

# TEST REPORT

**Applicant:** Shenzhen ABC Industrial Co., Ltd  
**Address:** 6th Floor, Building 3, Jinchi Exhibition Innovation Park, 59 Haoye Road, Fuhai Street, Baoan District, Shenzhen, P.R. China.  
**Equipment Type:** earphone  
**Model Name:** 20S  
**Brand Name:** N/A  
**Test Standard:** IEEE Std 149-2021  
**Sample Arrival Date:** Feb. 28, 2023  
**Test Date:** Feb. 28, 2023  
**Date of Issue:** Mar. 02, 2023

**ISSUED BY:**

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Mai Jintian

**Checked by:** Zou Liu

**Approved by:** Wei Yanquan  
(Chief Engineer)

*Mai Jintian*

*Zou Liu*

*Wei Yanquan*

<b>Revision History</b>		
Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Mar. 02, 2023</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 ABC Industrial Co., Ltd
Address	6th Floor, Building 3, Jinchi Exhibition Innovation Park, 59 Haoye Road, Fuhai Street, Baoan District, Shenzhen, P.R. China.

### 2.2 Manufacturer Information

Manufacturer	Shenzhen ABC Industrial Co., Ltd
Address	6th Floor, Building 3, Jinchi Exhibition Innovation Park, 59 Haoye Road, Fuhai Street, Baoan District, Shenzhen, P.R. China.

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

EUT Name	earphone
Model Name Under Test	20S
Antenna Type	Ceramic Antenna
Dimensions	4.8*2.2 mm

### 2.4 Ancillary Equipment

Note: Not applicable.

### 2.5 Technical Information

Test Frequencies	2400MHz, 2410MHz, 2420MHz, 2430MHz, 2440MHz, 2450MHz, 2460MHz, 2470MHz, 2480MHz, 2490MHz, 2500MHz
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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

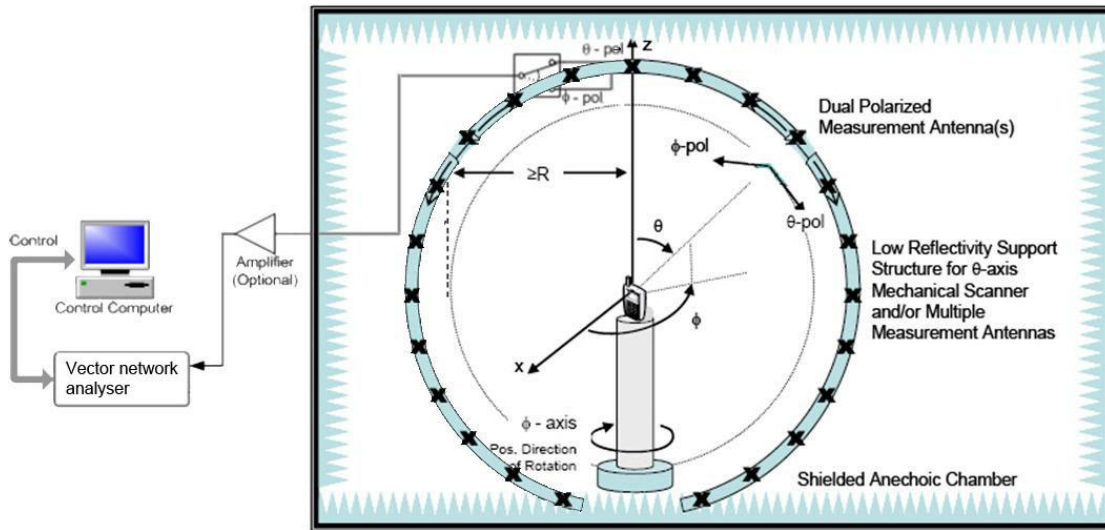
Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(°C)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	101	21.4	N/A	44

