

## 承 认 书

### SPECIFICATION APPROVAL SHEET

客 户 :

CUSTOMER

客 户 料 号 :

CUS PART NO

版次:

REV X1

品 名 / 规格 : RF Antenna(White)2.4~2.5/5.15~5.85GHz

SPECIFICATION 5dBi L=300mm(Ø1.13白色+MHF)

单重:

weight 15.5g

供 方 料 号 : 刀形,白色,PCB+弹簧,(杆套+固定座)

SUP PART NO SLEingA200140300-C06

日 期 :

DATE

2020.01.08

厂 商 核 准 :

SUP APPROVED

| 核准<br>APPROVED | 审核<br>CHECKED | 品保审核<br>QA CHECKED | 承办<br>DESIGNED          |
|----------------|---------------|--------------------|-------------------------|
| Jerry per      | Jbx           | ZQ                 | Xiang 2020.01.08<br>工程部 |

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, Donguan City, Guangdong Province, China.

Tel: +86-0769-89208968

Fax: +86-0769-89208969

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

正本由承办单位保存



DONGGUAN CITY SLEing INTEL-TECH CO.,LTD

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东莞市松山湖工业东路现代企业加速器6栋402  
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www.sleing.com

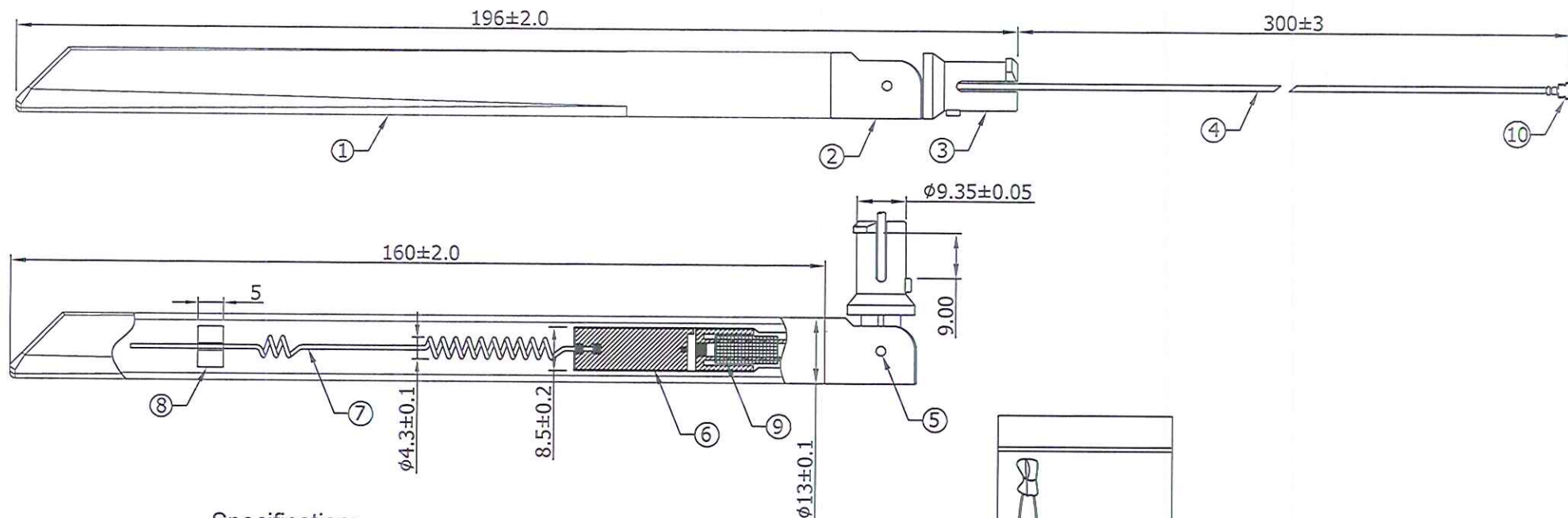
承认书项目表

| 序号 | 项目                                 | 附件资料                     |                          | 备注                                   |
|----|------------------------------------|--------------------------|--------------------------|--------------------------------------|
|    |                                    | 有                        | 无                        |                                      |
| 1  | 承认书封面 (Spec Cover)                 | <input type="checkbox"/> | <input type="checkbox"/> | 1. 封面需注明产品料号、品名规格<br>2. 经主管核准后加盖公司印章 |
|    | 客户满意度 (Customer satisfaction)      | <input type="checkbox"/> | <input type="checkbox"/> | 请客户对我司给予真诚的评价                        |
| 2  | 承认书项目表 (Spec Item )                | <input type="checkbox"/> | <input type="checkbox"/> |                                      |
| 3  | 工程成品图 (Drawing)                    | <input type="checkbox"/> | <input type="checkbox"/> |                                      |
| 4  | 电性测试报告 (Test Reports )             | <input type="checkbox"/> | <input type="checkbox"/> |                                      |
| 5  | S参数测试 (S Parameter)                | <input type="checkbox"/> | <input type="checkbox"/> | 与产品一致                                |
| 6  | 方向图(Patten)/测试效率 (Test Efficiency) | <input type="checkbox"/> | <input type="checkbox"/> | 与产品一致                                |
