

Testing Report

Customer Name: Shenzhen xinhongda Technology Co., Ltd

Product Name: 2.4G-Bluetooth Antenna

Sample Model: XHD-ML1.0

Reference Standard: GB/T 9410-2008;ANSI/IEEE Std 149-1979

Manufacturer Name : Shenzhen Punuodake Electronics Co., Ltd.

Manufacturer Address : 4th Floor, Tea Tree Factory 7, Lane 10,
Xiaweyuan Industrial Zone, Gushu Community,Xixiang Street,
Bao'an District, Shenzhen, Guangdong Province

Issue Date: 2024.5.10

Version

Version No.	Date	Description	Formulate	approval
A0	2024.5.10	For the first time		

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1. General Information

1.1. General information of testing institutions

Name	Shenzhen Yunding Communication Electronics Co., LTD
Address	3015, 3rd Floor, No. 1 Sanwei South Road, Bao 'an District, Shenzhen City, Guangdong Province
Tel	0755-23073599
E-mail	wht0809@163.com
Equipment	ATS300

1.2. Testing principle

ATS300 MULTI-PROBE OTA MEASUREMENT SYSTEM



SYSTEM OVERVIEW

Rapid, accurate, and stable.

The ATS300 measurement system is designed and constructed in accordance with CTIA specifications, serving as an Over-The-Air (OTA) measurement system. It boasts a broad application scope, rapid testing capabilities, and stable operation, making it ideal for comprehensive and precise antenna measurements and OTA assessments. With a wide frequency coverage that encompasses the latest 5G and Wi-Fi 6 standards, this system finds extensive application across various sectors including mobile communications, network communications, security surveillance, smart home systems, and indoor positioning.

SYSTEM SPECIFICATIONS

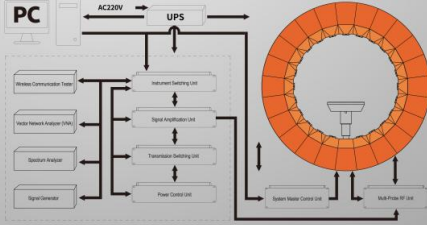
Multi-Probe Anechoic Chamber System	
Specification Items	Parameters
Dark Room Dimensions (LWH)	4m*3m*3m
Shielding Effectiveness	≥100dB
Measurement Frequency	0.6GHz-8GHz 11GHz
Number of Probes	23+1
Probe Array Diameter	1.5m
Probe Spacing Angle	15°
Maximum Test Object Size	≤0.75 m
Maximum Test Object Weight	≤ 30kg

MEASURING CAPACITY

ACTIVE		PASSIVE
Network Applications	Supported Standards	Supported Parameters
Cellular Network	2G: GSM/GPRS 3G: CDMA/WCDMA/TD-SCDMA 4G: LTE_TDD/LTE_FDD 5G: SA/NSA	Gain, Efficiency, Radiation Pattern, Beamwidth, Cross-Polarization Ratio, Circular Polarization Pattern, Axial Ratio, Front-to-Back Ratio, Ellipticity, Pointing Accuracy, ECC (Error Vector Magnitude or Effective Isotropic Radiated Power Conducted) etc.
Internet of Things (IoT)	NB-IoT eMTC WIFI 802.11b/g/n/a/ac/ax BT	Test Duration The test time for 11 frequency points should be less than 3 minutes (typical measurement time).
Satellite Navigation	BD/GPS/GLONASS	

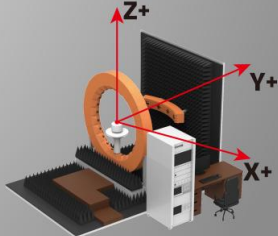
SYSTEM CONTROL DIAGRAM

System Schematic Diagram



SYSTEM COORDINATE CHART

Internal Rendered View



1.3. Test equipment

Equipment	Model No.	Serial No.	Manufactur	calibration date	Next calibration date
ATS300 4x 3x3 m (3D) Chamber	4*3*3		Xinghang	2023.12.5	2024.12.4
Network Analyzer	E5071B		Agilent	2023.11.26	2024.11.25
Network Analyzer	8753D		HP	2023.11.13	2024.11.12

1.4. Test environment

Temperature	24.6°C
Humidity	59%RH
Pressure	100.12kPa

1.5. Statement

- (1)The test results in the report are only applicable to the tested samples and the tested samples work under the environment described in the report.
- (2)Only Shenzhen Yunding Communication Electronics Co., LTD have the right to modify thereport,and the modification information shall be annotated in the revision form.
- (3)Any objection to this report shall be raised within 30 days afrer formal confirmation of thereport.
- (4)This report is invalid if there is any evidence that the sample information provided is falsified.
- (5)The report is invalid without the signature of the auditor and approver.

