

## 承 认 书

### SPECIFICATION APPROVAL SHEET

客 户 :

CUSTOMER

客 户 料 号 :

CUS PART NO

版次:

REV

X1

品 名 / 规格 :

2.4~2.5/5.15~5.85GHz

SPECIFICATION

WIFI-1 Antenna L=180mm(Ø1.13+MHF)

单重:

weight

供 方 料 号 :

SUP PART NO

SLEingB242490180

日 期 :

DATE

2023.08.22

厂 商 核 准 :

SUP APPROVED

| 核准<br>APPROVED | 结构审核<br>Structure audit | RF审核<br>RF CHECKED | 品保审核<br>QA CHECKED | 承办<br>DESIGNED |
|----------------|-------------------------|--------------------|--------------------|----------------|
| <i>JonAm</i>   | <i>H2U</i>              | <i>JDM</i>         | <i>LSK</i>         | <i>Xiang</i>   |

客 户 核 准 :

CUS APPROVED

| 核准<br>APPROVED | 审核<br>CHECKED | 品保审核<br>QA CHECKED | 承办<br>DESIGNED |
|----------------|---------------|--------------------|----------------|
|                |               |                    |                |

**东莞市森岭智能科技有限公司**

DONGGUAN CITY SLEing INTEL-TECH CO., LTD

中国广东省东莞市松山湖工业东路24号现代企业加速器6栋402

Room 402, No. 6 Plant, Accelerator of Modern Enterprise, No. 24 Industry  
East Road Songshanlake District, Dongguan City, Guangdong

Tel: +86-076989208968

Fax: +86-0769-89208969

[www.sleing.com](http://www.sleing.com)

正本由承办单位保存



东莞市森岭智能科技有限公司

DONGGUAN SLEing INTEL-TECH CO.,LTD

变更记录

MODIFICATION RECORD SHEET

| 版本<br>(REV.) | 更改日期<br>(Modification<br>date) | 更改内容描述 (Summary of<br>modification content) | 拟制 (Signature) | 批准 (Approval) |
|--------------|--------------------------------|---------------------------------------------|----------------|---------------|
| X1           | 2023.08.22                     | 初版发行 (First Issue)                          | 胡赵海 (Jerry)    | 朱正锐 (Jongrei) |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |
|              |                                |                                             |                |               |



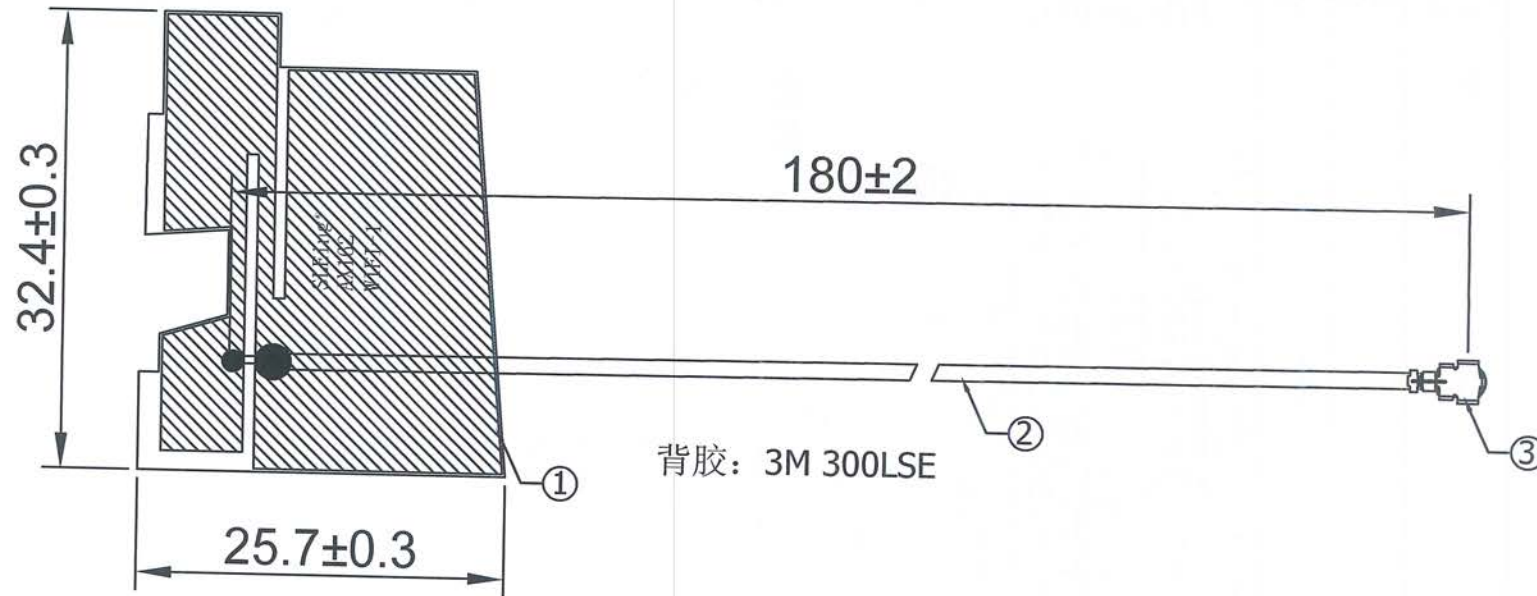
## 承认书项目表 (Spec Item )

