

TEST REPORT

Applicant: Dongguan MingHeng Plastic Products Co., Ltd.
Address: Room 101, Block 2, No. 59, Shipai Xiasha Road,
Shipai Town, Dongguan City, Guangdong Province,
China
Equipment Type: North Pole Power and Light Switch
Model Name: 62570
Brand Name: Mr. Christmas
Test Standard: IEEE Std 149-2021
Sample Arrival Date: Mar. 18, 2026
Test Date: Mar. 23, 2026
Date of Issue: Mar. 25, 2026

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Mai Jintian**Checked by:** Xia Long**Approved by:** Tolan Tu

(Technical Director)

Mai Jintian

Xia Long

Tolan Tu

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Mar. 25, 2026</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	3
1.1	Test Laboratory	3
1.2	Test Location	3
2	PRODUCT INFORMATION	4
2.1	Applicant Information	4
2.2	Manufacturer Information	4
2.3	General Description for Equipment under Test (EUT)	4
2.4	Ancillary Equipment	4
3	SUMMARY OF TEST RESULTS	5
3.1	Test Standards	5
3.2	Test Verdict	5
3.3	Test Uncertainty	5
4	GENERAL TEST CONFIGURATIONS	6
4.1	Test Condition	6
4.2	Test Equipment List	6
4.3	Test Setup	7
4.4	Test Frequencies	7
ANNEX A	TEST RESULTS	8
A.1	Gain and Efficiency	8
A.2	VSWR	8
ANNEX B	RADIATION PATTERN	9
ANNEX C	TEST SETUP PHOTOS	12
ANNEX D	EUT PHOTO	12

1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Building 2, Intelligent Connected Vehicle Industrial Park, No. 55, Xiangshan Road, Luotian Community, Yanluo Sub-district, Bao'an District, Shenzhen, Guangdong Province, 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
	☒ Building 2, Intelligent Connected Vehicle Industrial Park, No. 55, Xiangshan Road, Luotian Community, Yanluo Sub-district

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Dongguan MingHeng Plastic Products Co., Ltd.
Address	Room 101, Block 2, No. 59, Shipai Xiasha Road, Shipai Town, Dongguan City, Guangdong Province, China

2.2 Manufacturer Information

Manufacturer	Dongguan MingHeng Plastic Products Co., Ltd.
Address	Room 101, Block 2, No. 59, Shipai Xiasha Road, Shipai Town, Dongguan City, Guangdong Province, China

2.3 General Description for Equipment under Test (EUT)

EUT Name	North Pole Power and Light Switch
Model Name Under Test	62570
Antenna Type	PCB Antenna
Dimensions	33 mm * 12 mm

2.4 Ancillary Equipment

Note: Not applicable.

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	$\pm 1.92\text{dB}$

4 GENERAL TEST CONFIGURATIONS

4.1 Test Condition

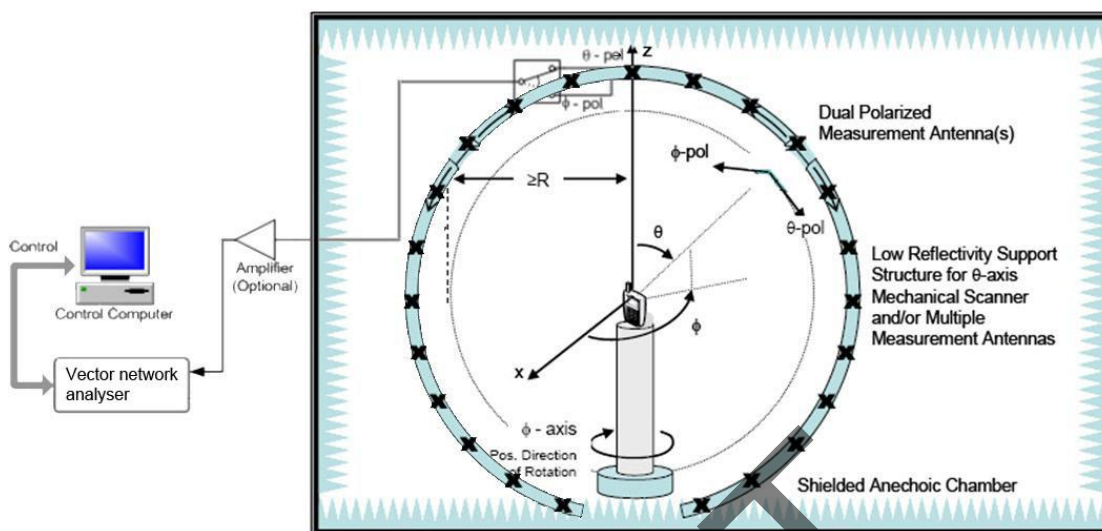
Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(°C)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	101	21.6	N/A	52

