

# TEST REPORT

**Applicant:** Shenzhen VSS Winline Electronics Co., Ltd.  
**Address:** 5 / F, Building A3, Tianrui Industrial Zone, No. 35,  
Fuyuan 1st Road,  
Fuhai Street, Baoan District, Shenzhen, China  
**Equipment Type:** PCB Antenna  
**Model Name:** RF14key  
**Brand Name:** N/A  
**Test Standard:** IEEE Std 149-2021  
**Sample Arrival Date:** Jan. 17, 2024  
**Test Date:** Jan. 17, 2024  
**Date of Issue:** Jan. 29, 2024

**ISSUED BY:**

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Mai Jintian

**Checked by:** Xia Long

**Approved by:** Tolan Tu  
(Testing Director)

*Mai Jintian*

*Xia Long*

*Tolan Tu*

<b>Revision History</b>		
Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Jan. 29, 2024</u>	<u>Initial Issue</u>

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# 1 GENERAL INFORMATION

## 1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

## 1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	<input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	<input type="checkbox"/> 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China

## 2 PRODUCT INFORMATION

### 2.1 Applicant Information

Applicant	Shenzhen VSS Winline Electronics Co., Ltd.
Address	5 / F, Building A3, Tianrui Industrial Zone, No. 35, Fuyuan 1st Road, Fuhai Street, Baoan District, Shenzhen, China

### 2.2 Manufacturer Information

Manufacturer	Shenzhen VSS Winline Electronics Co., Ltd.
Address	5 / F, Building A3, Tianrui Industrial Zone, No. 35, Fuyuan 1st Road, Fuhai Street, Baoan District, Shenzhen, China

### 2.3 General Description for Equipment under Test (EUT)

EUT Name	PCB Antenna
Model Name Under Test	RF14key
Antenna Type	PCB Antenna
Dimensions	30*28 mm

### 2.4 Ancillary Equipment

Note: Not applicable.

### 2.5 Technical Information

Test Frequencies	430MHz, 431MHz, 432MHz, 433MHz, 434MHz, 435MHz, 436MHz, 437MHz, 438MHz, 439MHz, 440MHz, 441MHz, 442MHz, 443MHz, 444MHz, 445MHz, 446MHz, 447MHz, 448MHz, 449MHz, 450MHz
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### 3 SUMMARY OF TEST RESULTS

#### 3.1 Test Standards

No.	Identity	Document Title
1	IEEE Std 149-2021	IEEE Standard Test Procedures for Antennas

#### 3.2 Test Verdict

Report Section	Description	Remark
ANNEX A.1	Gain and Efficiency	--
ANNEX A.2	VSWR	--
ANNEX B	Radiation Pattern	--

#### 3.3 Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Item	Uncertainty
VSWR(S11)	$\pm 0.61$
Gain	$\pm 1.92\text{dB}$

## 4 GENERAL TEST CONFIGURATIONS

### 4.1 Test Condition

Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(°C)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	101	21.6	N/A	40

### 4.2 Test Equipment List

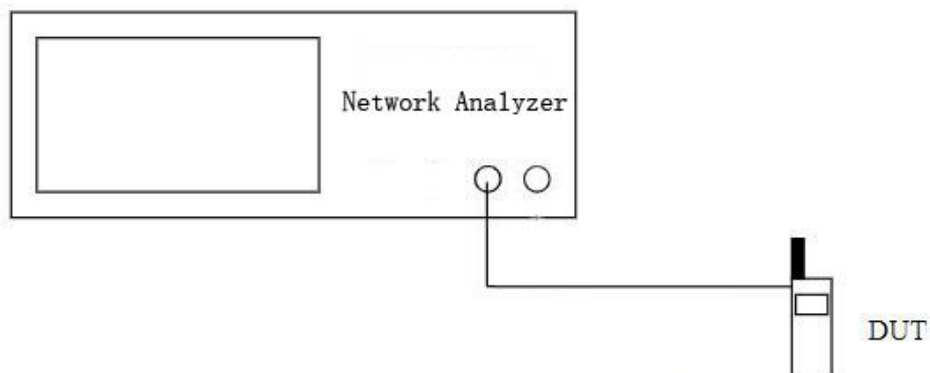
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855-0001	2021.11.12	2024.11.11
Vector Network Analyzer	Agilent	E5071B	MY42404001	2024.1.16	2025.1.15
Description	Manufacturer	Name		Version	
Test Software	MVG	SPM		V 1.8	