| 序号<br>(NO.) | 项目 (Project)                     | 备注 (Remark) | 页码<br>(Page) |
|-------------|----------------------------------|-------------|--------------|
| 1           | 承认书封面 (Spec Cover)               |             | 1            |
| 2           | 变更记录 (MODIFICATION RECORD SHEET) |             | 2            |
| 3           | 承认书项目表 (Spec Item )              |             | 3            |
| 4           | 工程成品图 (Drawing)                  |             | 4            |
| 5           | 电性测试报告 (Test Reports )           |             | 5            |
| 6           | 天线组装图 (Antenna assembly diagram) |             | 6            |
| 7           | S参数测试 (S Parameter Test)         |             | 7            |
| 8           | 测试设备 (Test Setup)                |             | 8            |
| 9           | 测试效率 (Test Efficiency)           |             | 9            |
| 10          | OTA                              |             | 10           |
|             |                                  |             |              |
|             |                                  |             |              |
|             |                                  |             |              |
|             |                                  |             |              |

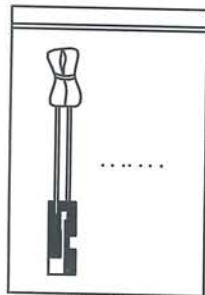
Give clear indication of:

1. The contents of the acknowledgement shall be arranged in order according to the items in the check sheet.
2. The number of copies of the acceptance letter shall be printed according to the customer's requirements, and the SGS report shall be stamped with the engineering seal.
3. All materials shall be confirmed by the customer. Any material/process/changes that may affect product quality and environmental quality must be re-sent to the customer for confirmation before import.
4. SGS report is valid for one year.
5. According to the contents attached to the actual acknowledgement, check the check form: "Yes" is provided, "no" is provided according to customer requirements.

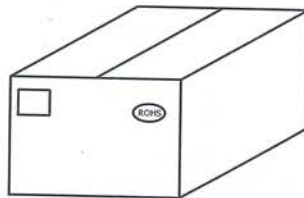
| REV. | CONTENT      | DATE       |
|------|--------------|------------|
| X1   | First Sample | 2023.08.22 |
|      |              |            |



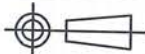
Specification:  
Frequency Rang:2.4~2.5/5.15~5.85GHz(带机测试)  
Return Loss:-10dB or less  
VSWR:1.92 Max