4.2 Test Equipment List

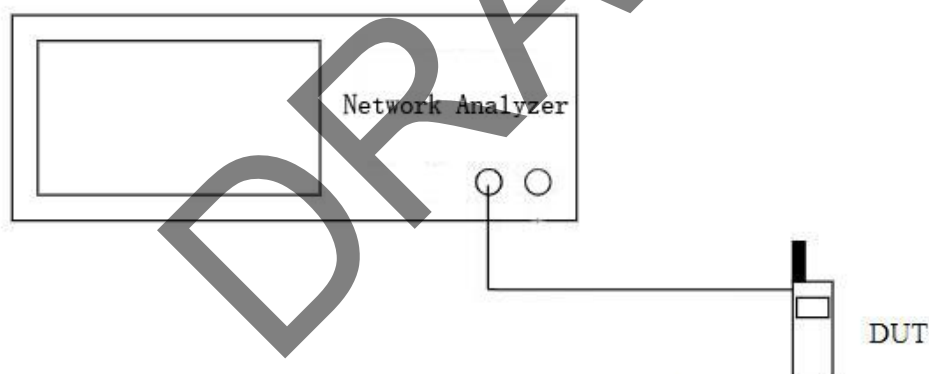
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855- 0001	2025.11.03	2028.11.02
Vector Network Analyzer	Agilent	E5071B	MY42404001	2025.12.22	2026.12.21
Description	Manufacturer	Name		Version	
Test Software	MVG	SPM		V 1.8	

4.3 Test Setup

4.3.1 Antenna gain, efficiency and radiation pattern test setup



4.3.2 S11 parameter test setup



4.4 Test Frequencies

Test Frequencies	433MHz, 433.1MHz, 433.2MHz, 433.3MHz, 433.4MHz, 433.5MHz, 433.6MHz, 433.7MHz, 433.8MHz, 433.9MHz, 434MHz
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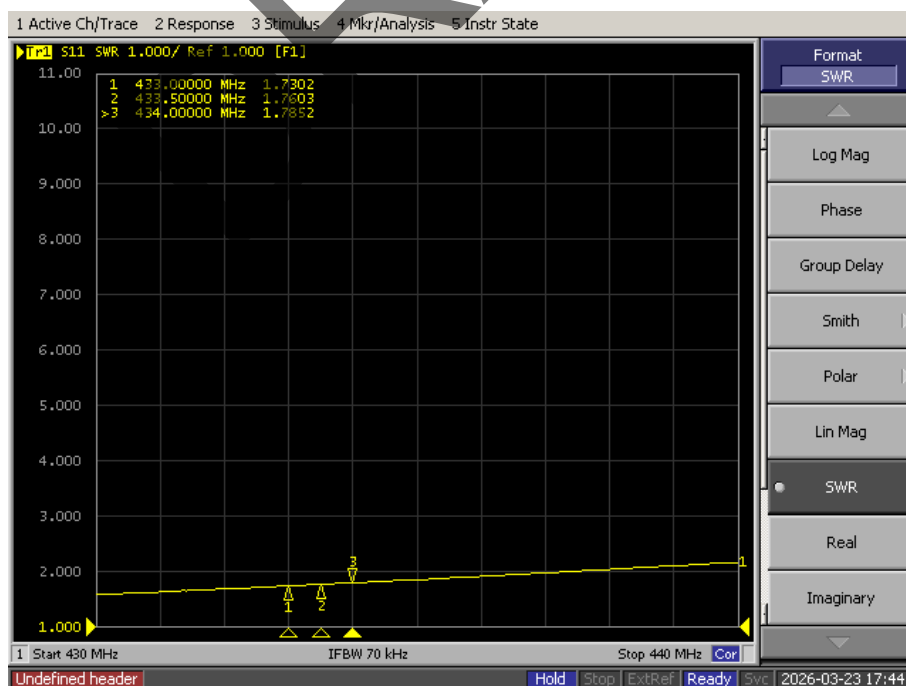
ANNEX A TEST RESULTS

