

# Testing Report

Customer Name: HCS (Suzhou) Limited

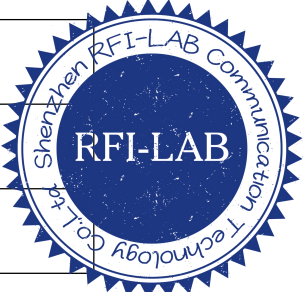
Product Name: 2.4GHz Antenna

Sample Model: RC4251608/01BR, RC425XXXX/XXR,

RC425XXXX/XXBR ((' X' =0-9, ' B' means packed  
with battery)

Reference Standard: *GB/T 9410-2008; ANSI/IEEE Std 149-2021*

Issue Date: 2023.5.16

Engineer: <i>Zkmis</i>	Date: <i>2023.5.15</i>	
Auditor: <i>Eason</i>	Date: <i>2023.5.16</i>	
Approver: <i>Aaron</i>	Date: <i>2023.5.16</i>	

## Version

Version No.	Date	Description	Formulate	Approval
A0	2023.5.16	For the first time, formulate	Zkris	Eason

## Contents

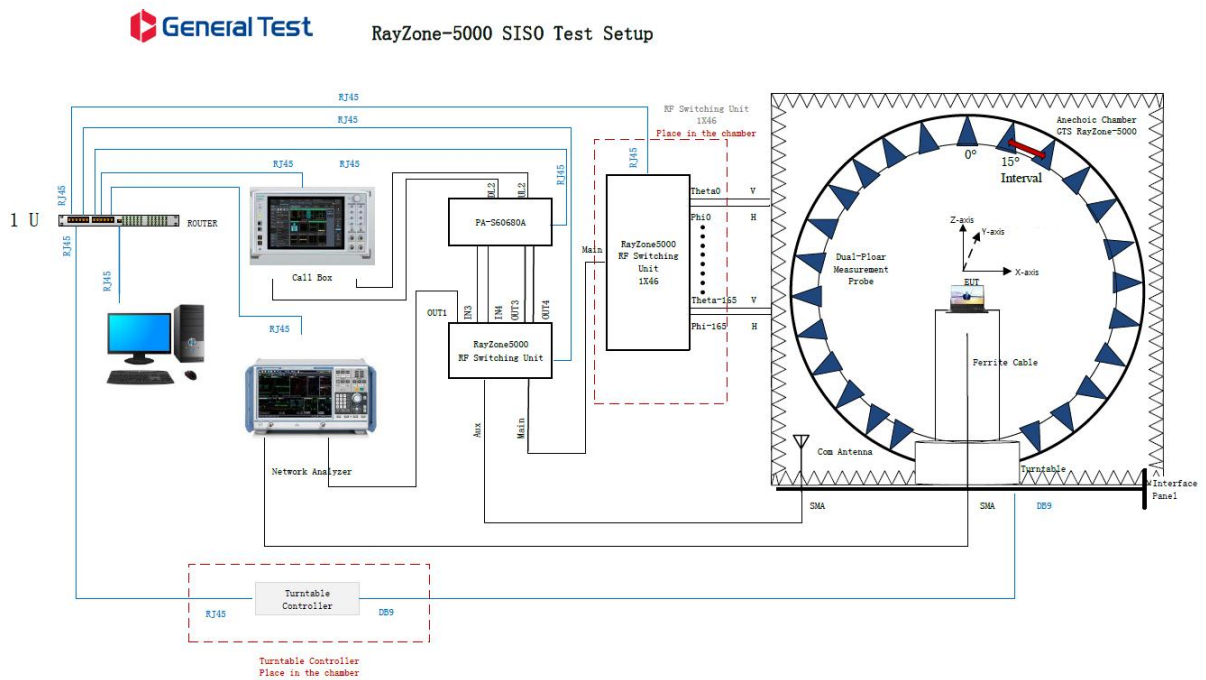
1.General Information .....	3
1.1 General information of testing institutions .....	3
1.2 Testing principle .....	3
1.3 Test equipment .....	4
1.4 Test environment .....	4
1.5 Statement .....	4
2.Sample Information .....	5
2.1 Client information .....	5
2.2 Description of EUT(S) .....	5
2.3 EUT appearance .....	6
2.4 EUT setup photo of free space OTA tesing .....	6
3.Test Results .....	7
3.1 Test standard .....	7
3.2 Test uncertainty .....	7
3.3 Test data .....	8
3.3.1 VSWR parameters .....	8
3.3.2 VSWR data .....	8
3.3.3 Typical free space efficiency and gain .....	8
3.3.4 Typical free space radiation pattern .....	9
(The following is blank) .....	10