50pcs/Bundle  
Packing:100pcs/bag



外箱须贴ROHS标签与物料标签各1PCS

|                                                                                                                               |  |            |           |                 |          |
|-------------------------------------------------------------------------------------------------------------------------------|--|------------|-----------|-----------------|----------|
| SLEing® 森岭                                                                                                                    |  |            |           | CUSTOMER        |          |
| 东莞市森岭智能科技有限公司<br>DONGGUAN SLEing INTEL-TECH CO.,LTD                                                                           |  |            |           | PART NO         |          |
|                                                                                                                               |  |            |           | TITLE           |          |
|  TOLERANCE UNLESS<br>OTHERWISE SPECIFIED |  |            |           | S.L P/NO        |          |
|                                                                                                                               |  |            |           | WIFI-1 ANTENNA  |          |
| UNIT:mm                                                                                                                       |  | ANGLES ±0° | X. ±0.3   | SIZE            | DRAWN    |
| SHEET: 1/1                                                                                                                    |  | 0.XX ±0.05 | XX. ±0.5  | A4              | CHECKED  |
| SCALE: 1/1                                                                                                                    |  |            | XXX. ±2.0 |                 | APPROVED |
| 4                                                                                                                             |  | 3          |           | 2023.08.22      |          |
|                                                                                                                               |  |            |           | Xiang H 24 Joly |          |

| NO | PART NAME | DESCRIPTION                        | REMARK          | Q'TY |
|----|-----------|------------------------------------|-----------------|------|
| 3  | Connector | MHF Plug for Φ1.13 Cable           | 第一代端子           | 1    |
| 2  | Cable     | Φ1.13mm Coaxial Cable Black,50Ω    |                 | 1    |
| 1  | FPCB      | FPC,L32.4*W25.7*T0.1mm,Color:Black | 300LSE Adhesive | 1    |

| TOLERANCE UNLESS OTHERWISE SPECIFIED | UNIT:mm | SHEET: 1/1 | SCALE: 1/1 |
|--------------------------------------|---------|------------|------------|
| ANGLES ±0.5°                         | X. ±0.3 | 0.XX ±0.05 | XX. ±0.5   |
| XXX. ±2.0                            |         |            |            |



东莞市森岭智能科技有限公司

DONGGUAN SLEing INTEL-TECH CO.,LTD

## 电性测试报告

## Test Reports

| Electrical Properties |                             |
|-----------------------|-----------------------------|
| Frequency             | 2.4~2.5/5.15~5.85GHz( 带机测试) |
| Impedance             | 50 Ohm Nominal              |
| V.S.W.R               | $\leq 1.92$                 |
| Return Loss           | -10 dB Max                  |
| Radiation             | Omni-directional            |
| Gain (Peak)           | 2 $\pm$ 0.5 dBi             |
| Polarization          | Linear, Vertical            |
| Admitted Power        | 2 W                         |
| Connector             | MHF                         |
| Physical Properties   |                             |
| Antenna Material      | FPCB                        |
| Cable Type            | $\Phi$ 1.13mm Black         |
| Operating Temp.       | -40~+85 °C                  |
| Storage Temp.         | -5~+30 °C                   |
|                       |                             |



# 天线组装图

## Antenna Profile

### Device

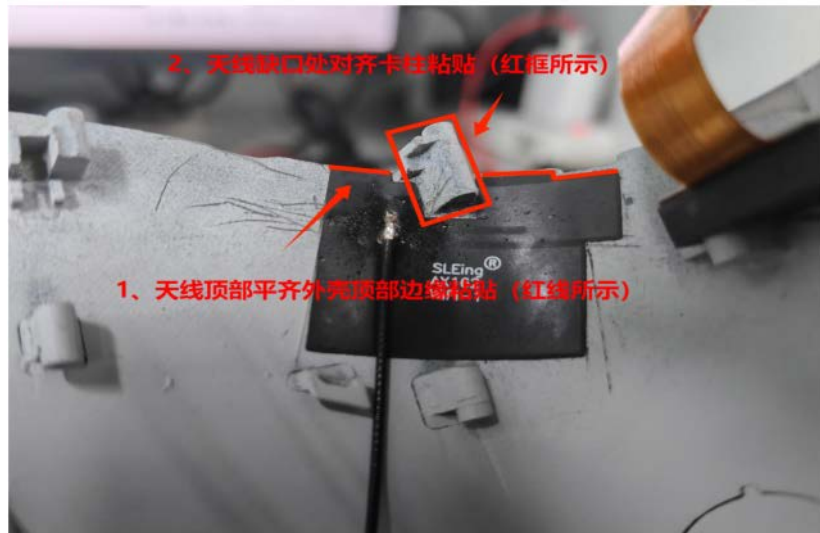
如图所示，放入主板，将天线端子扣在端口（黄色框所标）上，然后将天线端子打胶固定以防止天线端子脱落。

