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)

Revision History

Version	Issue Date	Revisions
Rev. 01	Mar. 02, 2023	Initial Issue

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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	☑ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 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

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)	±0.61
Gain	±1.92dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Condition

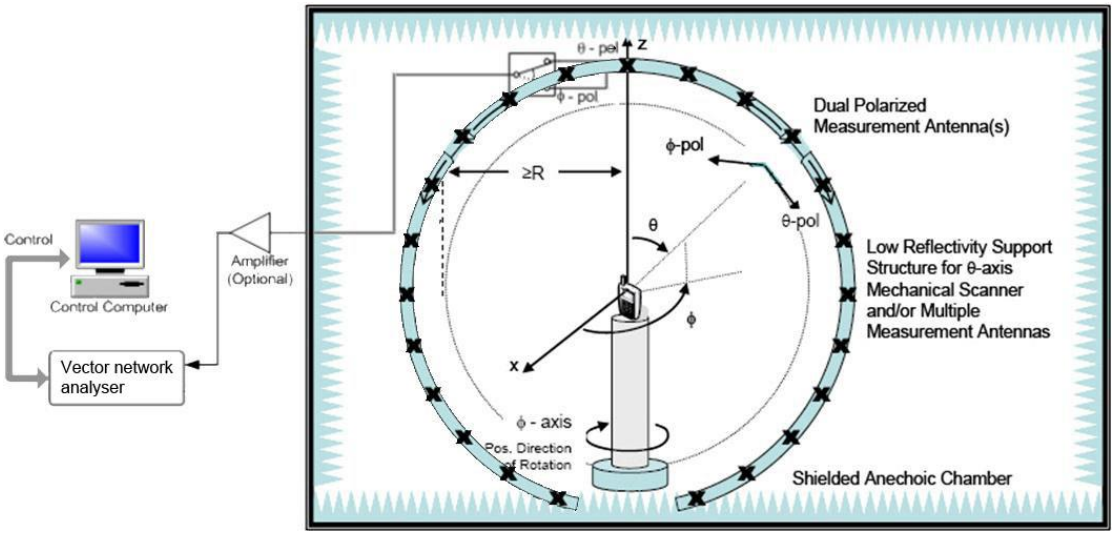
Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(℃)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	101	21.4	N/A	44

4.2 Test Equipment List

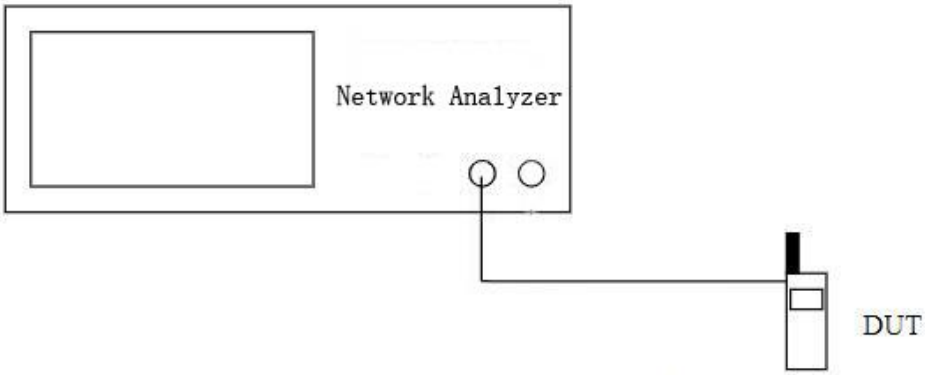
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855-0001	2021.11.12	2024.11.11
Vector Network Analyzer	Agilent	E5071B	MY42404001	2022.04.02	2023.04.01
Description	Manufacturer	Name		Version	
Test Software	MVG	SPM		V 1.8	