2. Sample Information

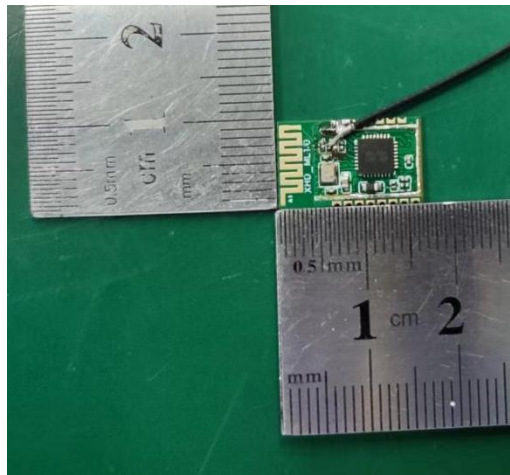
2.1. Client information

Name	Shenzhen xinhongda Technology Co., Ltd
Address	310, Block C, Hongwan Business Center, Gucheng Hongwan Second Industrial Zone, Xixiang Street, Bao'an District, Shenzhen
Contacts	Hong Tao
Tel	13113675359
E-mail	1098310537@qq.com

2.2. Description of EUT(S)

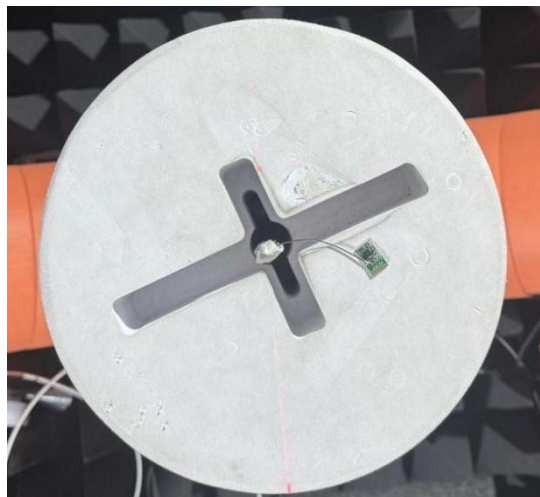
Product Name	2.4G-Bluetooth Antenna
Sample Model	XHD-ML1.0
Antenna Size	16.5*9.8MM
Antenna Type	PCB Antenna
Serial No.	/
Test Item	VSWR;Gain;Efficiency.Radiation pattern
Frequency Range	2400-2500MHz
Received Date	
Test Date	2024.5.10
Remark	/

2.3. EUT appearance



2.4. DUT setup photo of free space OTA testing

Planform



Front view



3. Test Results

3.1. Test standard

Name	Parameter	Method	Standard no.
Mobile communication antenna	VSWR	Generic specification for antennas used in the mobile communications	GB/T9410-2008
	Antenna gain		
	Radiation pattern		
Antenna	Radiation efficiency	IEEE Standard Test Procedures for Antennas	ANSI/IEEE Std 149-1979