图中:红线为 WIFI-1 天线走线，天线线长 180mm，直径 1.13mm，1 代端子（黑色同轴线）  
蓝线为 WIFI-2 天线走线，天线线长 85mm，直径 1.13mm，1 代端子（灰色同轴线）。



### Antenna

2. WIFI-1 天线粘贴方式如下图所示，注意天线粘贴过程中不能有偏移、起翘、鼓包和破损；



# S 参数测试

## S Parameter Test

Agilent E5071C Network Analyzer



WiFi 驻波 Antenna (NO.1)



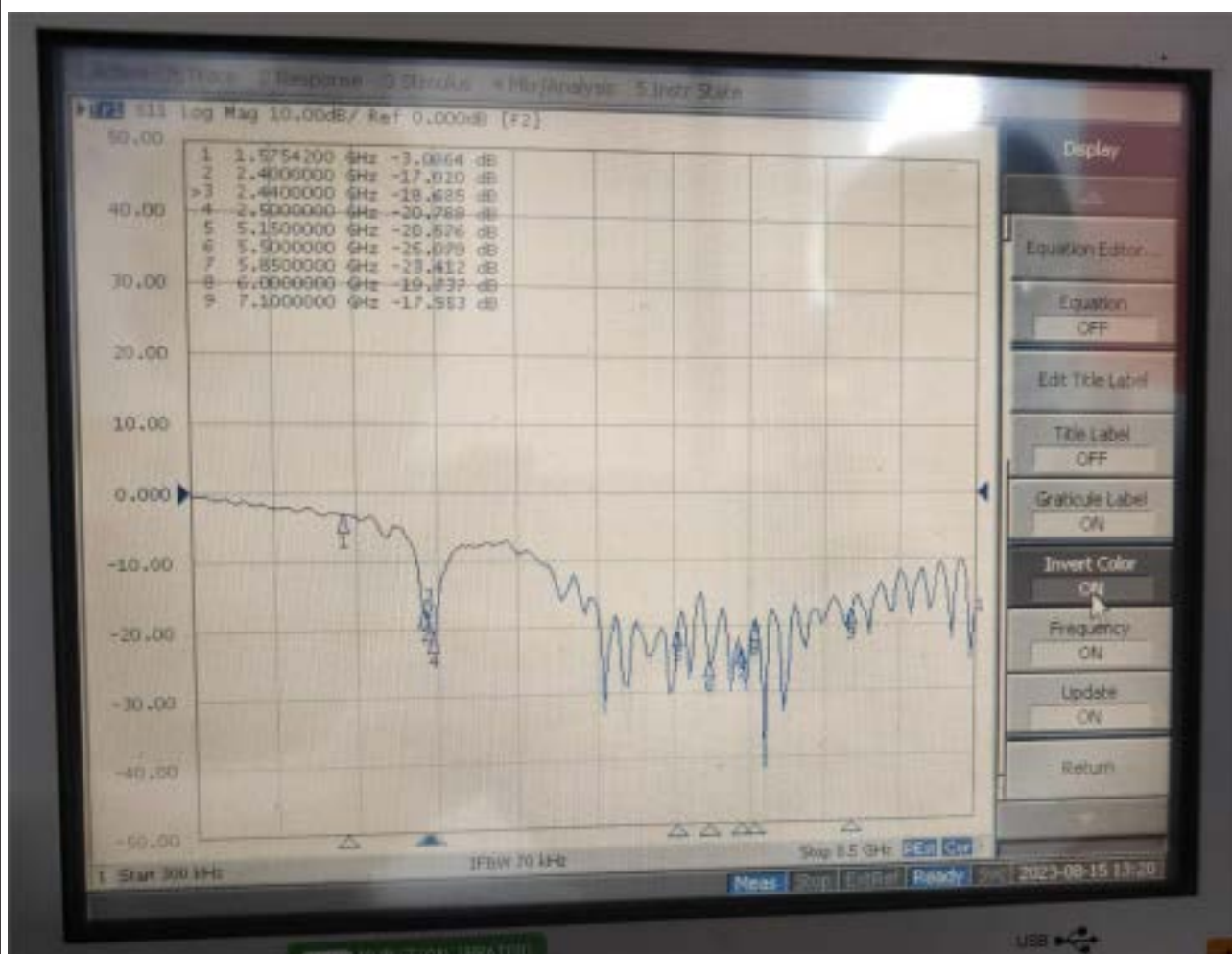