4.3 Test Setup

4.3.1 Antenna gain, efficiency and radiation pattern test setup



4.3.2 S11 parameter test setup



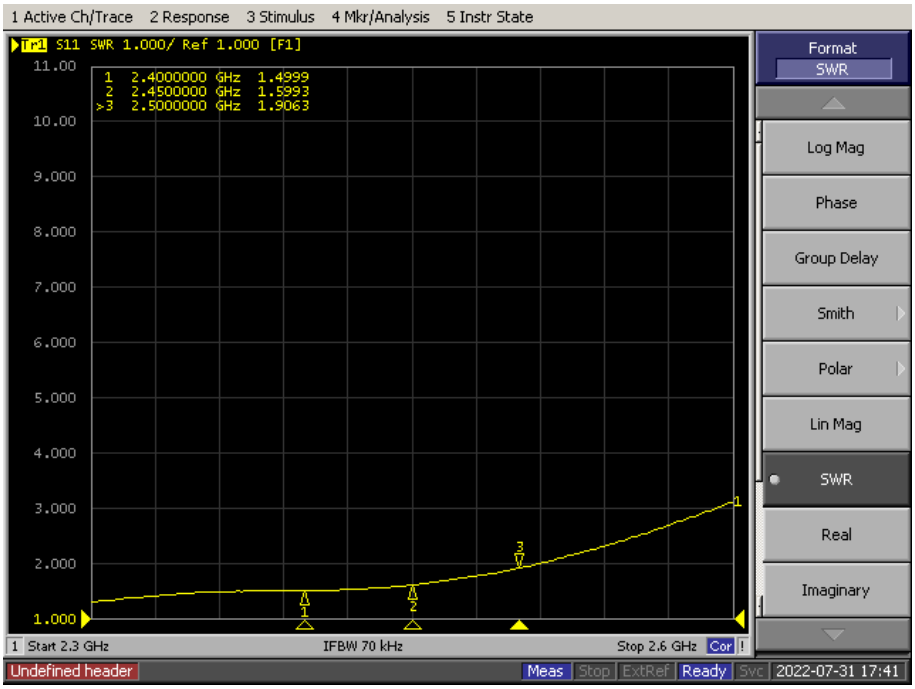
ANNEX A TEST RESULTS

A.1 Gain and Efficiency

Frequency	Gain (dBi)	Efficiency (%)
2400MHz	**3.59**	**46**
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

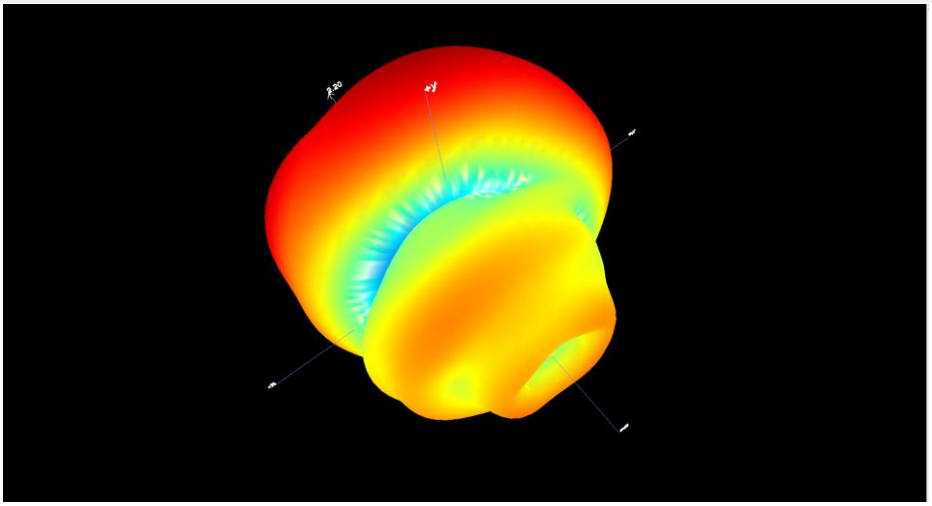
Frequency	VSWR
2400MHz	1.50
2450MHz	1.60
2500MHz	1.91