### 4.3 Test Setup

#### 4.3.1 Antenna gain, efficiency and radiation pattern test setup



#### 4.3.2 S11 parameter test setup



## ANNEX A TEST RESULTS

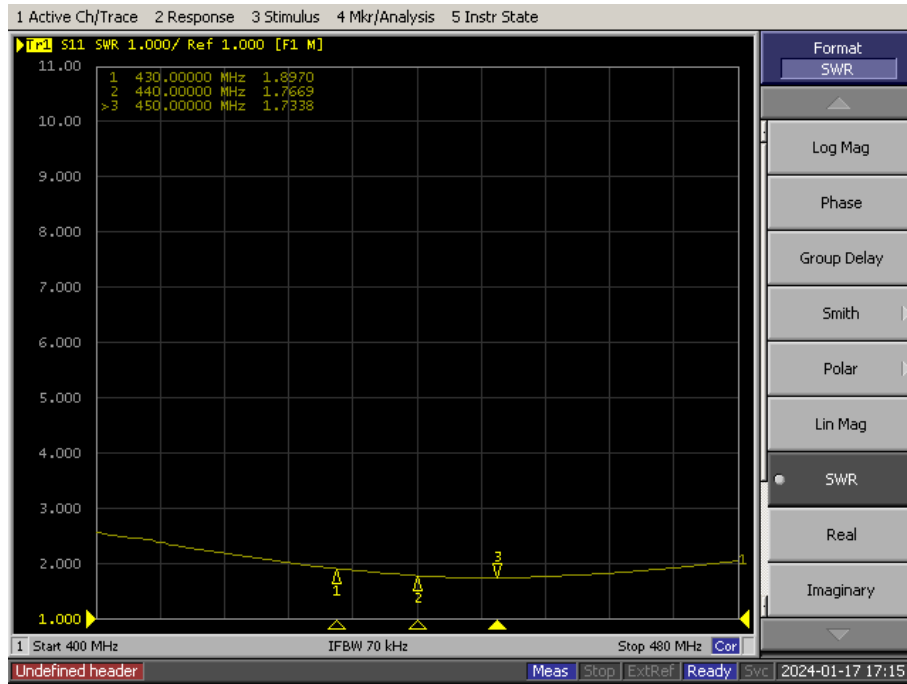
### A.1 Gain and Efficiency

Frequency	Gain (dBi)	Efficiency (%)
430MHz	-5.58	5
431MHz	-5.51	5
432MHz	-5.38	5
433MHz	-5.19	5
434MHz	-5.06	5
435MHz	-5.44	5
436MHz	-5.52	5
437MHz	-5.53	5
438MHz	-5.50	5
439MHz	-5.40	5
440MHz	-5.21	5
441MHz	-4.99	5
442MHz	-4.84	5
443MHz	-4.77	5
444MHz	-4.73	5
445MHz	-4.84	5
446MHz	-5.10	5
447MHz	-4.94	5
448MHz	-4.78	5
449MHz	-4.65	5
450MHz	<b>-4.59</b>	<b>6</b>