### 4.2 Test Equipment List

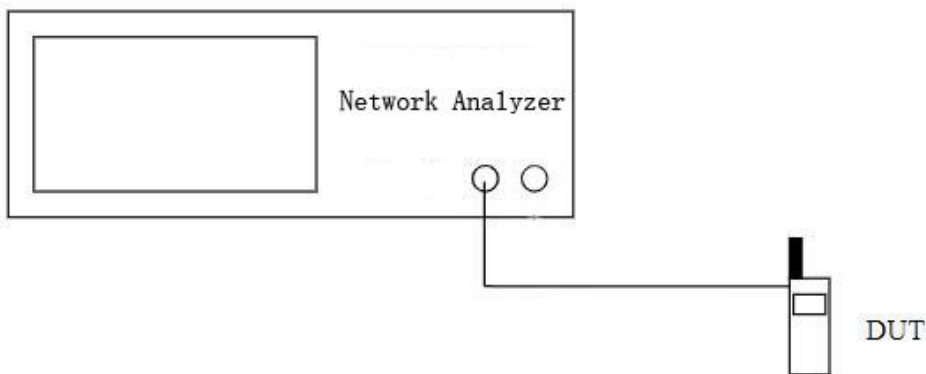
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855-0001	2021.11.12	2024.11.11
Vector Network Analyzer	Agilent	E5071B	MY42404001	2022.04.02	2023.04.01
Description	Manufacturer	Name		Version	
Test Software	MVG	SPM		V 1.8	

### 4.3 Test Setup

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



#### 4.3.2 S11 parameter test setup



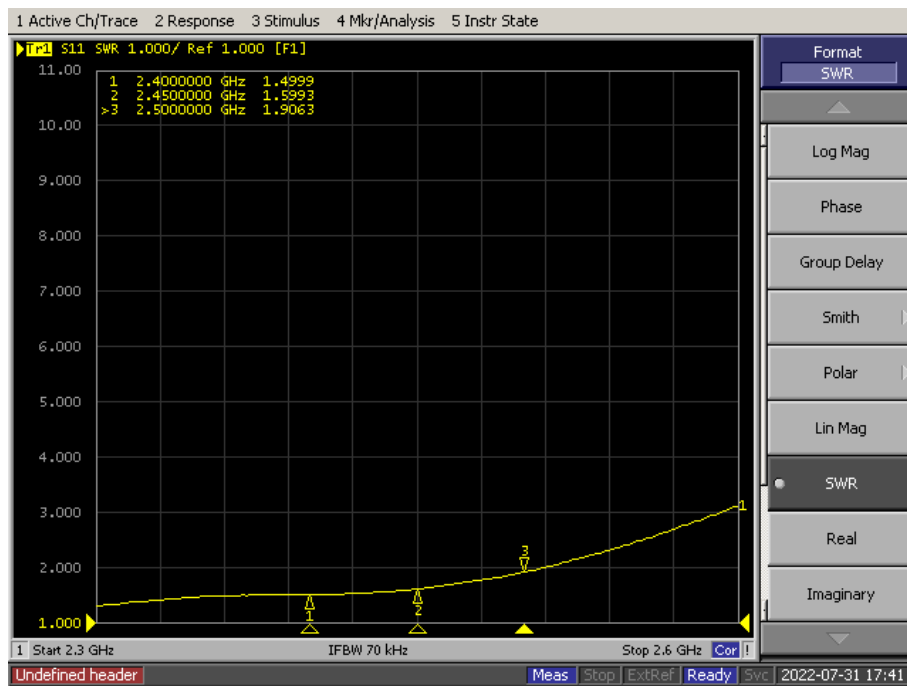
# ANNEX A TEST RESULTS

## A.1 Gain and Efficiency

Frequency	Gain (dBi)	Efficiency (%)
2400MHz	<b>3.59</b>	<b>46</b>
2410MHz	1.95	46
2420MHz	1.59	44
2430MHz	1.39	45
2440MHz	1.48	46
2450MHz	1.42	45
2460MHz	1.34	44
2470MHz	1.36	43
2480MHz	1.46	43
2490MHz	1.45	43
2500MHz	1.38	42