# 1. General Information

## 1.1 General information of testing institutions

<b>Name</b>	Shenzhen RFI-LAB Communication Technology Co., Ltd.
<b>Address</b>	10/F A, Lingyun Bld, Liufang Rd, Baoan District, SZ
<b>Tel</b>	/
<b>E-mail</b>	/
<b>Equipment</b>	All the equipment used in the report is fixed in Zone B, West Side of 1/F, Building 1, Tingwei Industrial Park, No.6 Liufang Road, Bao 'an District, Shenzhen

## 1.2 Testing principle



### 1.3 Test equipment

Equipment	Model No.	Serial No.	Manufacturer	Calibration date	Next calibration date
OTA Test System	RayZone-5000	RFI-LAB-RF-D00	GTS	2023.3.14	2025.3.13
Network Analyzer	E5071C	RFI-LAB-RF-D01	KEYSIGHT	2023.5.11	2024.5.10
Network Analyzer	E5071C	RFI-LAB-RF-C02	KEYSIGHT	2023.5.11	2024.5.10

### 1.4 Test environment

Temperature	23.8°C
Humidity	58%RH
Pressure	100.19kPa

### 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 RFI-LAB Communication Technology Co., Ltd. have the right to modify the report, and the modification information shall be annotated in the revision form.
- (3) Any objection to this report shall be raised within 30 days after formal confirmation of the report.
- (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

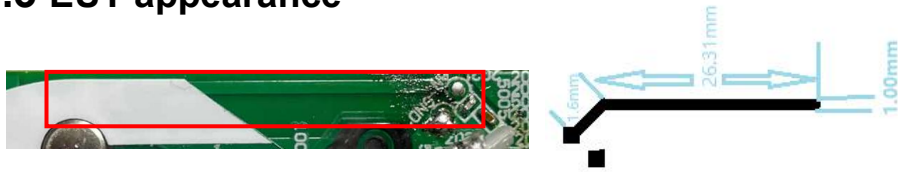
### 2.1 Client information

<b>Name</b>	HCS (Suzhou) Limited
<b>Address</b>	19F-20F, Building B-3rd, No. 209 Zhuyuan Road, New District, Suzhou, P. R. China
<b>Contacts</b>	/
<b>Tel</b>	/
<b>E-mail</b>	/
<b>Manufacturer</b>	/

### 2.2 Description of EUT(S)

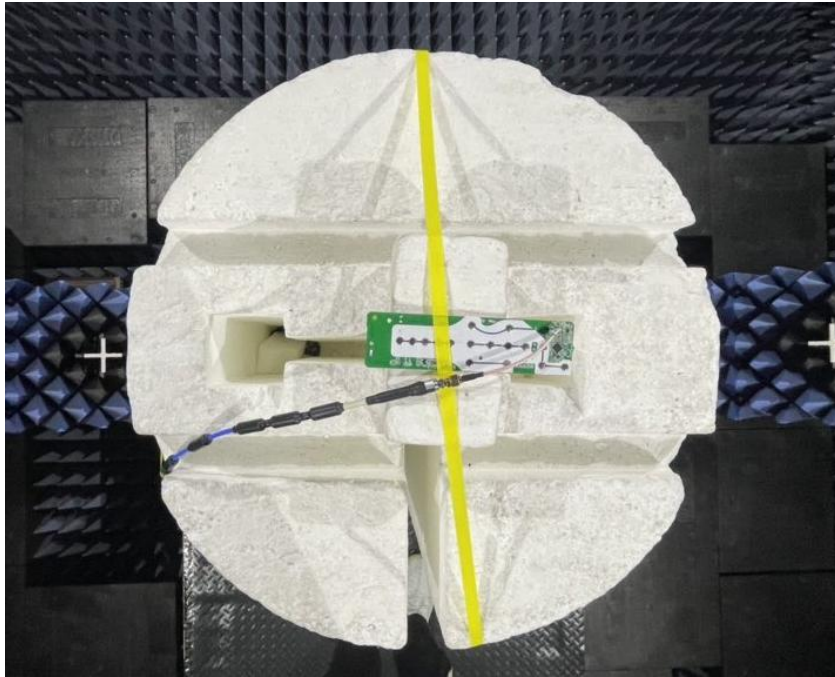
<b>Product Name</b>	2.4GHz Antenna
<b>Sample Model</b>	RC4251608/01BR, RC425XXXX/XXR, RC425XXXX/XXBR (('X'=0-9, 'B' means packed with battery)
<b>Antenna Size</b>	/
<b>Serial No.</b>	/
<b>Antenna Type</b>	PCB Antenna
<b>Test Item</b>	VSWR; Antenna gain; Efficiency; Radiation pattern
<b>Frequency Range</b>	2400-2500MHz
<b>Received Date</b>	2023.05.12
<b>Test Date</b>	2023.05.15
<b>Remark</b>	/