| 7  | SGS报告 (SGS Report)                 | <input type="checkbox"/> | <input type="checkbox"/> | 1. 需依产品材质类别及颜色分别提供<br>2. 报告有效期为一年    |
| 8  | 其它                                 | <input type="checkbox"/> | <input type="checkbox"/> | 依贵司具体要求另行说明                          |
| 9  |                                    | <input type="checkbox"/> | <input type="checkbox"/> |                                      |
| 10 |                                    | <input type="checkbox"/> | <input type="checkbox"/> |                                      |
| 11 |                                    | <input type="checkbox"/> | <input type="checkbox"/> |                                      |

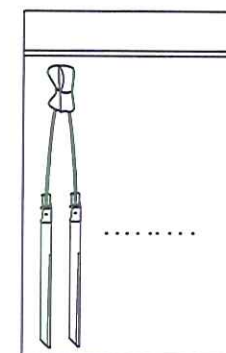
说明:

1. 承认书内容需依查核表项目依顺序排列。
2. 承认书依客户要求打印份数, SGS报告需加盖工程章.
3. 所有材料一律经过客户确认后, 任何材料/制程/可能影响产品品质及环境品质的变更, 都必需重新送样给客户确认后方可导入。
4. SGS报告有效期为一年。
5. 依实际承认书所附件内容在查核表中勾选: “有” 为已提供, “无” 根据客户要求提供。

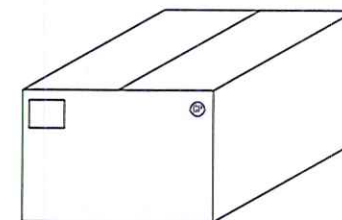
| REV. | CONTENT      | DATE       |
|------|--------------|------------|
| X1   | First Sample | 2020.01.08 |



Specification:  
Frequency Rang:2.4~2.5/5.15~5.85GHz  
Return Loss:-10dB or less  
VSWR:1.92 Max  
Gain:5.0±0.5 dBi



25pcs/Bundle  
Packing:50pcs/bag



外箱须贴GP标签与物料标签各1PCS

|    |             |                                                |        |      |
|----|-------------|------------------------------------------------|--------|------|
| 10 | Connector   | MHF Plug for $\Phi 1.13$ Cable                 |        | 1    |
| 9  | Foma        | L10*W5*H2.0mm,Black                            |        | 1    |
| 8  | Foma        | L9.0*W8.0*T5.0mm,Black                         |        | 1    |
| 7  | Helix       | L92.3* $\Phi 4.3$ mm,Brass                     |        | 1    |
| 6  | PCB         | FR4,L47.7W8.5T0.4mm,Black                      |        | 1    |
| 5  | Rivet       | POM,Color:White                                |        | 2    |
| 4  | Cable       | $\Phi 1.13$ mm Coaxial Cable White,50 $\Omega$ |        | 1    |
| 3  | Bottom Base | PC,Color:White                                 |        | 1    |
| 2  | Upper Base  | PC,Color:White                                 |        | 1    |
| 1  | Antenna Cap | TPEE,Color:White                               |        | 1    |
| NO | PART NAME   | DESCRIPTION                                    | REMARK | Q'TY |

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DONGGUAN SLEing INTEL-TECH CO.,LTD