## A.2 VSWR

Frequency	VSWR
2400MHz	1.50
2450MHz	1.60
2500MHz	1.91

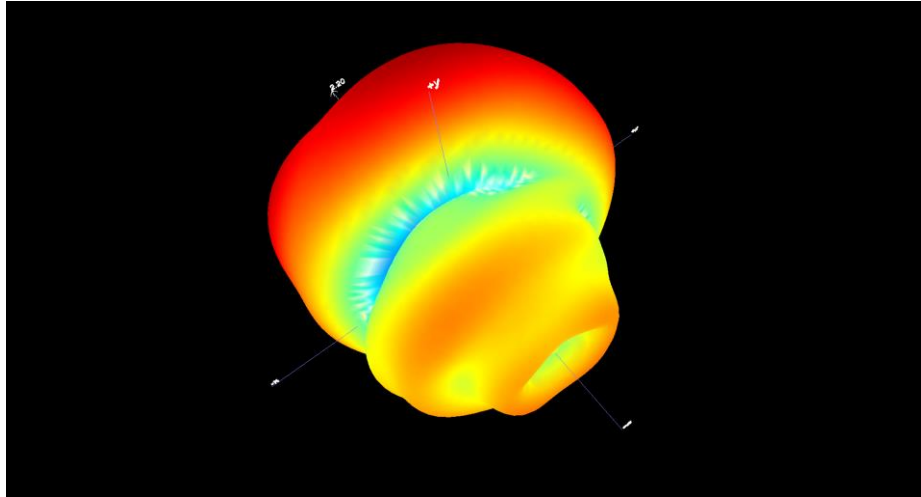




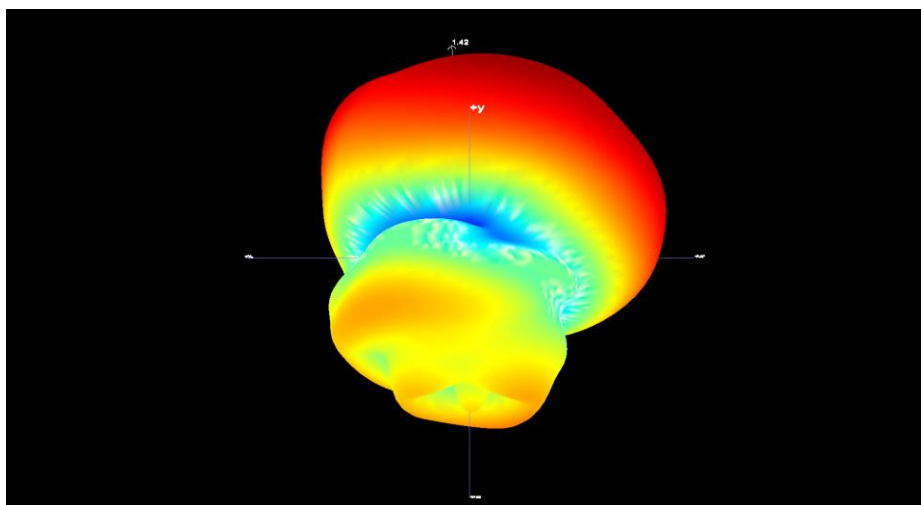
## ANNEX B RADIATION PATTERN

### B.1 3D Pattern

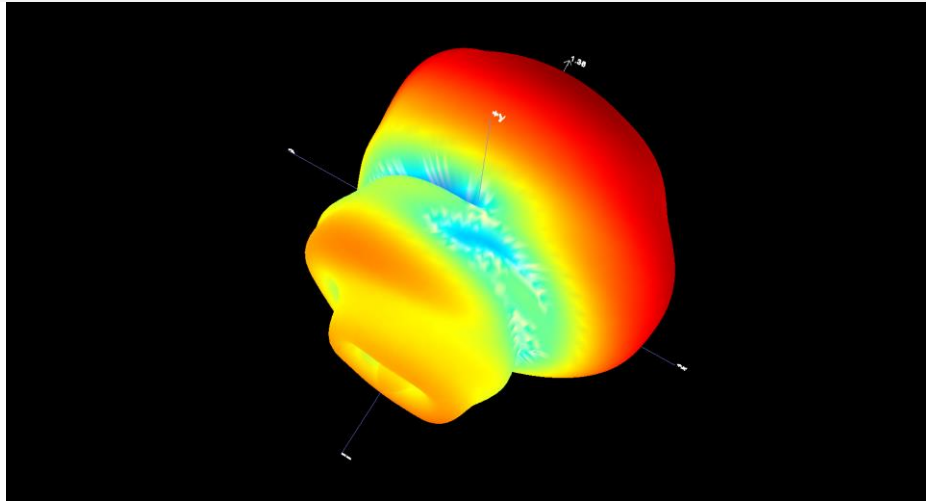
B1.1 3D Pattern for 2400MHz



B1.2 3D Pattern for 2450MHz