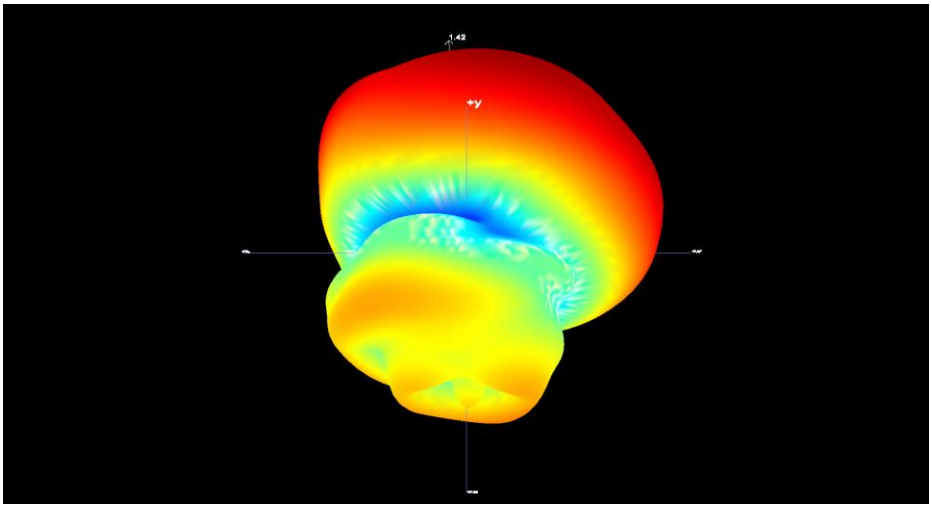
ANNEX B RADIATION PATTERN

B.1 3D Pattern

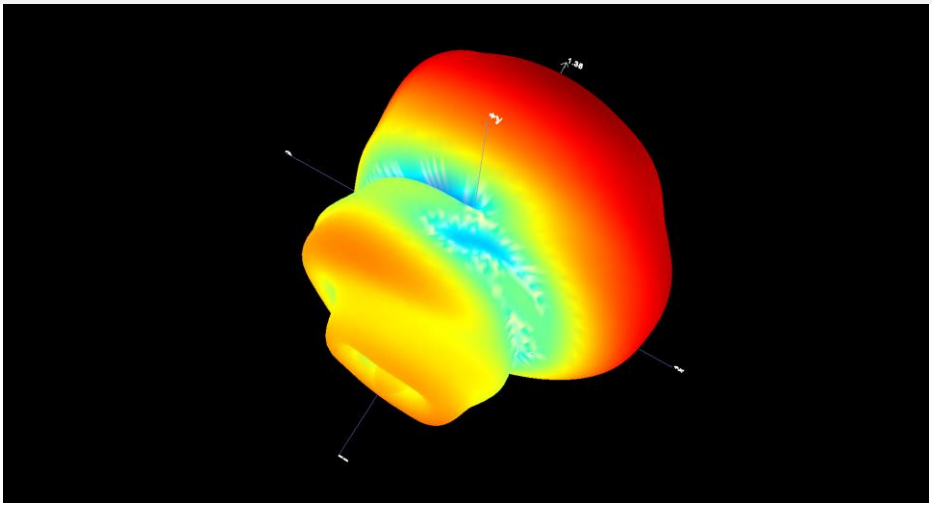
B1.1 3D Pattern for 2400MHz



B1.2 3D Pattern for 2450MHz