### 2.3 EUT appearance

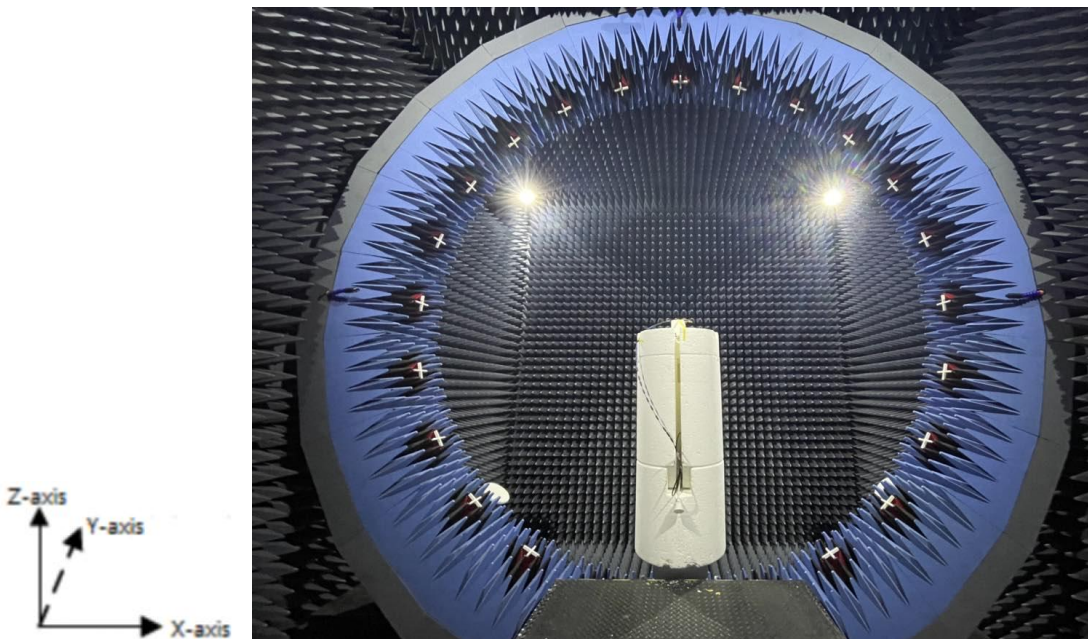


### 2.4 EUT setup photo of free space OTA testing

Planform



Front view



## 3. Test Results

### 3.1 Test standard

Name	Parameter	Method	Standard no.
Mobile communication antenna	Antenna gain	Generic specification for antennas used in the mobile communications	GB/T 9410-2008
	Radiation pattern		
	VSWR		
Antenna	Radiation efficiency	IEEE Standard Test Procedures for Antennas	ANSI/IEEE Std 149-2021
	Gain and directivity		