TOLERANCE UNLESS  
OTHERWISE SPECIFIED

UNIT:mm

SHEET: 1/1

SCALE: 1/1

ANGLES  $\pm 0.5^\circ$

XX  $\pm 0.05$

XXX.  $\pm 2.0$

|          |       |                           |          |
|----------|-------|---------------------------|----------|
| CUSTOMER |       |                           |          |
| PART NO  |       |                           |          |
| TITLE    |       | RF ANTENNA CABLE ASSEMBLY |          |
| S.L P/NO |       | SLEingA200140300-C06      |          |
| SIZE     | DRAWN | CHECKED                   | APPROVED |
| A4       | Xi    | 2020.01.08                | Touy     |

# 电性测试报告

## Test Reports

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

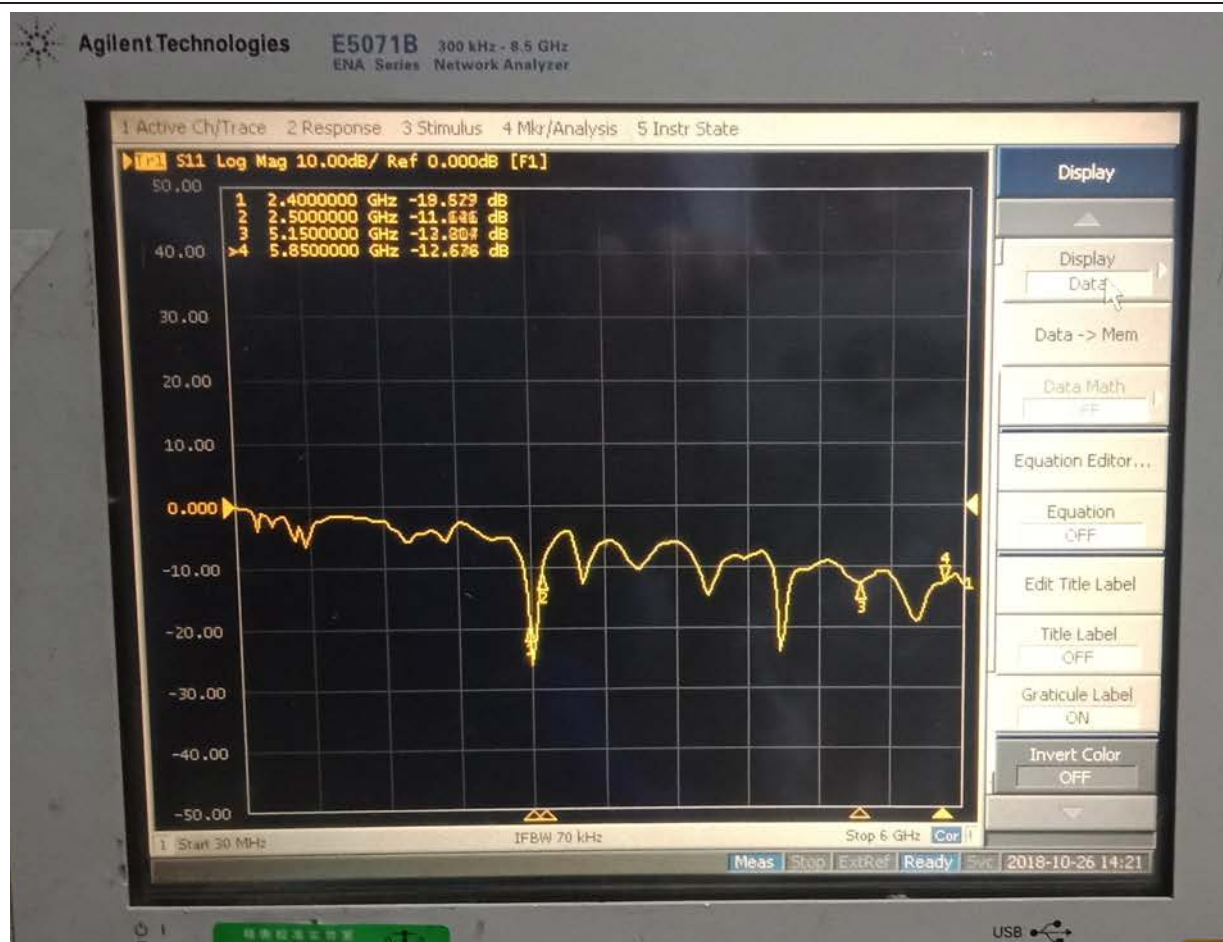
# S 参数测试

## S Parameter Test

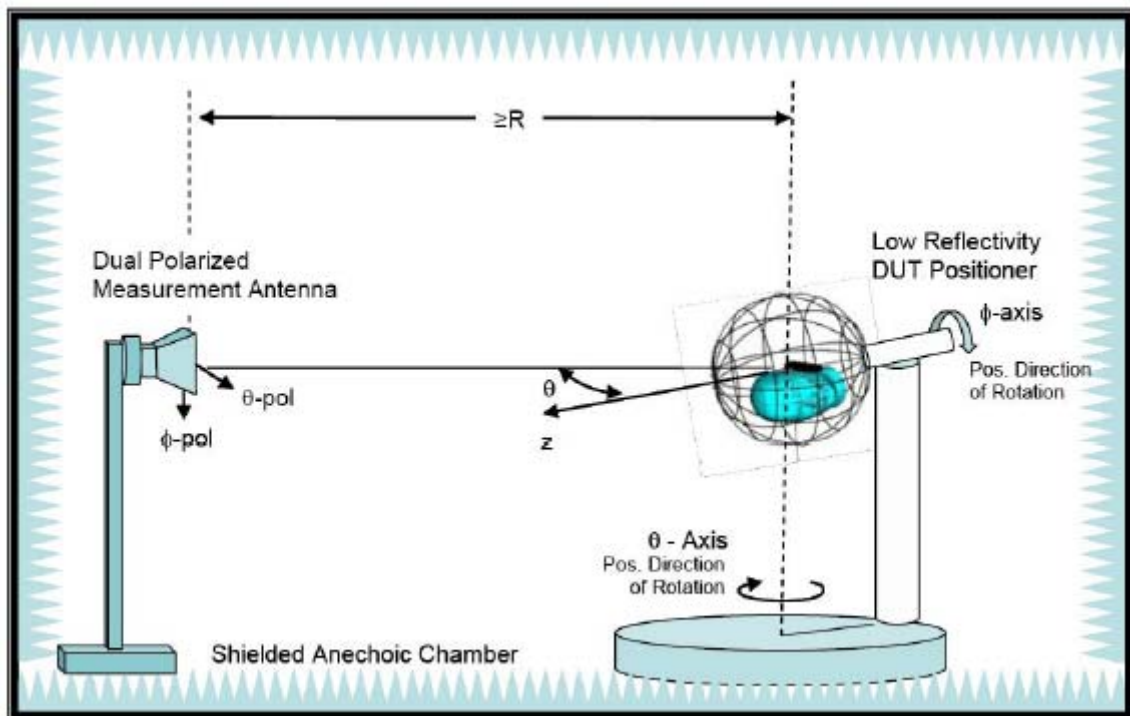
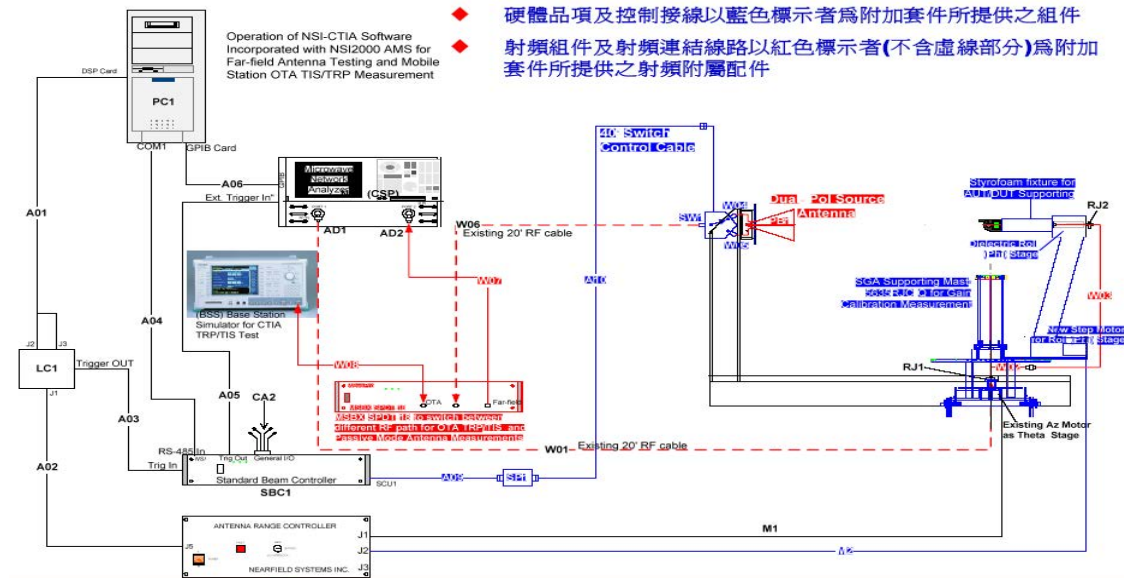
Agilent E5071C Network Analyzer



