

# TEST REPORT

**Applicant:** Shenzhen Viofo Technology Co., Ltd  
**Address:** East of 3rd Floor, Factory Building No.1,  
Huihuayuan, NO. 69 of Donghuan 2nd Road,  
Longhua Street, Longhua District, Shenzhen, China  
**Equipment Type:** Car Dash Camera  
**Model Name:** WM1  
**Brand Name:** VIOFO  
**Test Standard:** ANSI/IEEE Std 149-2021  
**Sample Arrival Date:** Dec. 14, 2022  
**Test Date:** Dec. 15, 2022  
**Date of Issue:** Dec. 16, 2022

**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

### Revision History

| Version        | Issue Date           | Revisions            |
|----------------|----------------------|----------------------|
| <u>Rev. 01</u> | <u>Dec. 16, 2022</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 Viofo Technology Co., Ltd                                                                                                   |
| Address   | East of 3rd Floor, Factory Building No.1, Huihuayuan, NO. 69 of Donghuan 2nd Road, Longhua Street, Longhua District, Shenzhen, China |

### 2.2 Manufacturer Information

|              |                                                                                                                                      |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Manufacturer | Shenzhen Viofo Technology Co., Ltd                                                                                                   |
| Address      | East of 3rd Floor, Factory Building No.1, Huihuayuan, NO. 69 of Donghuan 2nd Road, Longhua Street, Longhua District, Shenzhen, China |

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

|                       |                 |
|-----------------------|-----------------|
| EUT Name              | Car Dash Camera |
| Model Name Under Test | WM1             |
| Antenna Type          | PCB Antenna     |
| Dimensions            | 11*3mm          |

### 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   | ANSI/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         |
|------|---------------------|
| Gain | $\pm 1.92\text{dB}$ |

## 4 GENERAL TEST CONFIGURATIONS

### 4.1 Test Condition

| Environment<br>Parameter                           | Selected Values During Tests |                 |         |                          |
|----------------------------------------------------|------------------------------|-----------------|---------|--------------------------|
|                                                    | Ambient<br>Pressure(KPa)     | Temperature(°C) | Voltage | Relative<br>Humidity (%) |
| Normal<br>Temperature,<br>Normal Voltage<br>(NTNV) | 101                          | 21.8            | N/A     | 50                       |

### 4.2 Test Equipment List

| Description                                       | Manufacturer | Model  | Serial No.       | Cal. Date  | Cal. Due   |
|---------------------------------------------------|--------------|--------|------------------|------------|------------|
| SG24 Multi-probe<br>Antenna Measurement<br>System | SATIMO       | SG24-L | 1101855-<br>0001 | 2021.11.12 | 2024.11.11 |
| Vector Network<br>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



## ANNEX A TEST RESULTS

### A.1 Gain and Efficiency

| Frequency | Gain (dBi)  | Efficiency (%) |
|-----------|-------------|----------------|
| 2400MHz   | 1.45        | 48%            |
| 2410MHz   | 1.53        | 48%            |
| 2420MHz   | <b>1.70</b> | 48%            |
| 2430MHz   | 1.66        | <b>49%</b>     |
| 2440MHz   | 1.47        | 48%            |
| 2450MHz   | 1.42        | 47%            |
| 2460MHz   | 1.33        | 46%            |
| 2470MHz   | 1.49        | 47%            |
| 2480MHz   | 1.64        | 47%            |
| 2490MHz   | 1.65        | 45%            |
| 2500MHz   | 1.39        | 44%            |

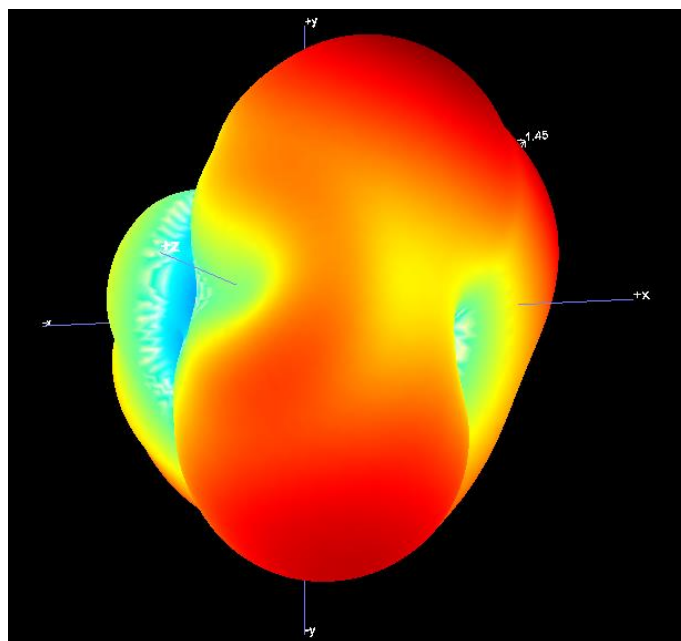
### A.2 VSWR

| Frequency | VSWR |
|-----------|------|
| 2400MHz   | 1.69 |
| 2450MHz   | 1.47 |
| 2500MHz   | 1.29 |

