

PCB Antenna Specification

1. Name and address of the antenna manufacturer-----Page2
2. Model number of the antenna-----Page2
3. Test method, measurement standards-----Page2
4. Chamber and equipment information/calibration-----Page3
5. Test Setup Photos-----Page3
6. Antenna Photo, Configuration and RF Chains-----Page4
7. Max gain values-----Page4
8. Polarization, θ , Θ -----Page5
9. 2D or 3D Pattern-----Page6
10. Formulas, Calculation, Units-----Page6

1. Name and address of the antenna manufacture

Manufacturing Company: AsiaRF Co., Ltd. (卓越電子股份有限公司)

Address: 1 F., No. 7, Houde St., Yonghe Dist., New Taipei City 23455, Taiwan (R.O.C.)

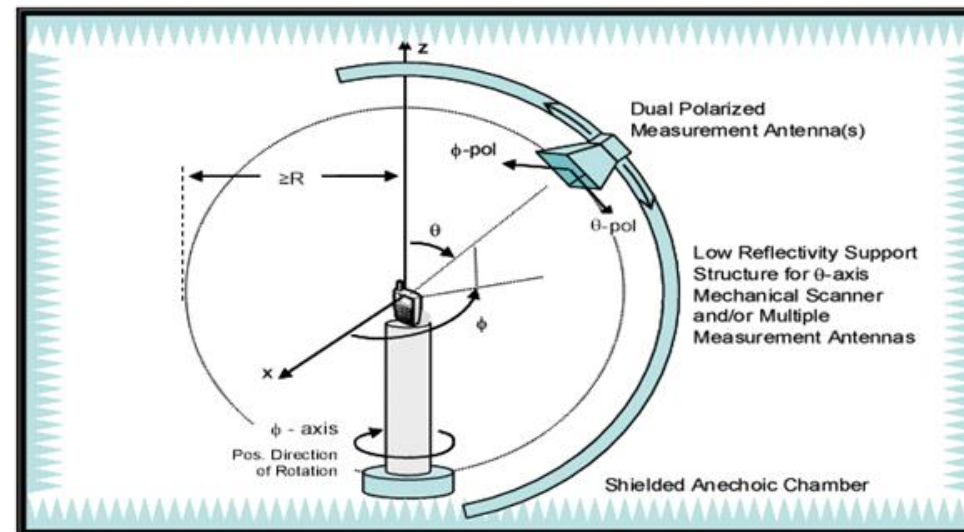
2. Model number of the antenna

Model: AP7988-WHM

3. Test method, measurement standards

Place the DUT on the test turntable of the lab and fix it at the center position, then rotate the turntable for measurement and the test equipment is use Keysight E5063A.

Instrument Analyzer	Manufacturer/ Brand	Model No.	Serial No.
Network Analyzer	Keysight	E5063A	ZNB8 S/N:106319
Sleeve Dipole	MVG	SD740	SD740
Dual Ridge Horn	MVG	SH600-25	SH600-25
Wideband Dipole	MVG	WD6000-20	WD6000-20
StarLab probe array	MVG	StarLab	StarLab



4. Chamber and equipment information/calibration

Instrument Analyzer	Manufacturer/Brand	Model No.	Serial No.	Characteristics	Calibration Data	Calibration Due Date
Network Analyzer	Keysight	E5063A	ZNB8 S/N:106319	9KHz ~ 8.5GHz	2021/12/2	2024/12/1
Sleeve Dipole	MVG	SD740	SD740	690MHz ~ 800MHz	2022/5/23	2025/5/22
Dual Ridge Horn	MVG	SH600-25	SH600-25	600MHz ~ 9GHz	2022/5/23	2025/5/22
Wideband Dipole	MVG	WD6000-20	WD6000-20	6GHz ~ 10GHz	2022/5/23	2025/5/22
StarLab probe array	MVG	StarLab	StarLab	600-10GHz	2022/5/22	2024/12/30