## A.2 VSWR

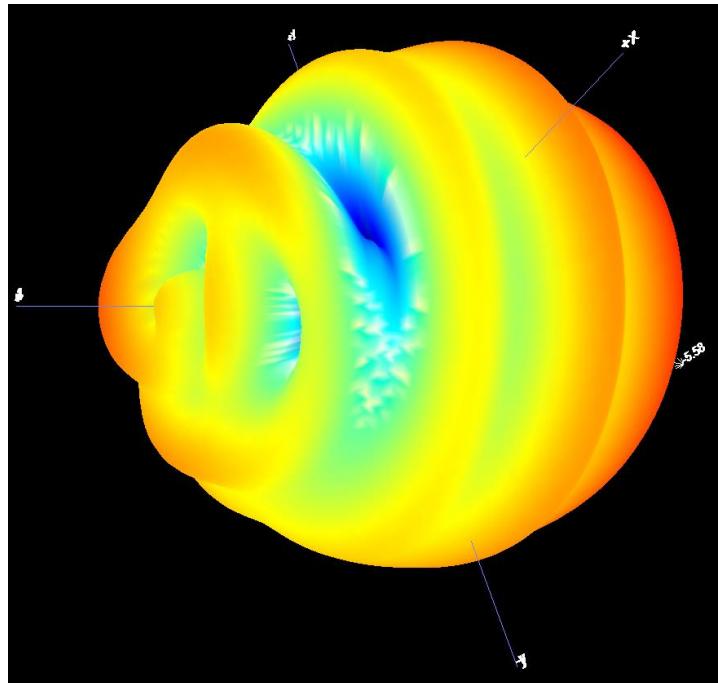
Frequency	VSWR
430MHz	1.90
440MHz	1.77
450MHz	1.73