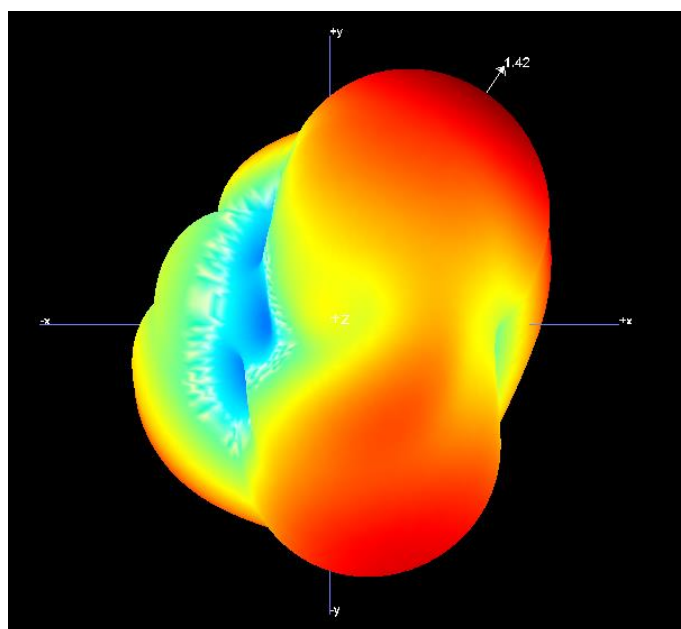
## ANNEX B RADIATION PATTERN

### B.1 3D Pattern

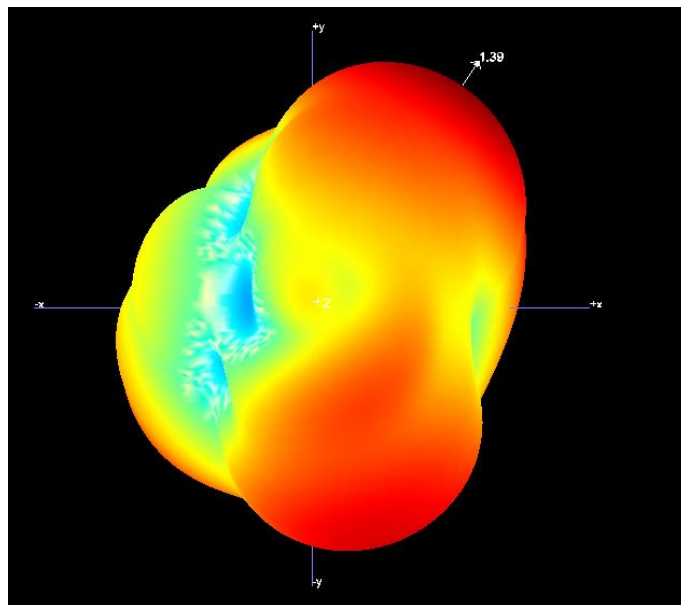
B1.1 3D Pattern for 2400MHz



B1.2 3D Pattern for 2450MHz

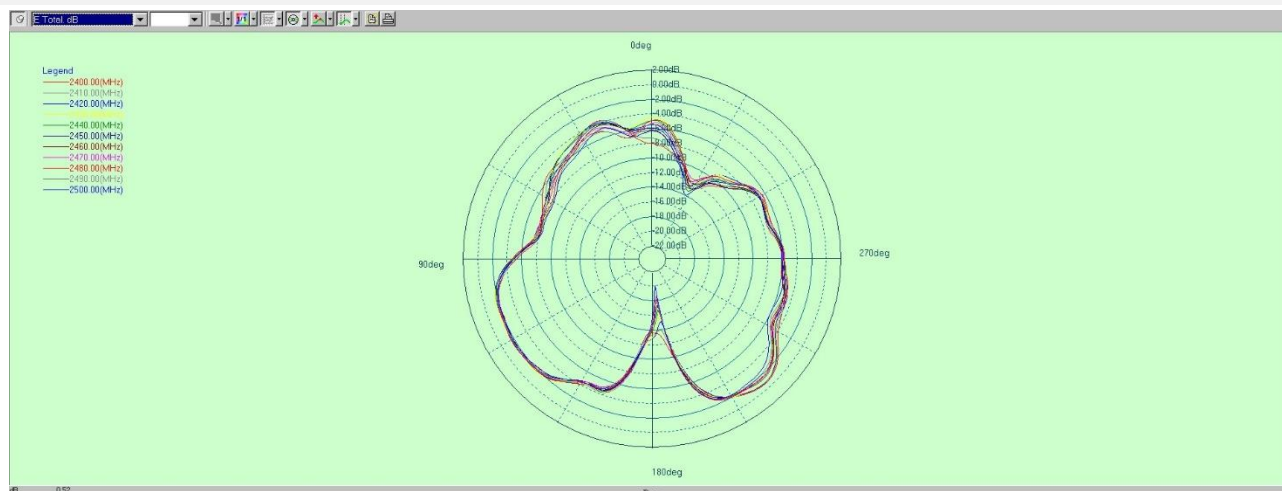


B1.3 3D Pattern for 2500MHz