A.1 Gain and Efficiency

Frequency	Gain (dBi)	Efficiency (%)
433MHz	-8.33	8%
433.1MHz	-8.33	8%
433.2MHz	-8.33	8%
433.3MHz	-8.34	8%
433.4MHz	-8.34	8%
433.5MHz	-8.35	8%
433.6MHz	-8.35	8%
433.7MHz	-8.36	8%
433.8MHz	-8.37	8%
433.9MHz	-8.37	8%
434MHz	-8.39	8%

A.2 VSWR

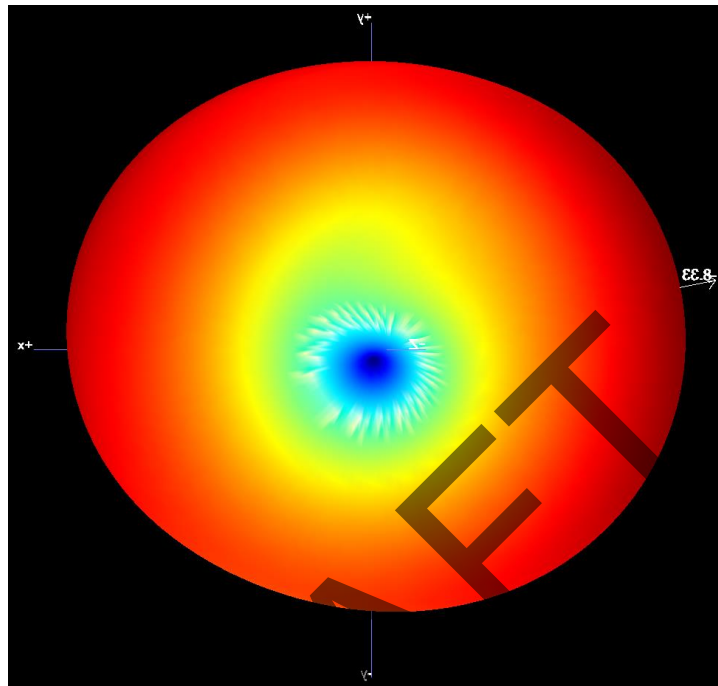
Frequency	VSWR
433MHz	1.73
433.5MHz	1.76
434MHz	1.79