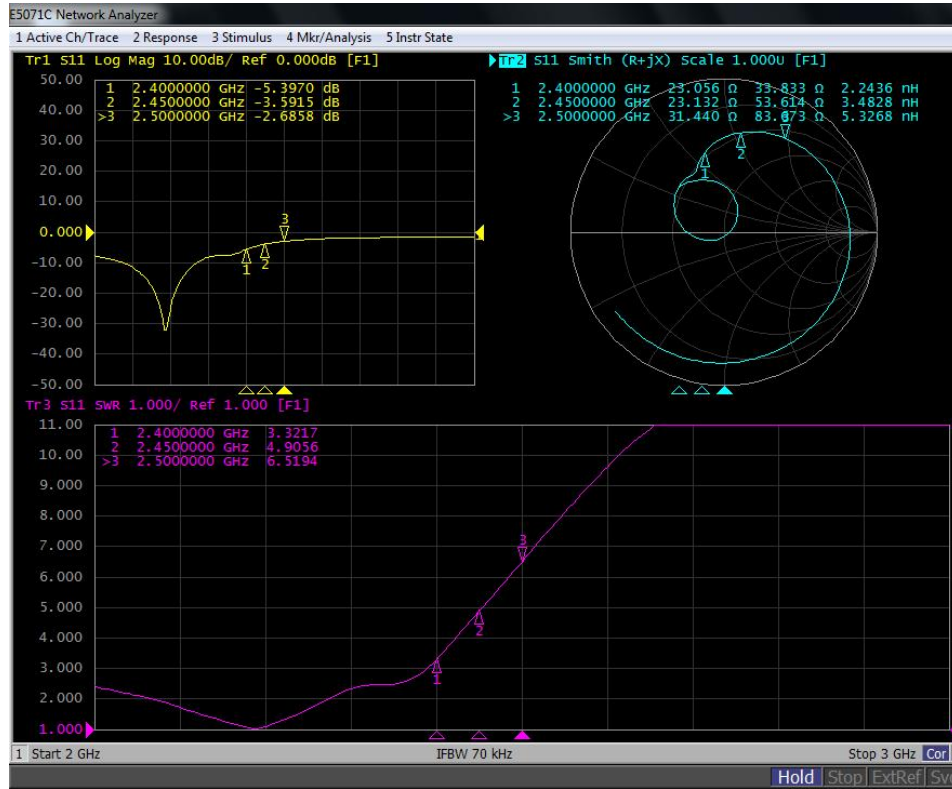
### 3.2 Test uncertainty

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	$\pm 0.3$
Antenna gain	$\pm 0.72\text{dB}$
Radiation efficiency	$\pm 0.72\text{dB}$

### 3.3 Test data

#### 3.3.1 VSWR parameters



#### 3.3.2 VSWR data

Frequency/MHz	2400	2450	2500
VSWR	3.3217	4.9056	6.5194

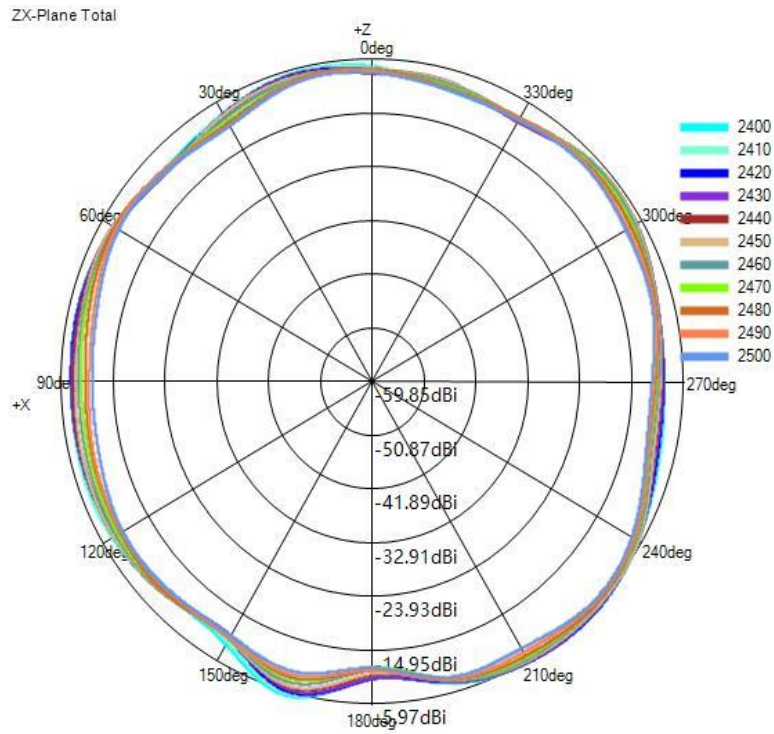
#### 3.3.3 Typical free space efficiency and gain

Frequency/MHz	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain/dBi	-4.71	-4.62	-4.65	-4.96	-5.29	-5.44	-5.78	-6.03	-6.13	-6.36	-6.70
Efficiency/%	13.63	13.82	13.79	13.49	13.32	13.44	12.72	12.20	12.07	11.64	11.13