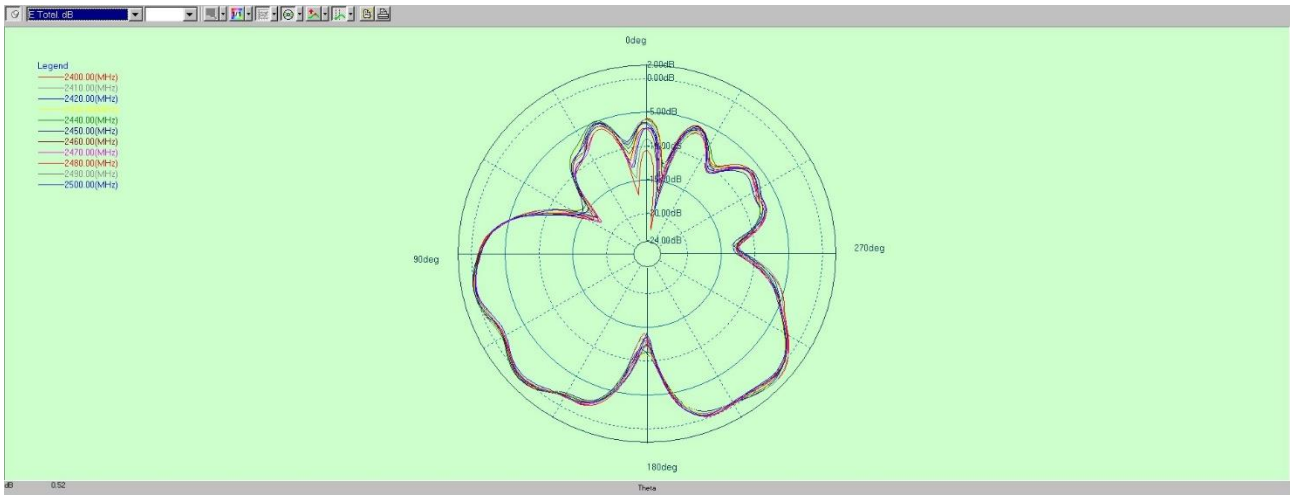


B1.3 3D Pattern for 2500MHz

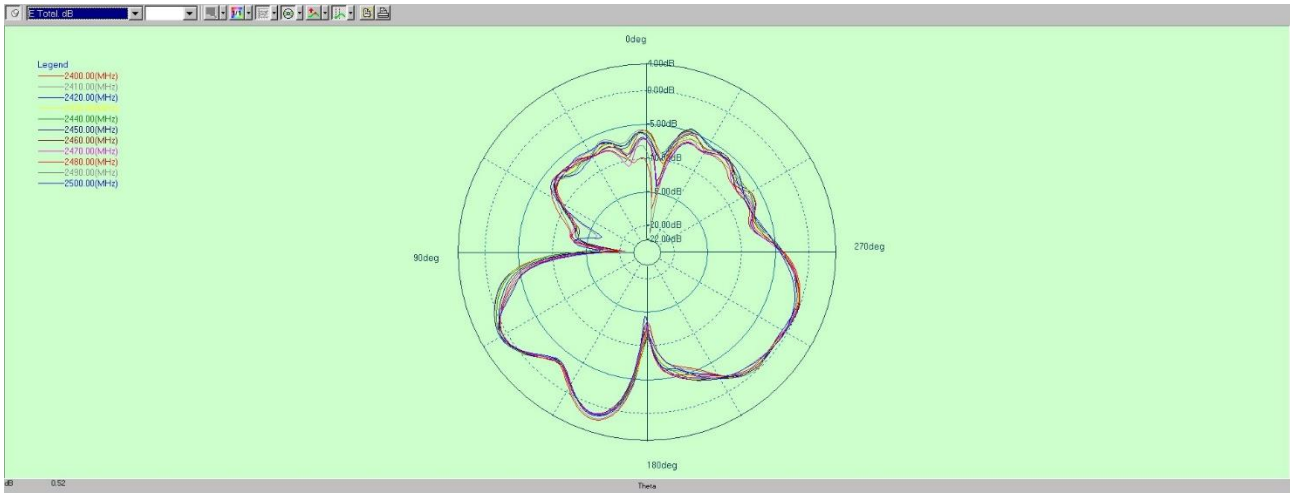


B.2 1D Radiation Pattern

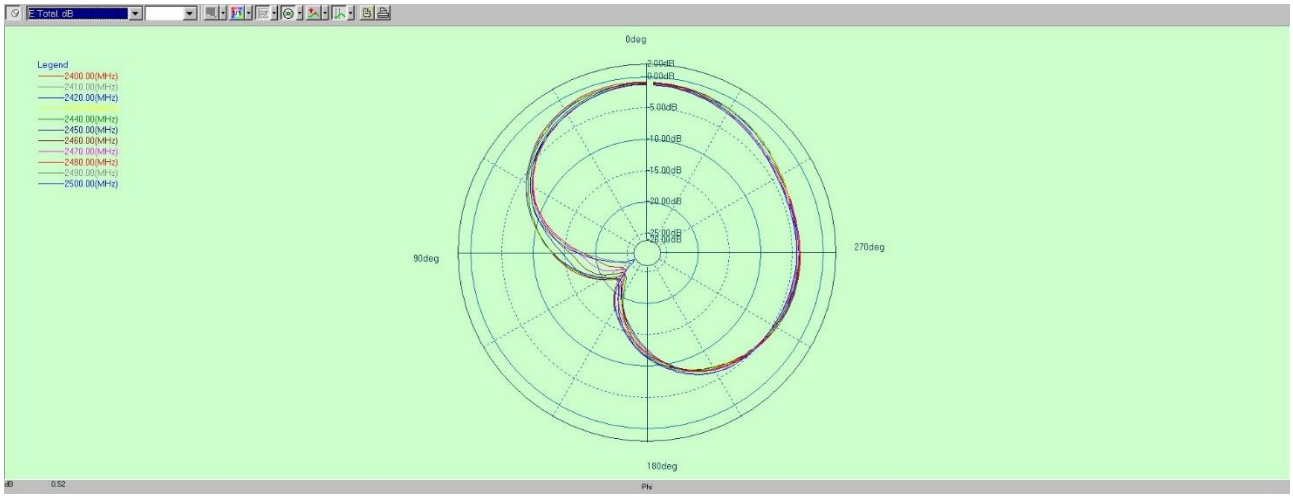