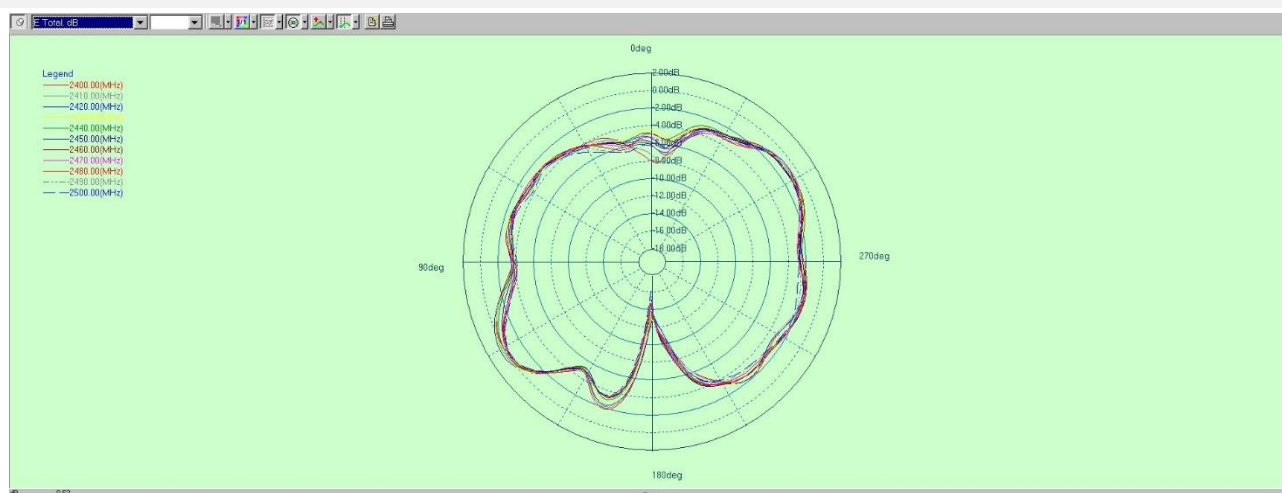


## B.2 1D Radiation Pattern

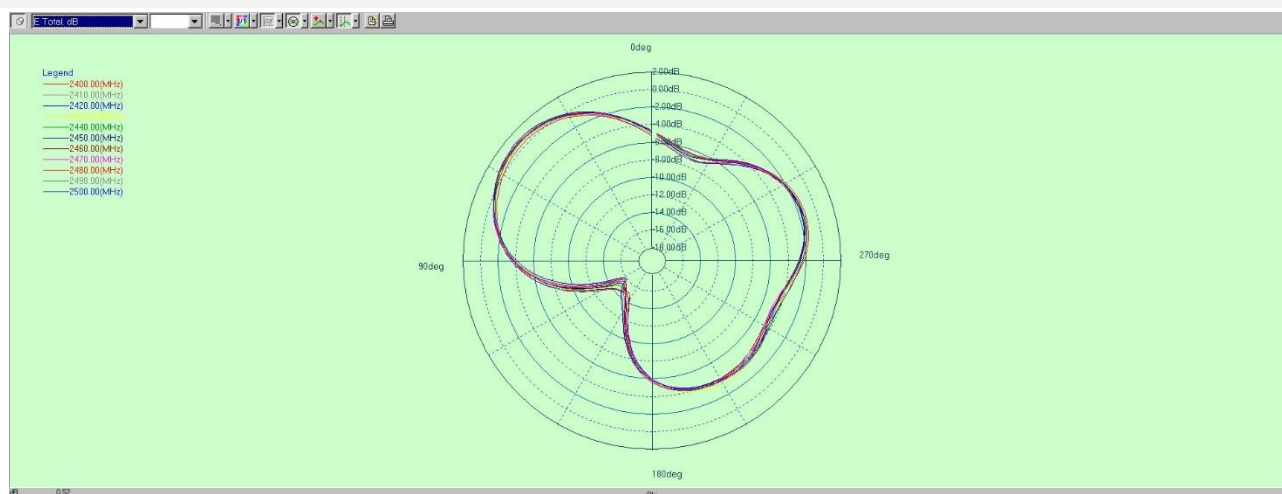
### B2.1 PHI=0



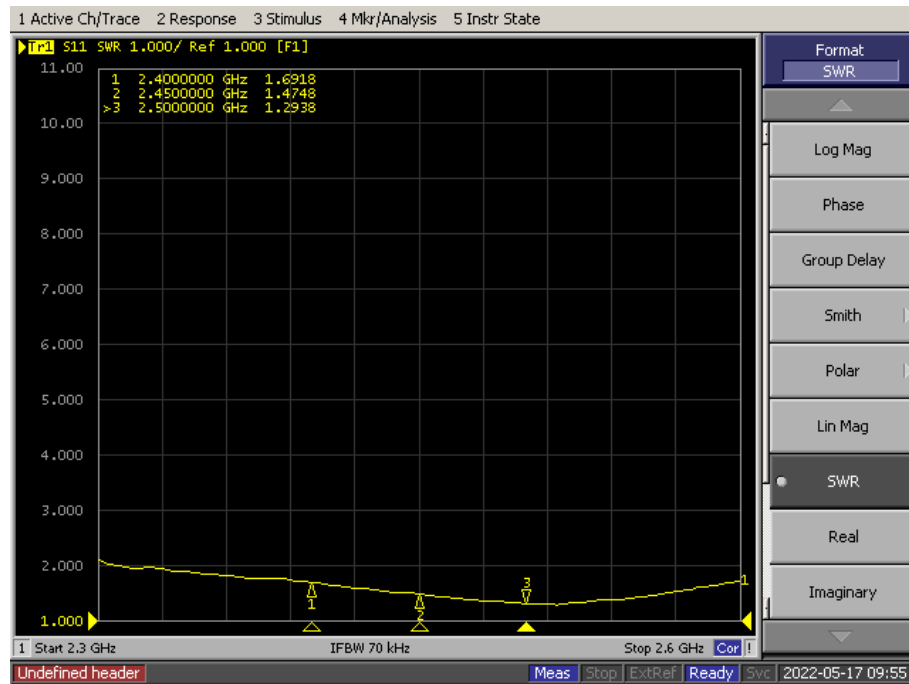
### B2.2 PHI=90



### B2.3 THETA=90



## B2.4 VSWR



## **ANNEX C TEST SETUP PHOTOS**

Please refer the document “BL-SZ22C0688-AO.PDF”.