# S 参数测试

## S Parameter Test

Agilent E5071C Network Analyzer

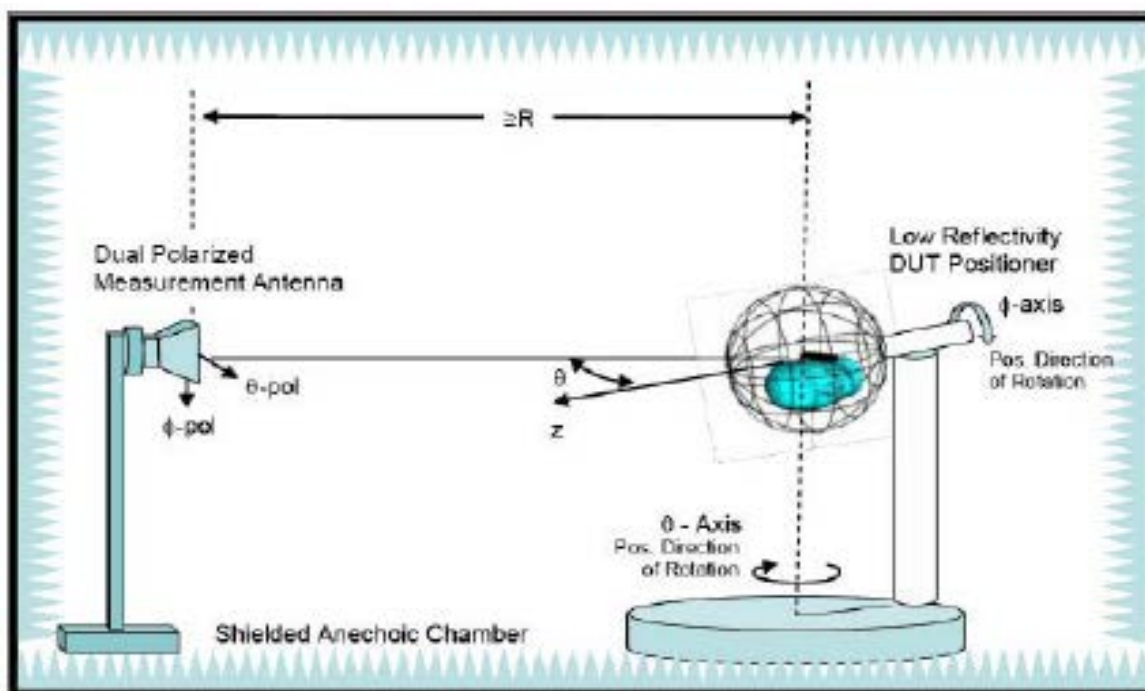
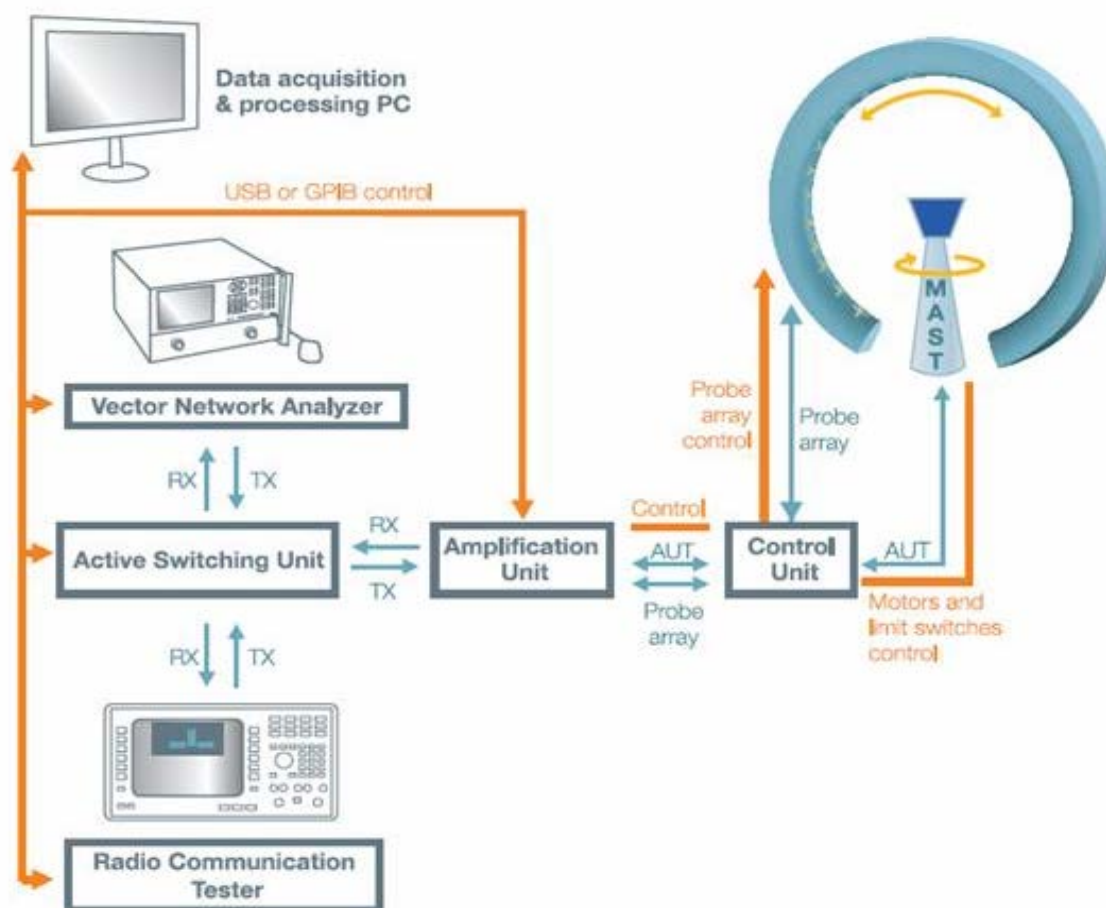