RF Antenna (NO. 1)



## 1.2 Test Setup

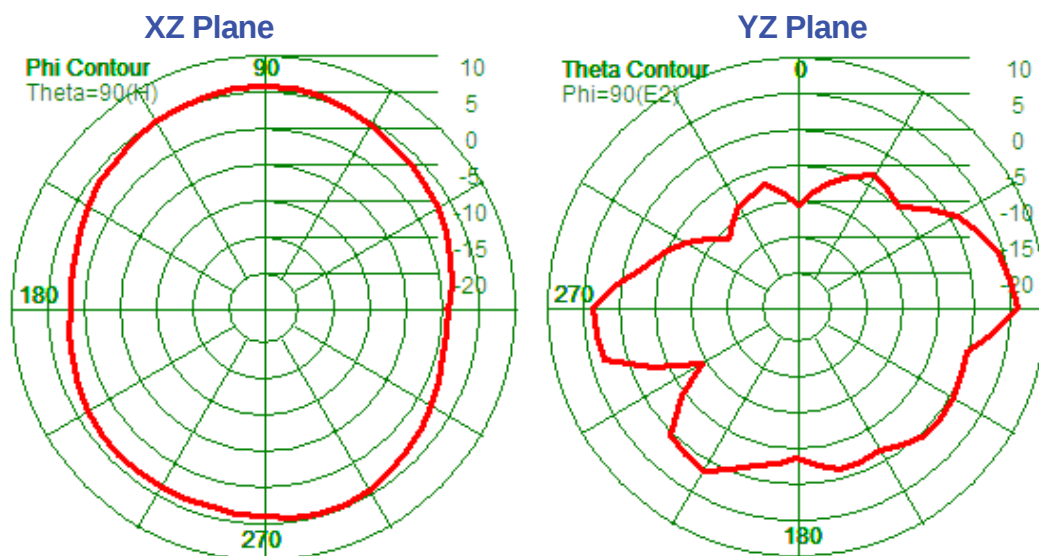


Configuration of 3D Chamber

## 方向图

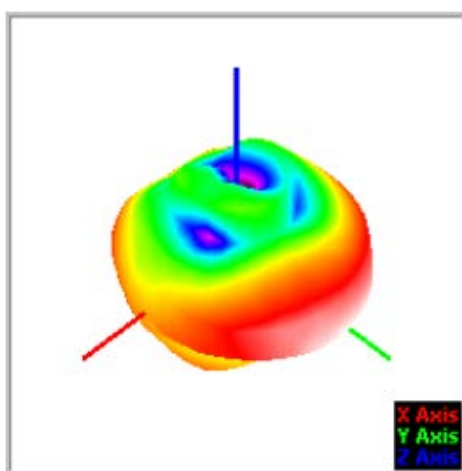
### 2.4G Patten

#### 1.3 2D Radiation patterns test results (Passive Antenna)



#### 1.5 3D Radiation patterns test results (Passive Antenna)

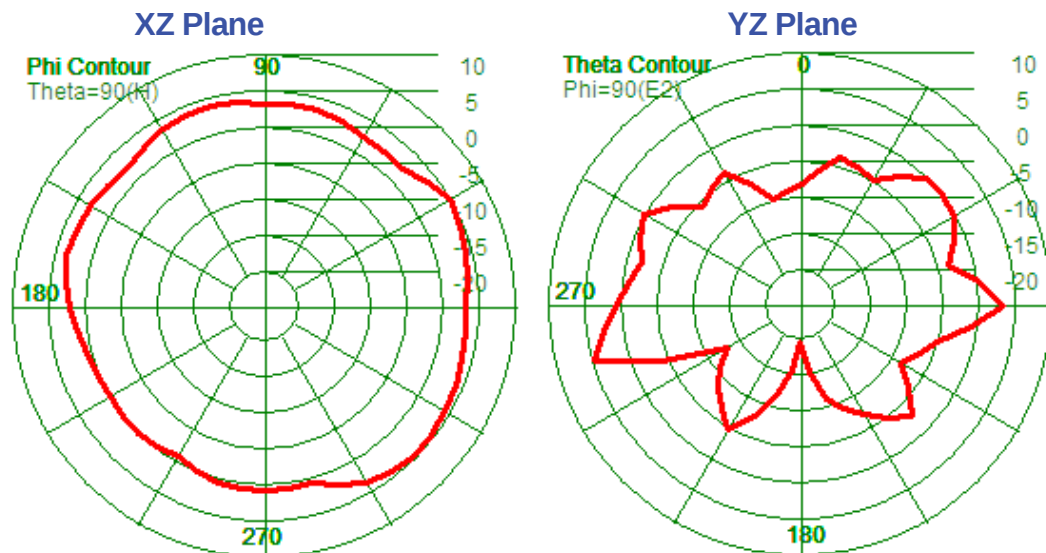
##### 3D



## 方向图

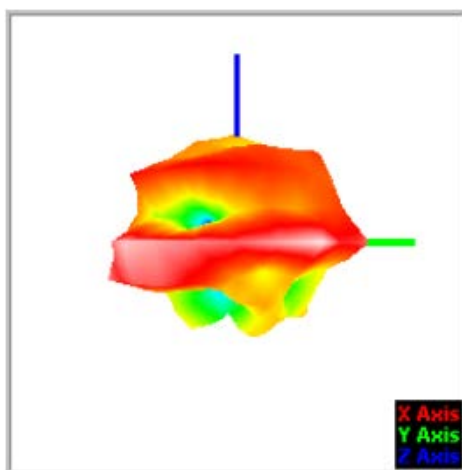
### 5.8G Patten

#### 1.3 2D Radiation patterns test results (Passive Antenna)



#### 1.5 3D Radiation patterns test results (Passive Antenna)

##### 3D



## 测试效率

## Test Efficiency

## 2. 4G

| Test Point ID | Freq. (MHz) | TRP (dBm) | Gain (dBi) | Directivity (dBi) | Efficiency (%) | Efficiency (dB) | Max (dBm) | Theta of Max | Phi of Max | Min (dBm) | Theta of Min | Phi of Min | AVG (dBm) | Max/Min (dB) | Max/AVG (dB) | Min/AVG (dB) |
|---------------|-------------|-----------|------------|-------------------|----------------|-----------------|-----------|--------------|------------|-----------|--------------|------------|-----------|--------------|--------------|--------------|
| 1             | 2400.0      | 2400.00   | 5.81       | 6.04              | 94.9%          | -0.23           | 5.81      | 90           | 90         | -12.24    | 0            | 0          | -0.54     | 18.05        | 6.36         | -11.70       |
| 2             | 2410.0      | 2410.00   | 5.72       | 5.98              | 94.3%          | -0.26           | 5.72      | 90           | 90         | -11.86    | 0            | 0          | -0.68     | 17.58        | 6.40         | -11.18       |