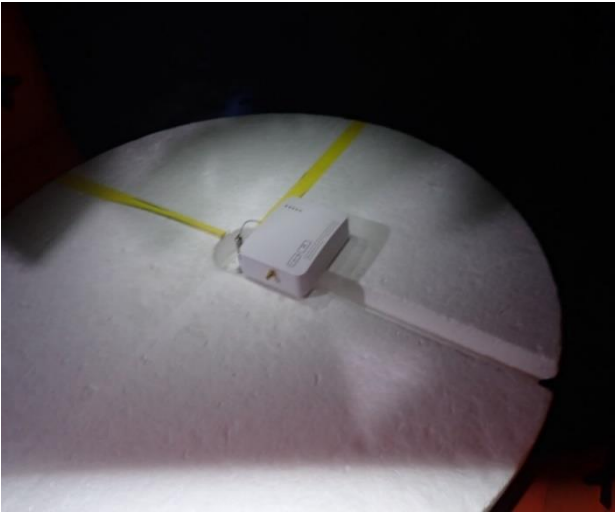
E5063A Network Analyzer



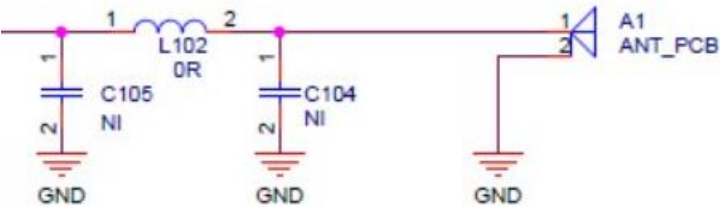
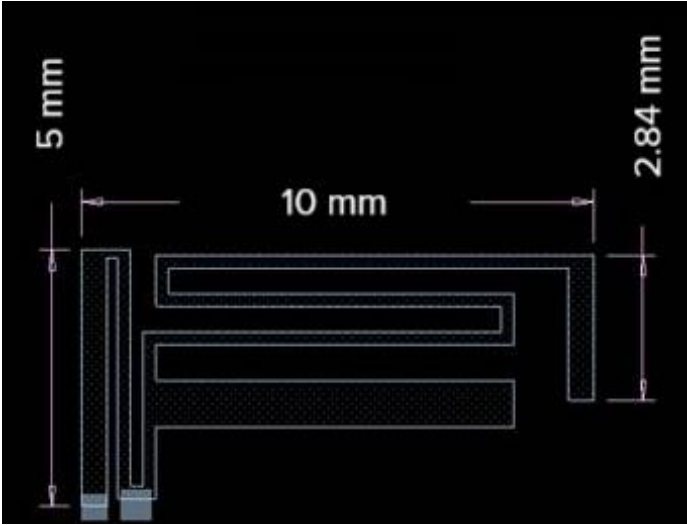
MT



5.Test Setup Photos



6. Antenna Photo, Configuration and RF Chains



Number	Value
L102	0R
C105	NC
C104	NC

7. Max gain values

Gain: about 1.2dBi (peak)

Test Information:

Tester: Jerry Lin

Test Chamber and address:

3 meters Anechoic Chamber, Chamber#1

8F, No.63, Juguang Rd, Zhonghe Dist, New Taipei City 235, Taiwan, R.O.C.

Test time :2024/8/23

Environmental:

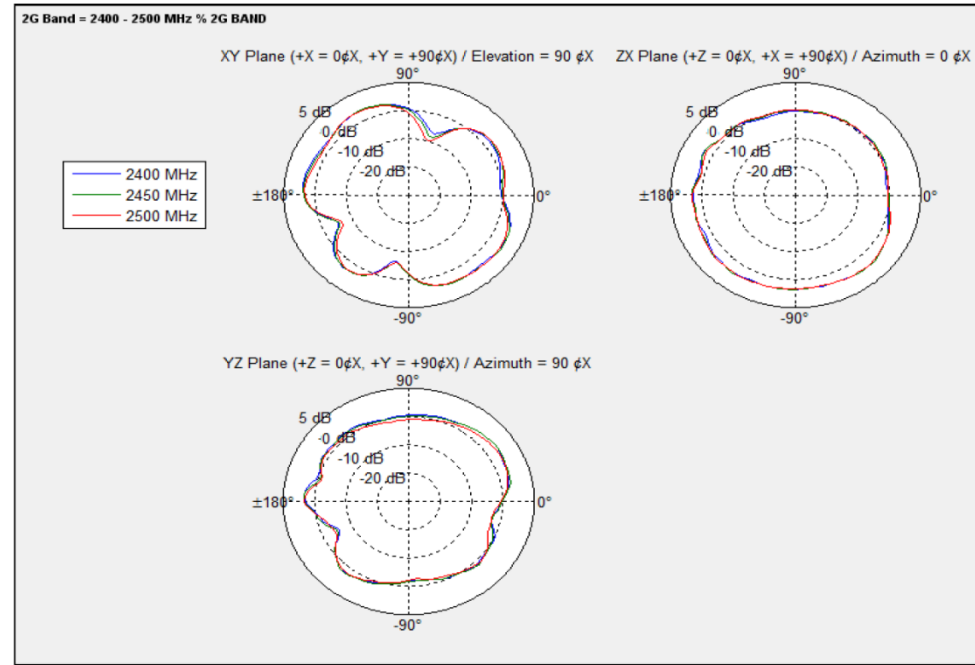
temperature:25°C

humidity:95%

8.Polarization, θ , Θ

Frequency (MHz)	Efficiency (%)	Avg. Gain(dBi)	Peak Gain (dBi)	V+H Avg. Gain (dB)			V+H Peak Gain (dB)		
				XY-plane	YZ-plane	ZX-plane	XY-plane	YZ-plane	ZX-plane
2400	52.8	-2.15	1.18	-2.9	-2.92	-3.27	0.14	0.07	-0.07
2450	54.39	-2.08	1.2	-3.1	-3.17	-2.99	0.08	0	-0.09
2500	51.18	-2.16	1.17	-3.2	-3.24	-3.06	-0.2	-0.15	-0.11

9.2D or 3D Pattern



10. Formulas, Calculation, Units

Design an PCB antenna with directivity coefficient $D=3.98$ dBi (based on PCB antenna layout design and FR4 material), reflection coefficient $\Gamma=-6$ dB, PCB antenna efficiency $P_r=70\%$ (According to PCB material and layout calculation),

The is P_{sys} (considering matching reflection coefficient) = ? ; $G=?$ (Antenna peak gain)

- $|\Gamma| = -6\text{dB} = 10^{(-6/20)} = 0.5$;
 $P_{sys} = P_r \cdot (1 - |\Gamma|^2) = 0.7 \cdot (1 - 0.5^2) = 52.5\%$
- $10\log P_{sys} = 10\log(0.525) = -2.798\text{dB}$
 $G = P_{sys} + D = -2.798\text{dBi} + 3.98\text{dBi} = \mathbf{1.2\text{dBi}}$ (round to one decimal place)