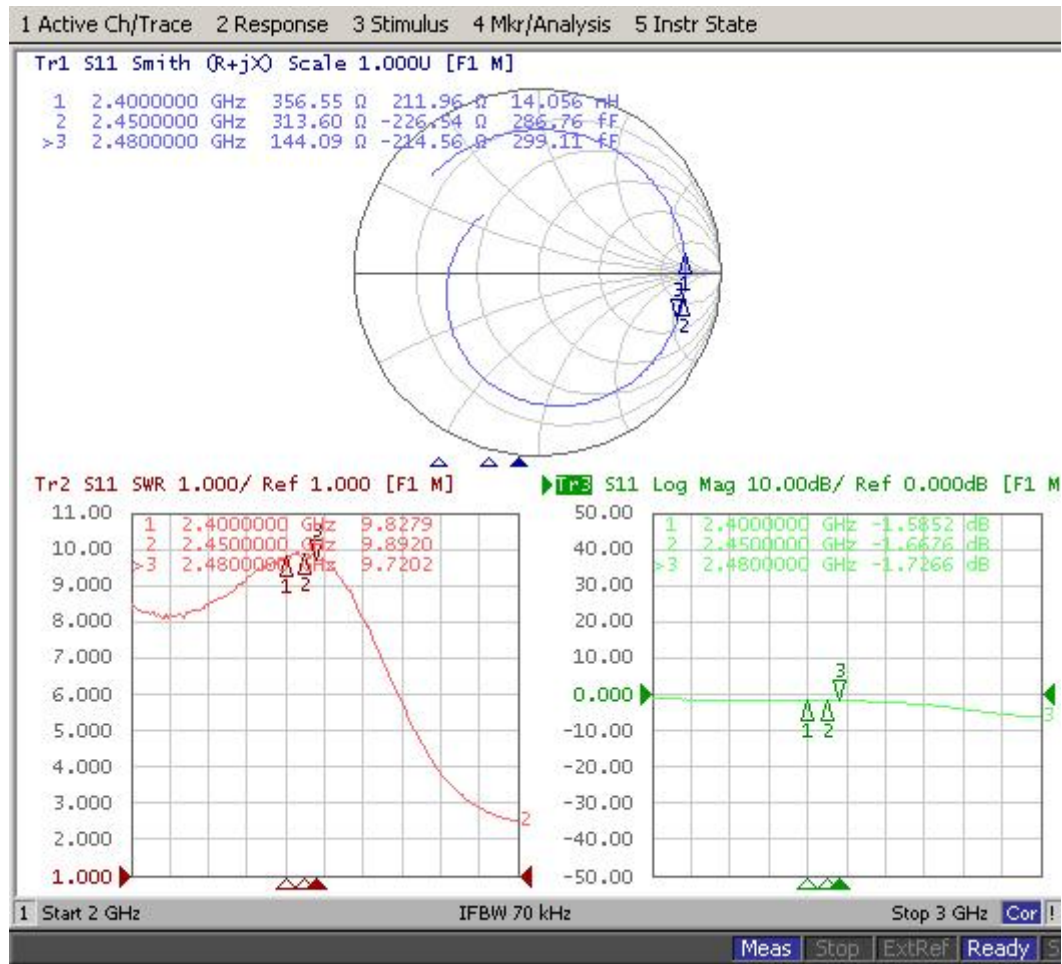
3.2. Test uncertainty

The uncertainty was calculated on the basis of the GUM published by ISO, using the inclusion factor of $K=2$ and the 95% confidence level to express the extended uncertainty.

Item	Uncertainty
VSWR	± 0.3
Antenna gain	$\pm 1\text{dB}$
Radiation efficiency	$\pm 10\%$

3.3. Test data

3.3.1. S11 parameters



3.3.2. VSWR

Frequency/MHz	2400	2450	2480
VSWR	9.8279	9.8920	9.7202

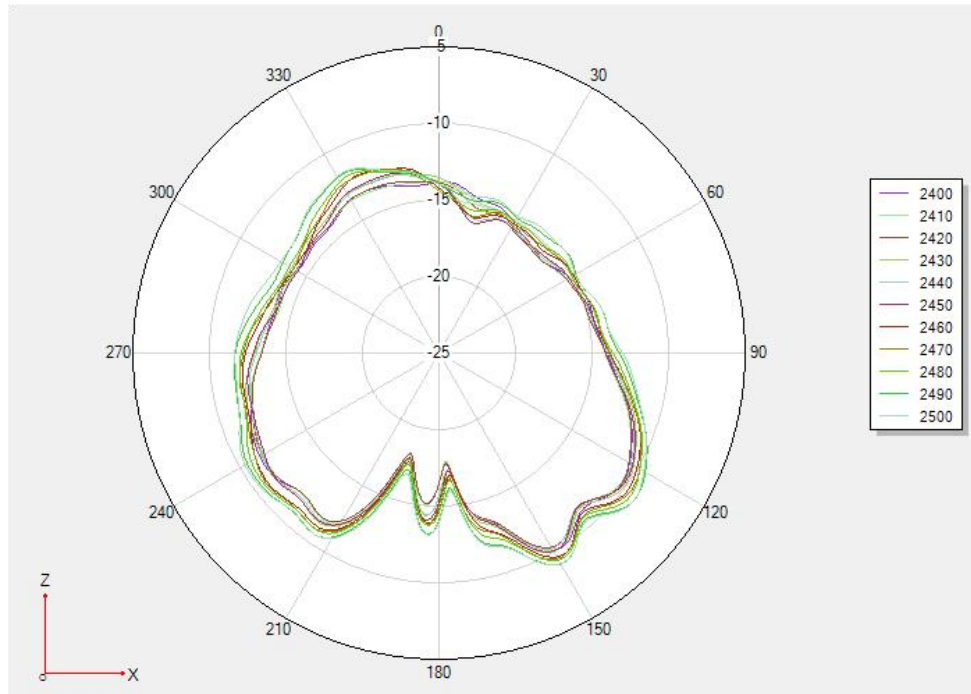
3.3.3. Typical free space efficiency and gain

