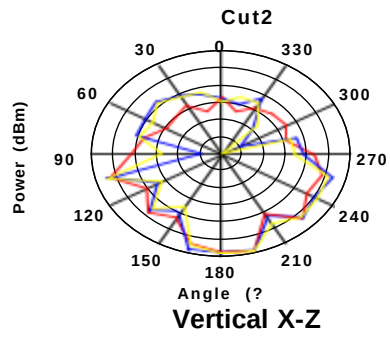
Horizontal Y-Z



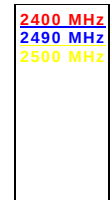
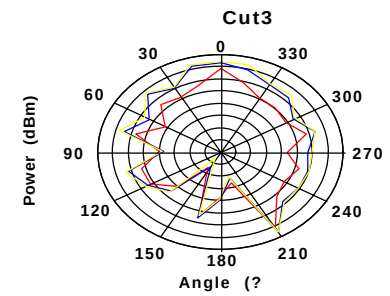
Max: 0
Min: -35
Scale: 5/div



Max: -5
Min: -35
Scale: 5/div

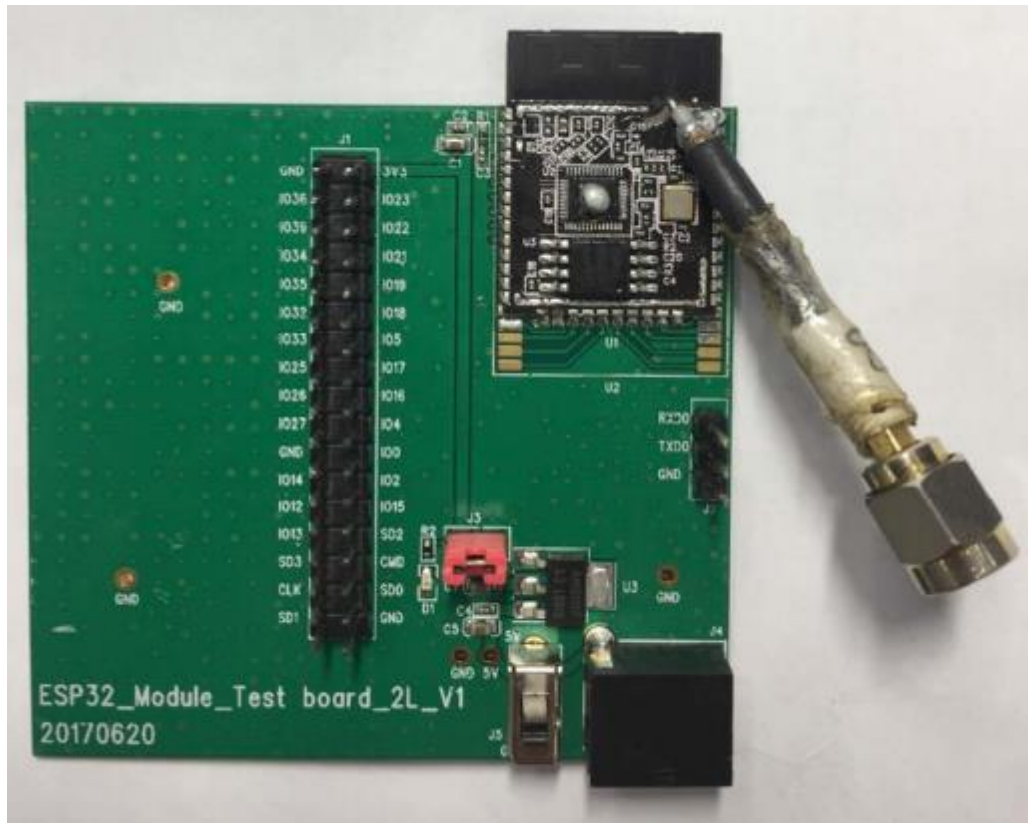


Max: 2
Min: -14
Scale: 2/div



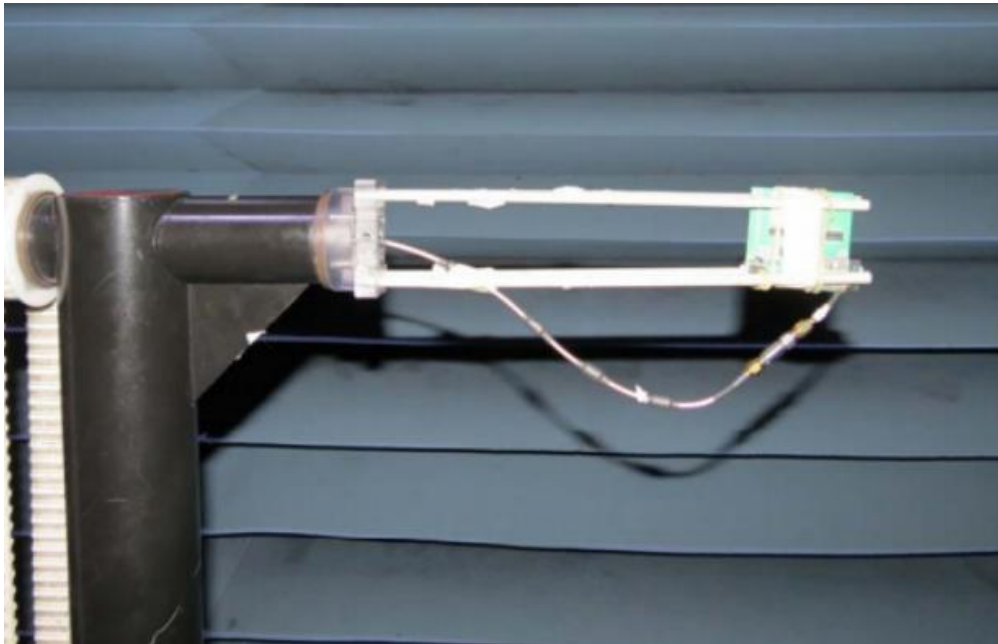
APPENDIX B: The EUT Appearance and Test Configuration

B.1 EUT Appearance



Picture 1 Constituents of EUT

B.2 Test Configuration



ESP-ANT B
Picture 2 Test Setup

*******END*******