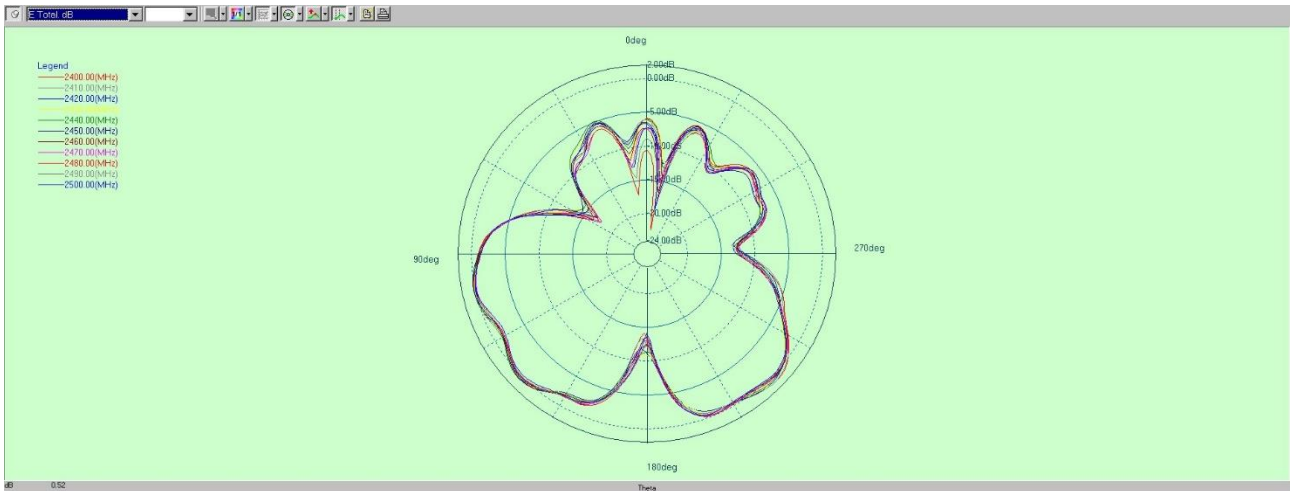


B1.3 3D Pattern for 2500MHz

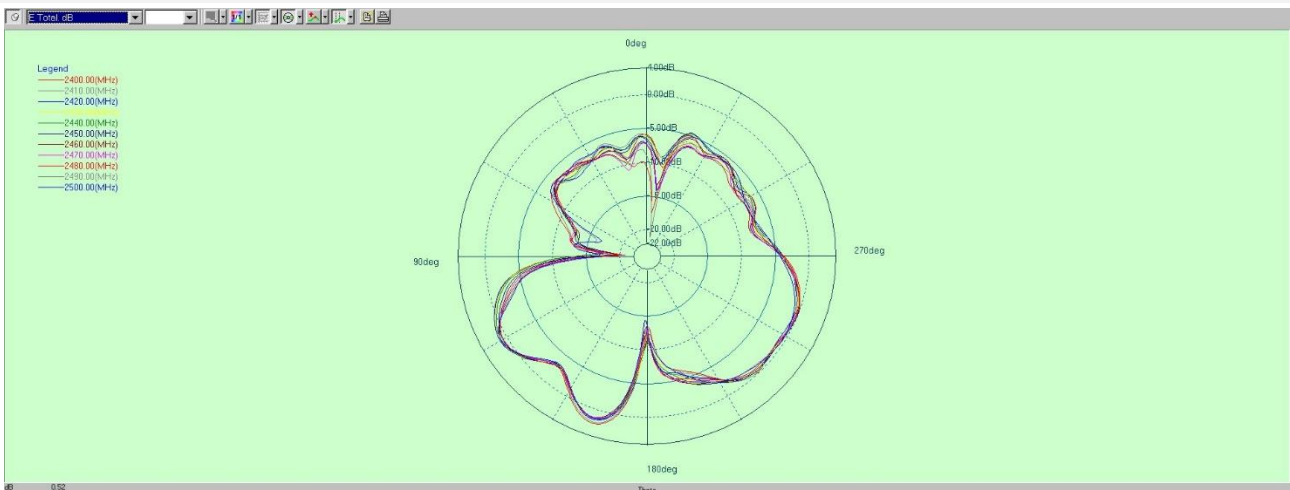


## B.2 1D Radiation Pattern

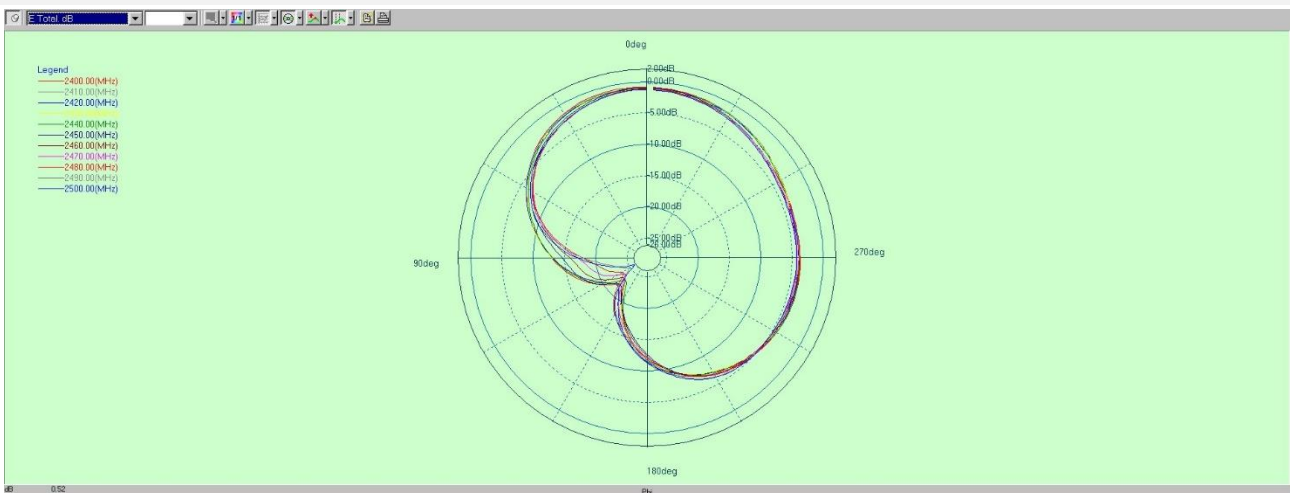
### B2.1 PHI=0



### B2.2 PHI=90



### B2.3 THETA=90



## **ANNEX C TEST SETUP PHOTOS**

Please refer the document “BL-SZ 2321144-AO.PDF”.