Frequency/MHz	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain/dBi	-7.53	-7.64	-7.74	-7.35	-7.48	-7.48	-7.2	-7.26	-7.04	-6.75	-6.67
Efficiency/%	5.32	5.16	5.19	5.62	5.38	5.31	5.79	5.85	5.98	6.37	6.58

3.3.4. Typical free space radiation pattern

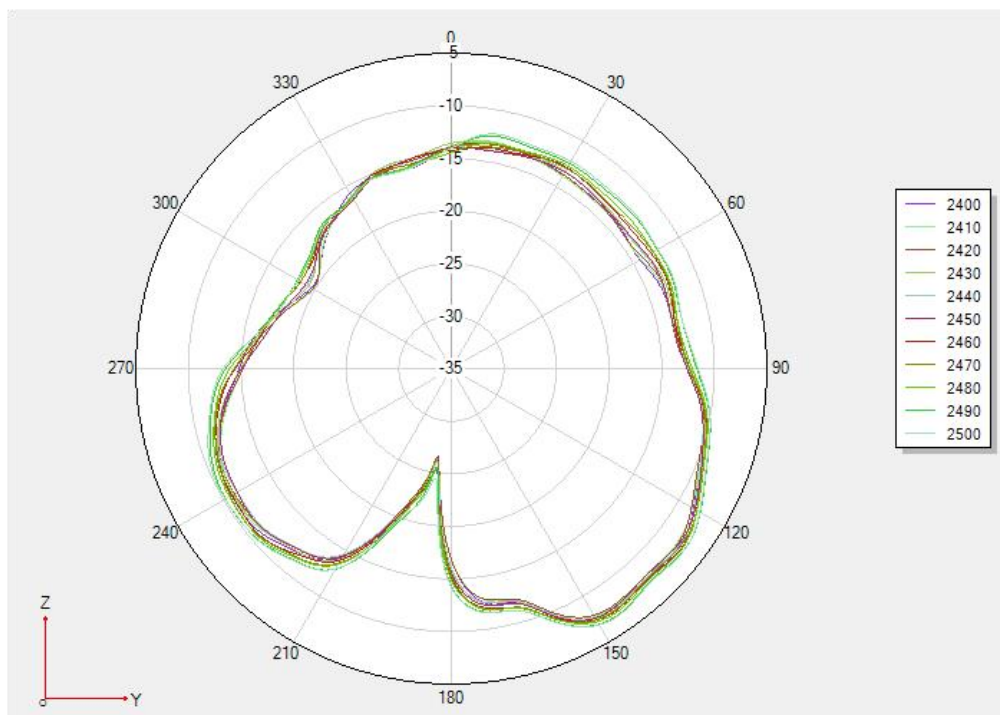
(1) 2400-2500MHz X-Z Plane:

Phi 0



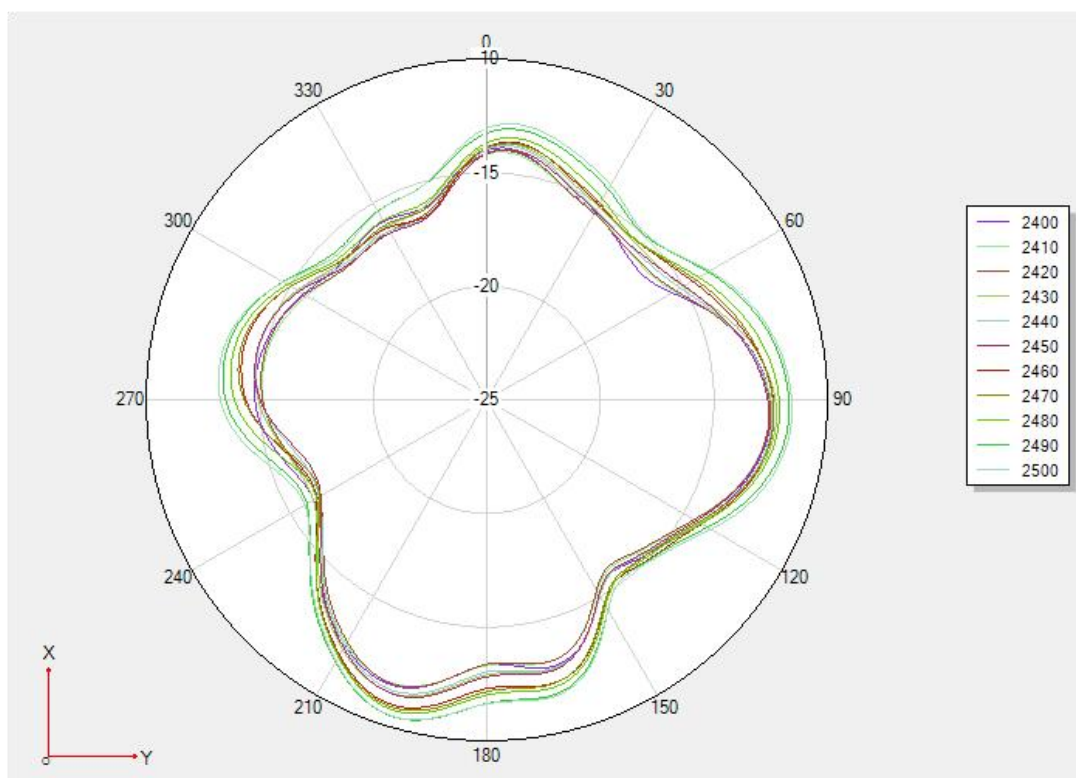
(2) 2400-2500MHz Y-Z Plane:

Phi 90

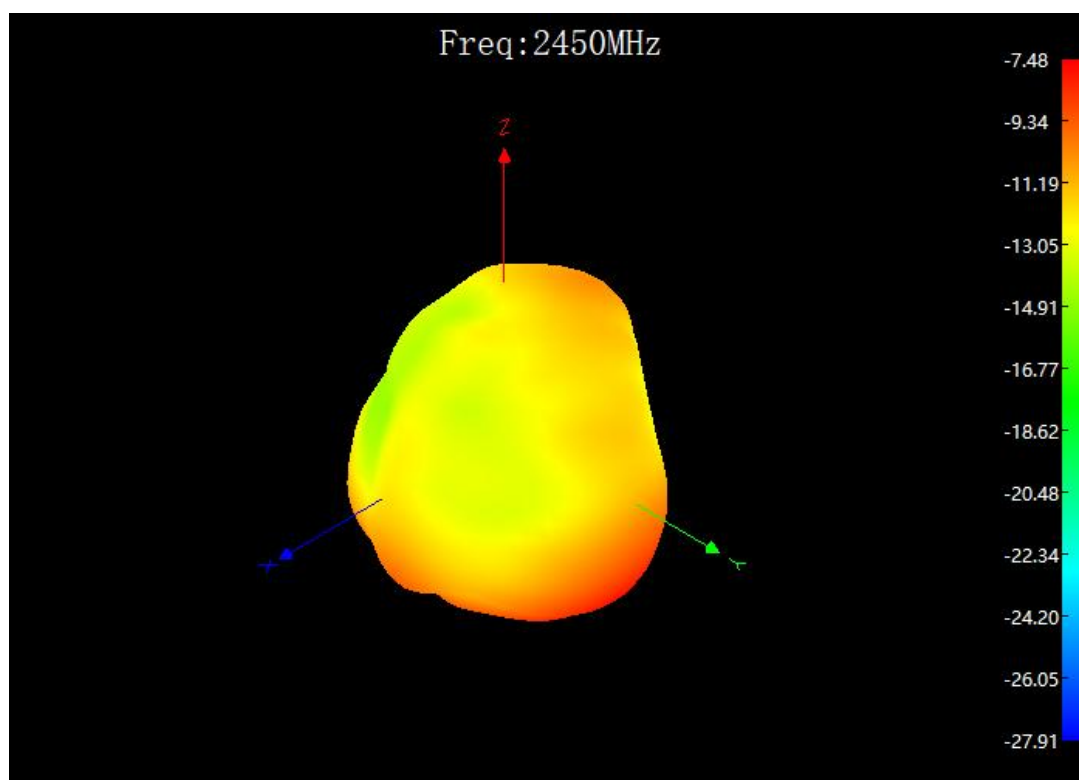


(3)2400-2500MHz X-Y Plane:

Theta 90



(4)Typical Free Space 3D Radiation Pattern at 2.45GHz:



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