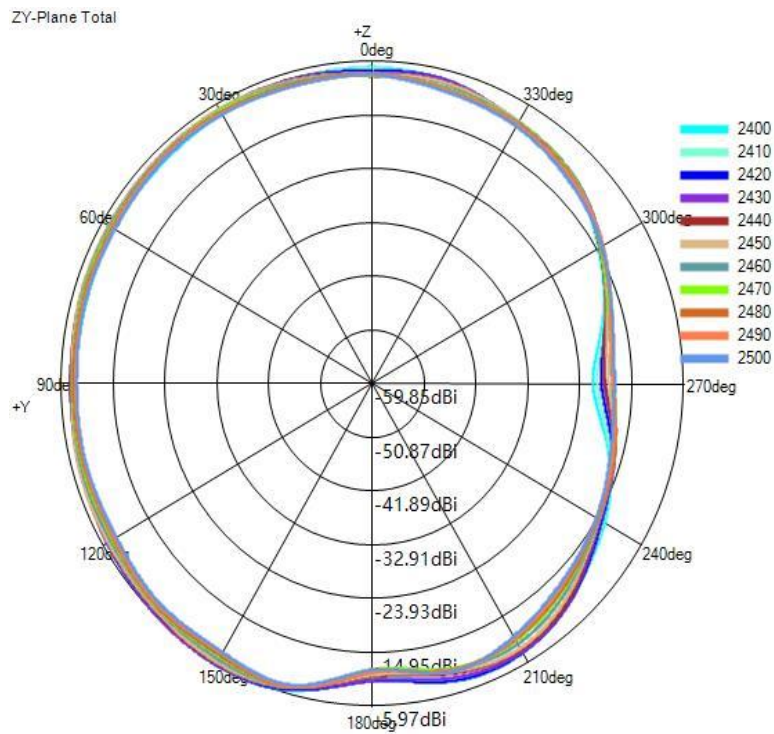


### 3.3.4 Typical free space radiation pattern

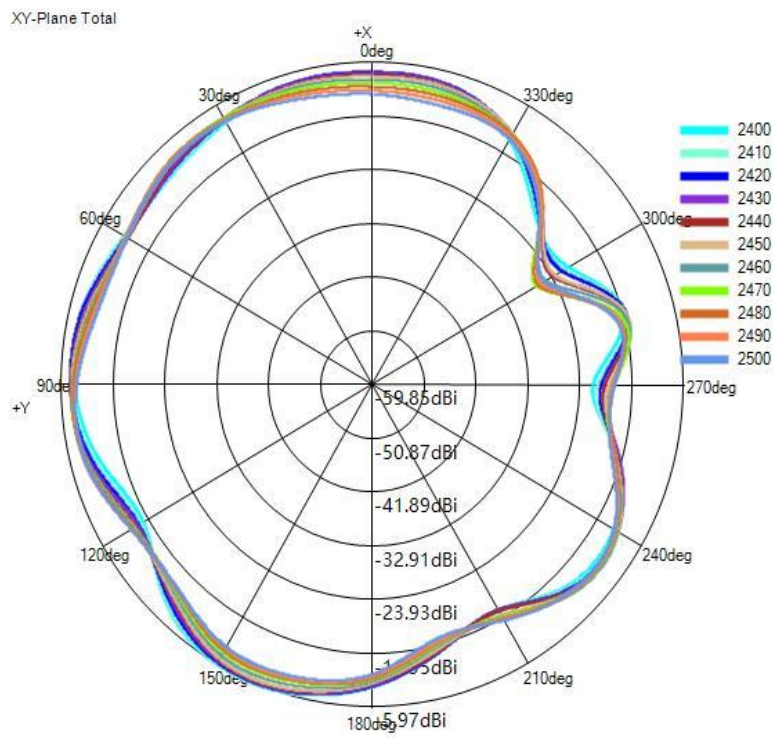
(1) X-Z Plane(unit:dBi):



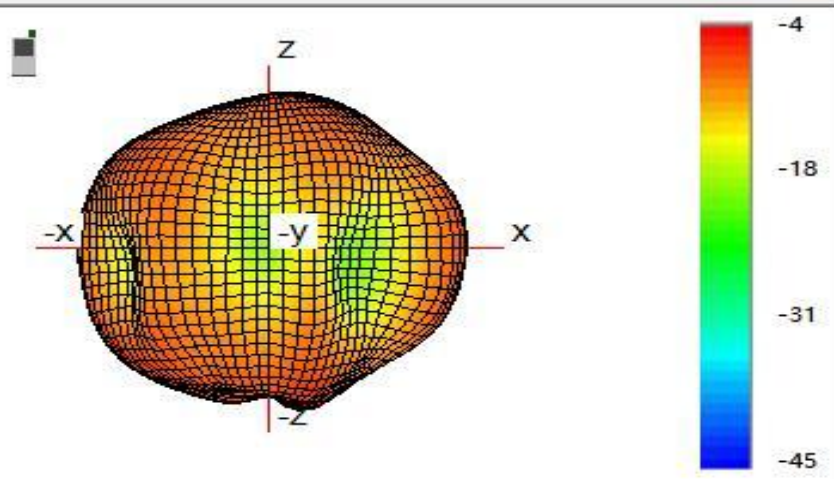
(2) Y-Z Plane(unit:dBi):



(3) X-Y Plane(unit:dBi):



(4) Typical Free Space 3D Radiation Pattern at 2.41GHz(unit:dBi):



-----  
**End**

**(The following is blank)**