## **ANNEX D EUT PHOTO**

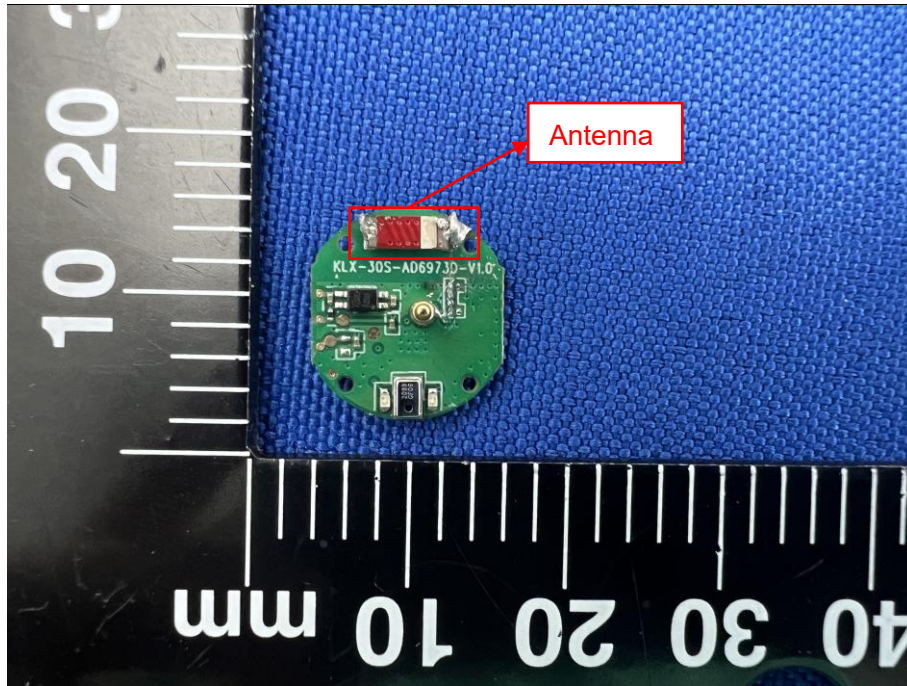
Please refer the document “BL-SZ 2321144-AA.PDF”.

## Statement

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7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--

## EUT PHOTO



## TEST SETUP PHOTOS