## **ANNEX D EUT PHOTO**

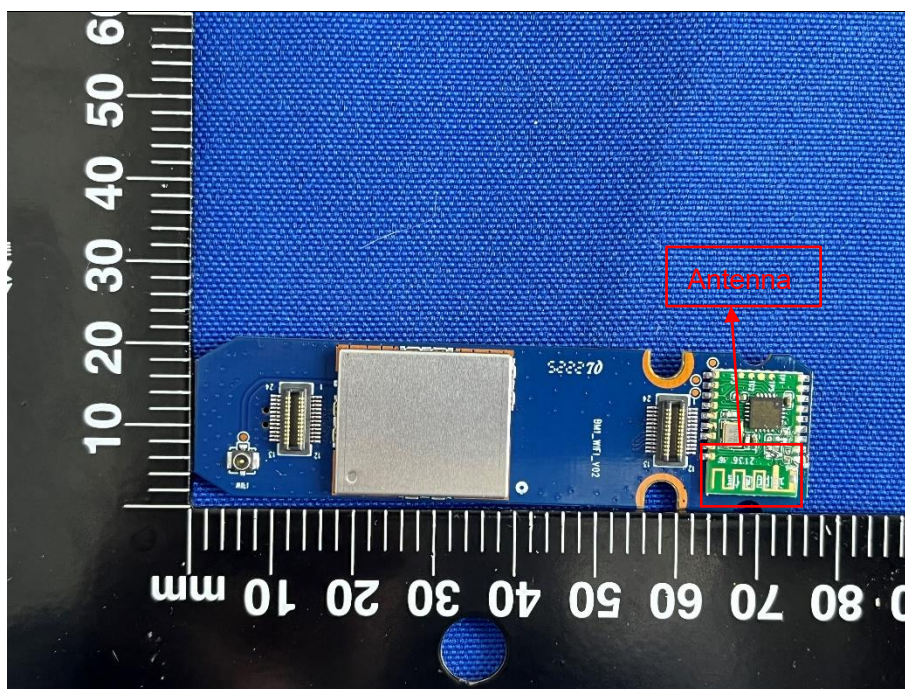
Please refer the document “BL-SZ22C0688-AA.PDF”.

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

--END OF REPORT--

## EUT PHOTO



## TEST SETUP PHOTOS