B2.1 PHI=0



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

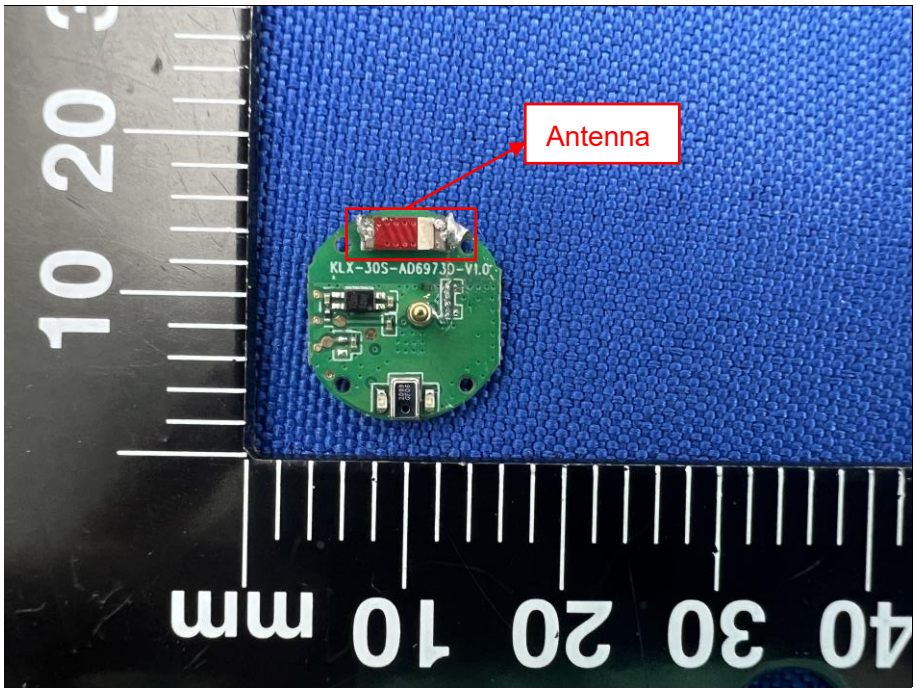
Please refer the document “BL-SZ 2321144-AA.PDF”.