WiFi 回波损耗 Antenna (NO.1)





## 测试设备 Test Setup

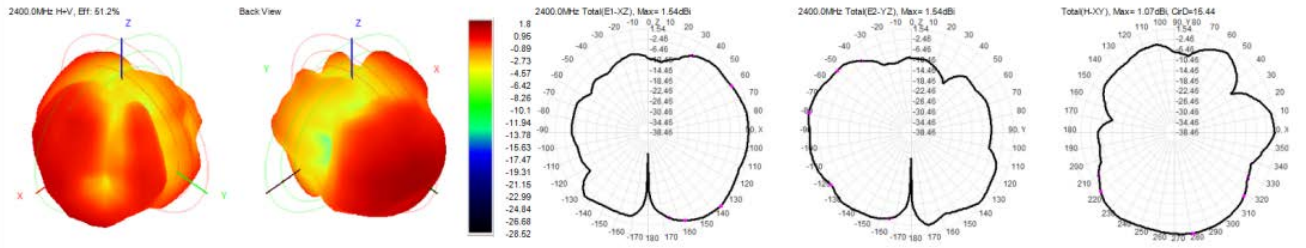


## 测试效率

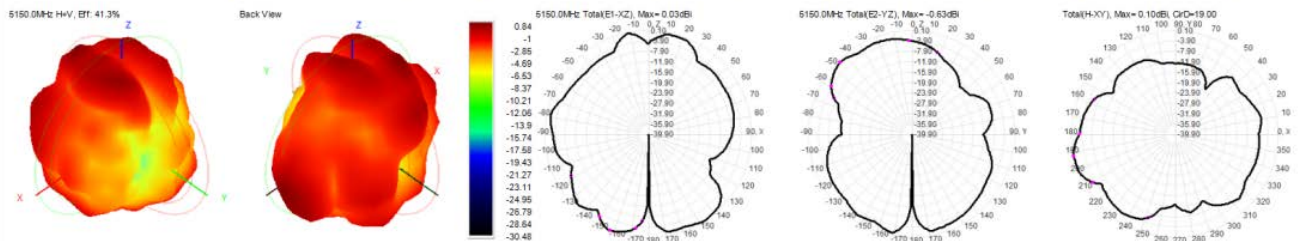
## Test Efficiency

## AX162 WIFI-1天线无源效率测试报告

|           |                 |        |        |        |        |        |        |        |        |        |        |        |
|-----------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 2.4G WiFi | Frequency ID    | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     |
|           | Frequency (MHz) | 2400.0 | 2410.0 | 2420.0 | 2430.0 | 2440.0 | 2450.0 | 2460.0 | 2470.0 | 2480.0 | 2490.0 | 2500.0 |
|           | Gain (dBi)      | 1.80   | 1.93   | 1.72   | 1.44   | 1.29   | 1.31   | 1.28   | 1.34   | 1.17   | 1.09   | 1.06   |
|           | Efficiency (%)  | 51.21  | 51.08  | 50.71  | 50.53  | 49.81  | 49.48  | 50.44  | 50.41  | 49.09  | 49.19  | 48.49  |



|         |                 |        |        |        |        |        |        |        |        |        |        |        |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5G WiFi | Frequency ID    | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     |
|         | Frequency (MHz) | 5150.0 | 5200.0 | 5250.0 | 5300.0 | 5350.0 | 5400.0 | 5450.0 | 5500.0 | 5550.0 | 5600.0 | 5650.0 |
|         | Gain (dBi)      | 0.84   | 0.85   | 1.40   | 1.38   | 1.42   | 1.58   | 1.77   | 1.93   | 1.52   | 1.77   | 1.31   |
|         | Efficiency (%)  | 41.27  | 41.54  | 39.66  | 37.88  | 37.73  | 38.20  | 38.05  | 37.63  | 37.13  | 36.41  | 37.24  |
|         | Frequency ID    | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     |
|         | Frequency (MHz) | 5700.0 | 5750.0 | 5800.0 | 5850.0 | 5900.0 |        |        |        |        |        |        |
|         | Gain (dBi)      | 1.50   | 1.30   | 1.04   | 1.63   | 1.63   |        |        |        |        |        |        |
|         | Efficiency (%)  | 37.77  | 37.11  | 37.26  | 37.16  | 37.56  |        |        |        |        |        |        |
|         | Frequency ID    | 23     | 24     | 25     | 26     | 27     | 28     | 29     | 30     | 31     | 32     | 33     |
|         | Frequency (MHz) | 5950.0 | 6000.0 | 6050.0 | 6100.0 | 6150.0 | 6200.0 | 6250.0 | 6300.0 | 6350.0 | 6400.0 | 6450.0 |





## OTA

| Operating Band | Bandwidth  | Free Space Requirements |       | Channal | Testing Results |              | Gap |              |
|----------------|------------|-------------------------|-------|---------|-----------------|--------------|-----|--------------|
|                |            | TRP                     | TIS   |         | TRP             | TIS (LCD ON) | TRP | TIS (LCD ON) |
| WIFI 2.4G      | 11b 11Mbps | 12                      | -80   | 1       | 12.4            | -83.6        | 0.4 | 3.6          |
|                |            | 12                      | -80   | 7       | 12.6            | -82.1        | 0.6 | 2.1          |
|                |            | 12                      | -80   | 11      | 12.1            | -83.1        | 0.1 | 3.1          |
|                |            | 12.0                    | -80.0 | Avg     | 12.4            | -82.9        | 0.4 | 2.9          |
| WIFI 5G        | 11a 6Mbps  | 11                      | -86   | 36      | 13.4            | -87.5        | 2.4 | 1.5          |
|                |            | 11                      | -86   | 100     | 13.7            | -88.3        | 2.7 | 2.3          |
|                |            | 11                      | -86   | 157     | 13.1            | -89.0        | 2.1 | 3.0          |
|                |            | 11.0                    | -86.0 | Avg     | 13.4            | -88.2        | 2.4 | 2.2          |