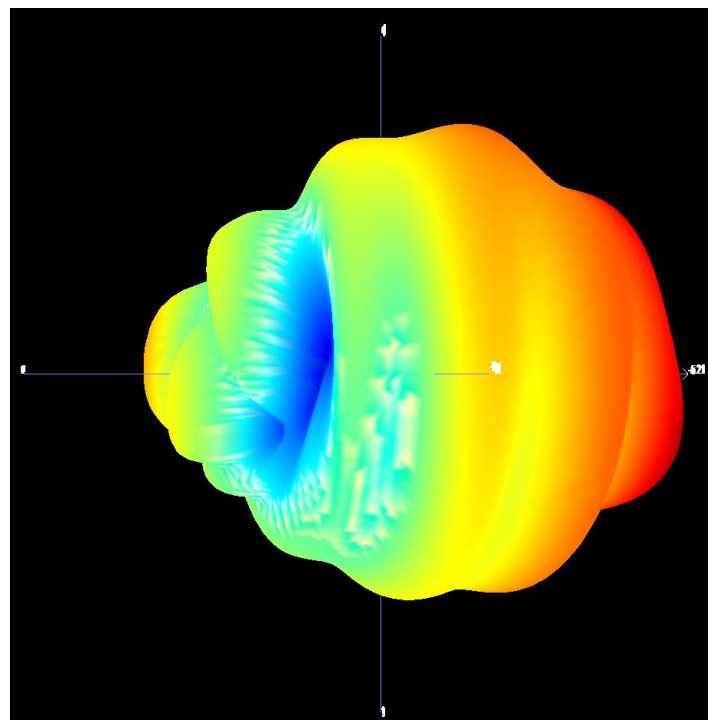
## ANNEX B RADIATION PATTERN

### B.1 3D Pattern

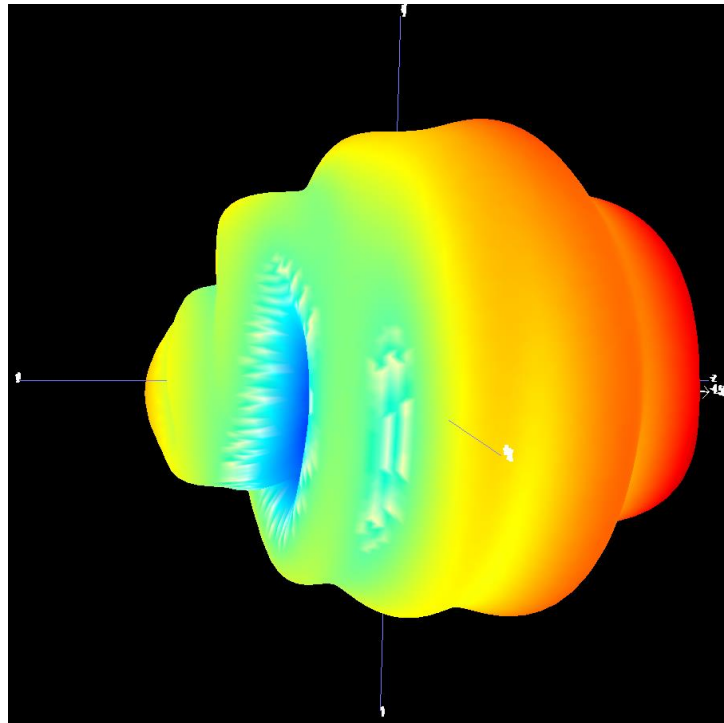
B1.1 3D Pattern for 430MHz



B1.2 3D Pattern for 440MHz

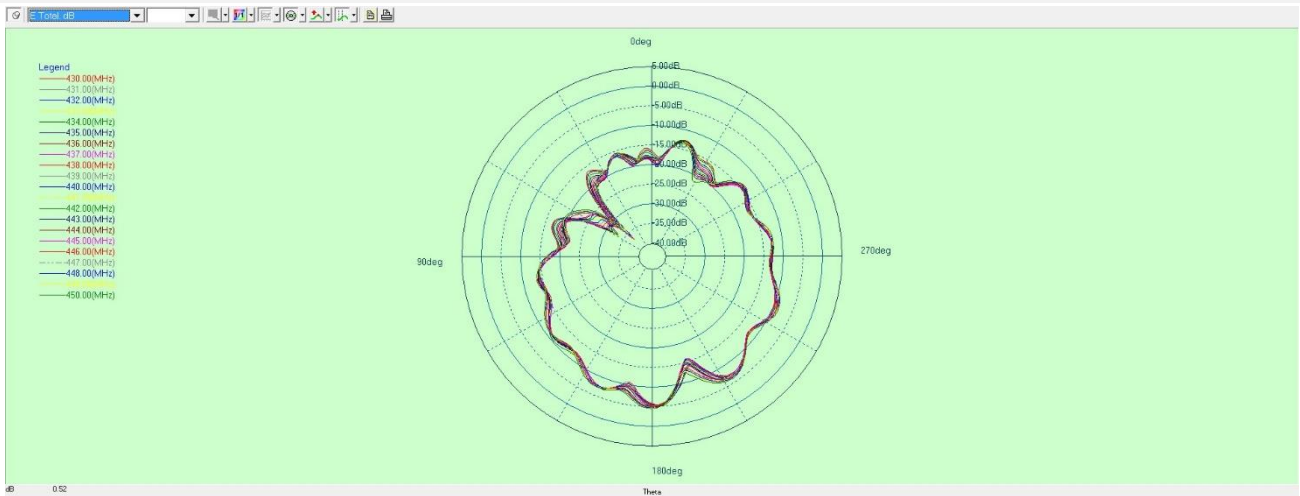


B1.3 3D Pattern for 450MHz

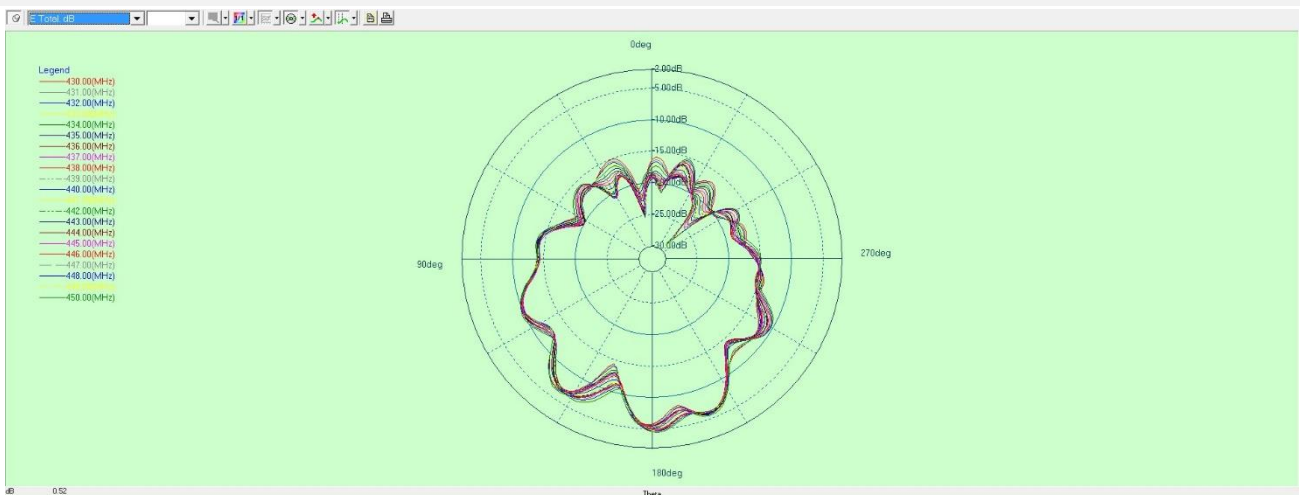


## B.2 1D Radiation Pattern

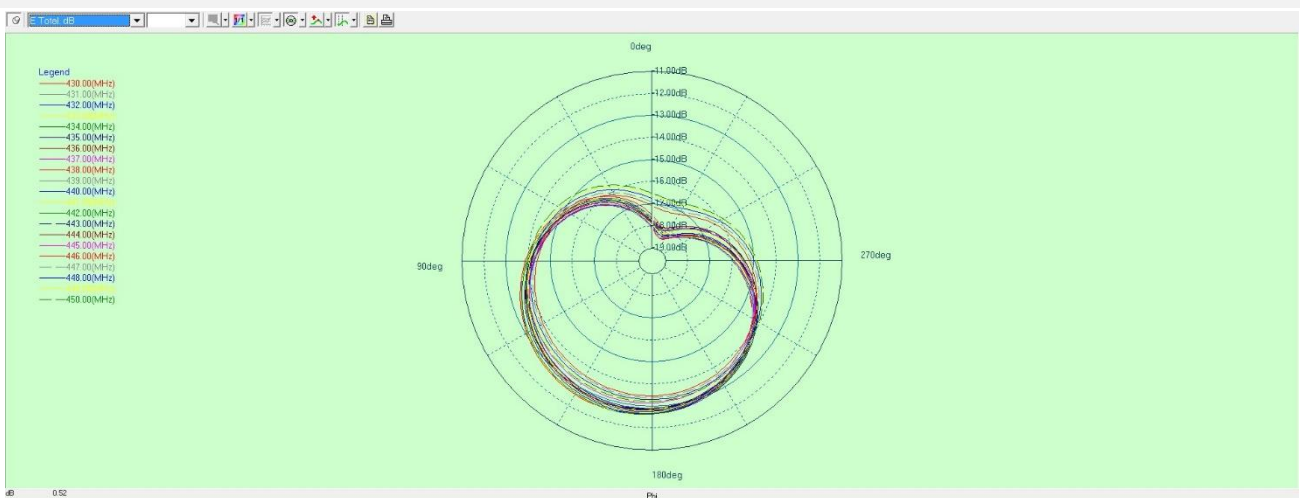
### B2.1 PHI=0



### B2.2 PHI=90



### B2.3 THETA=90



## **ANNEX C TEST SETUP PHOTOS**

Please refer the document “BL-SZ2410707-AO.PDF”.

## **ANNEX D EUT PHOTO**

Please refer the document “BL-SZ2410707-AA.PDF”.

## Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
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--END OF REPORT--