Statement

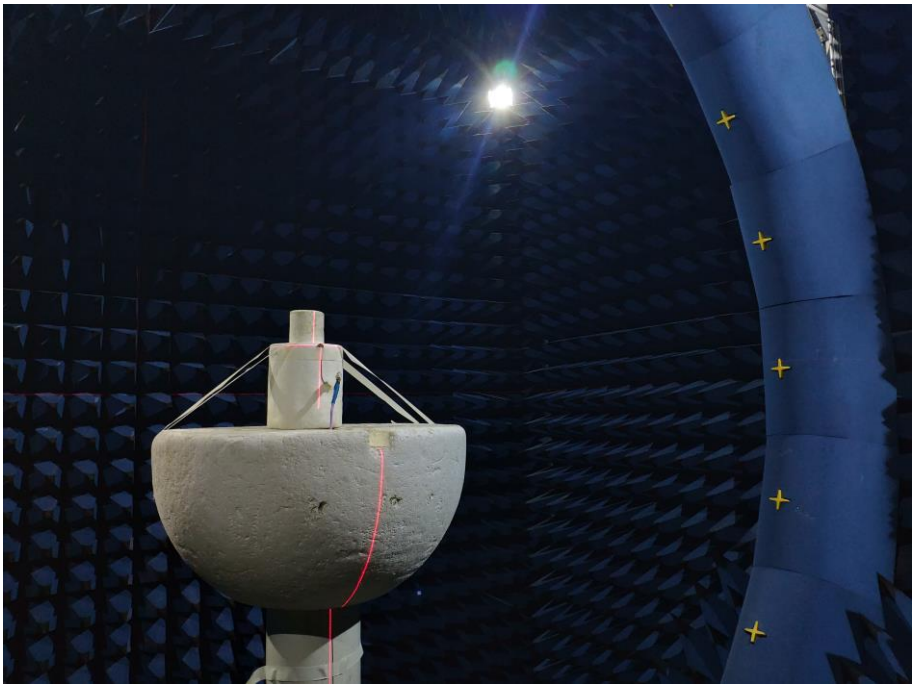
1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the “inspection and testing dedicated stamp” or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
6. This report shall not be partially reproduced without the written permission of the laboratory.
7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

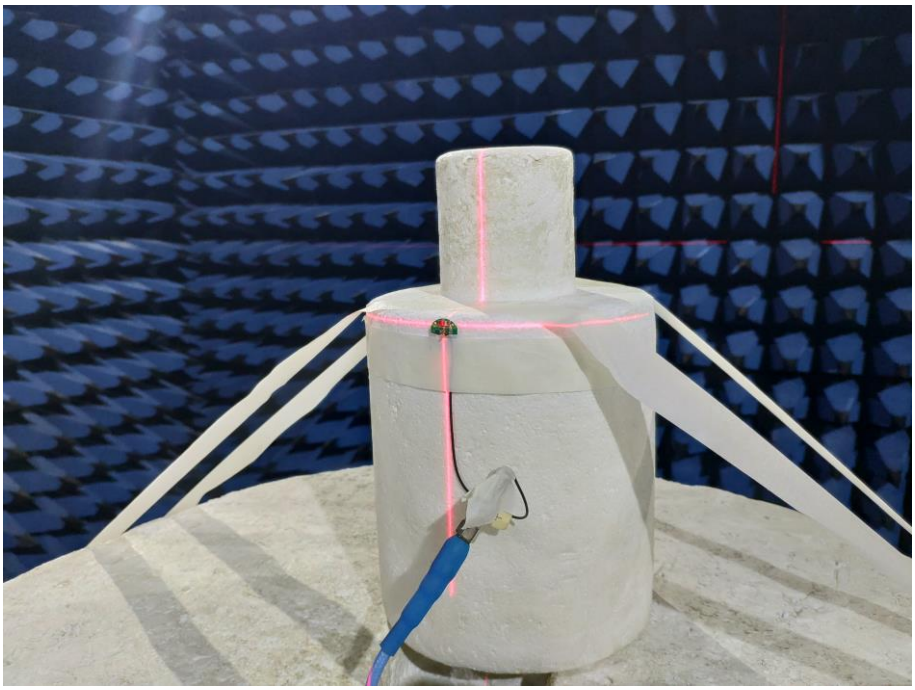
--END OF REPORT--

EUT PHOTO



TEST SETUP PHOTOS





Agilent Technologies
E5071B