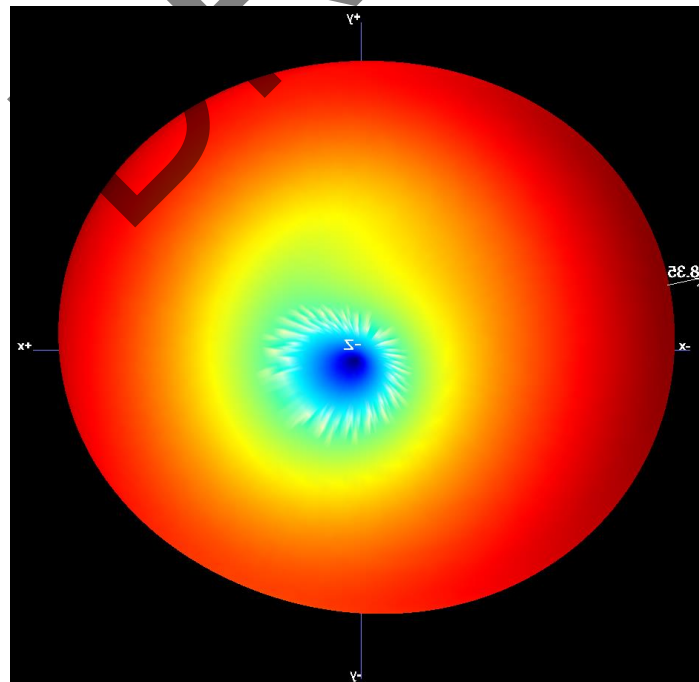
ANNEX B RADIATION PATTERN

B.1 3D Pattern

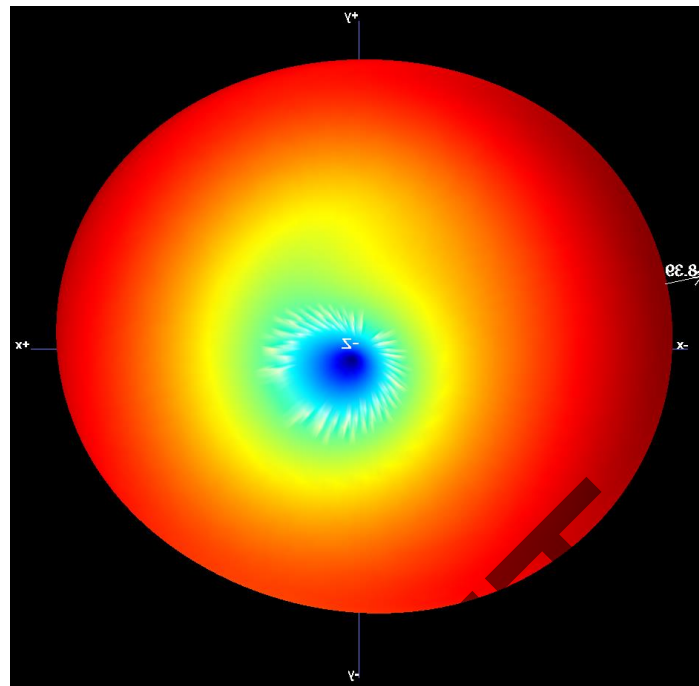
B1.1 3D Pattern for 433MHz



B1.2 3D Pattern for 433.5MHz

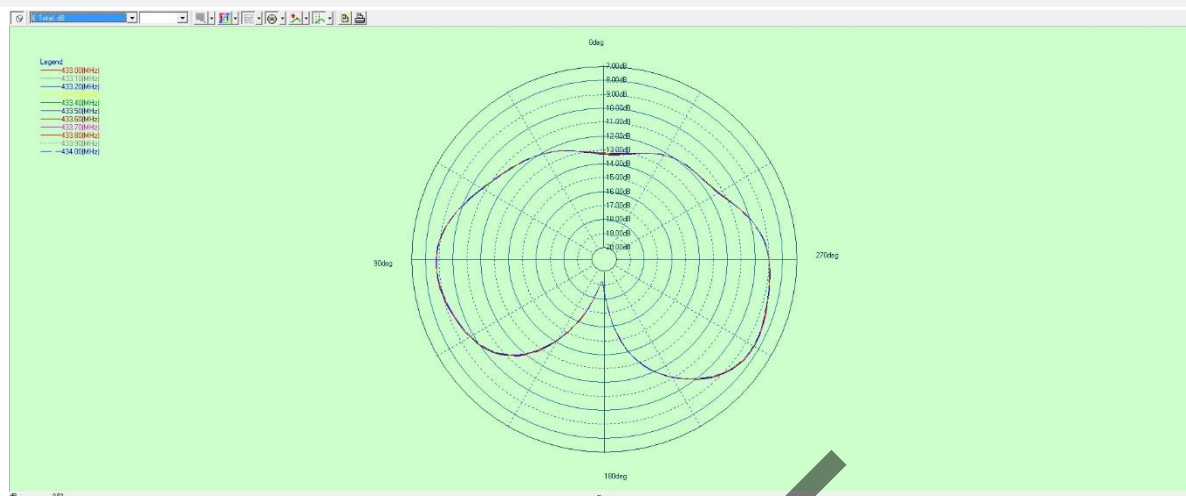


B1.3 3D Pattern for 434MHz



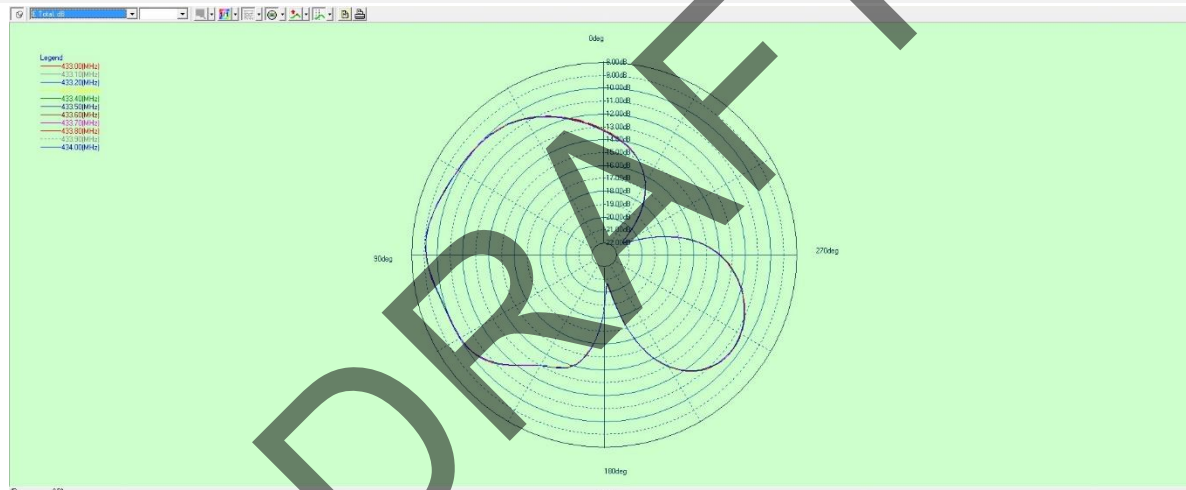
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1 PHI=0



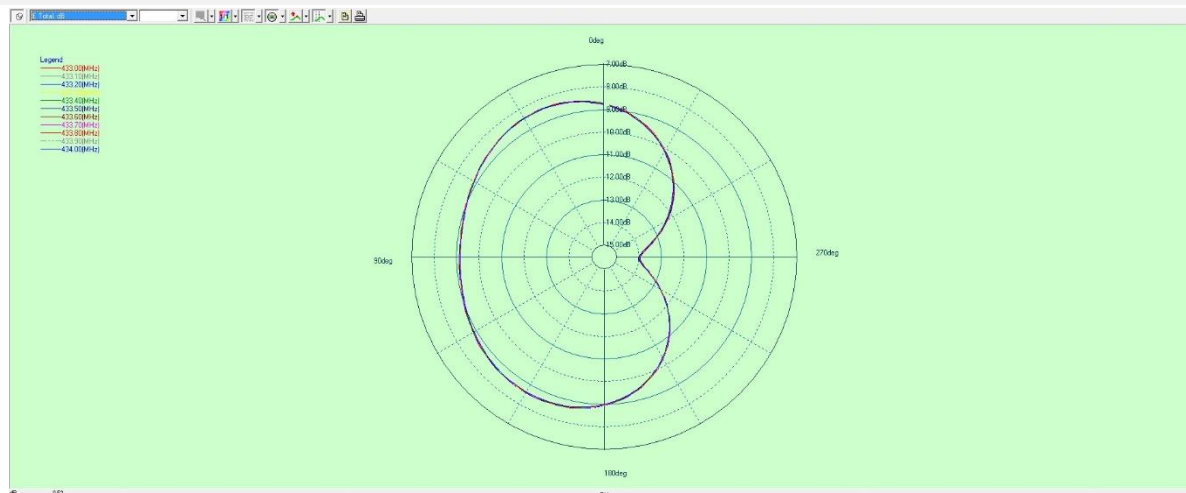
The screenshot shows the QGIS interface with a map area that is mostly green. A legend is visible in the top-left corner of the map area, listing several data series with corresponding line styles and colors:

- 433.3000042 (red solid line)
- 433.1000042 (red solid line)
- 433.2000042 (blue solid line)
- 433.4000042 (green solid line)
- 433.5000042 (green solid line)
- 433.6000042 (green solid line)
- 433.7000042 (red solid line)
- 433.8000042 (red solid line)
- 433.9000042 (green dashed line)
- 434.0000042 (blue dashed line)



Legend

- 433.000000
- 433.000000
- 433.200000
- 433.400000
- 433.500000
- 433.700000
- 433.900000
- 434.000000



ANNEX C TEST SETUP PHOTOS

Please refer the document “Ti-EE26030513-AO.PDF”.

ANNEX D EUT PHOTO

Please refer the document “Ti-EE26030513-AA.PDF”.

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

--END OF REPORT--

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