| 3             | 2420.0      | 2420.00   | 5.45       | 5.99              | 88.2%          | -0.54           | 5.45      | 90           | 90         | -11.57    | 0            | 0          | -0.97     | 17.02        | 6.42         | -10.60       |
| 4             | 2430.0      | 2430.00   | 5.21       | 6.04              | 82.6%          | -0.83           | 5.21      | 90           | 90         | -11.28    | 0            | 0          | -1.19     | 16.49        | 6.41         | -10.09       |
| 5             | 2440.0      | 2440.00   | 5.24       | 5.97              | 84.6%          | -0.73           | 5.24      | 90           | 90         | -10.91    | 0            | 0          | -1.18     | 16.15        | 6.42         | -9.73        |
| 6             | 2450.0      | 2450.00   | 4.81       | 5.95              | 76.8%          | -1.14           | 4.81      | 90           | 75         | -11.29    | 0            | 120        | -1.67     | 16.10        | 6.48         | -9.62        |
| 7             | 2460.0      | 2460.00   | 4.87       | 5.88              | 79.2%          | -1.01           | 4.87      | 90           | 75         | -11.24    | 0            | 0          | -1.71     | 16.11        | 6.57         | -9.54        |
| 8             | 2470.0      | 2470.00   | 4.62       | 5.91              | 74.4%          | -1.29           | 4.62      | 90           | 75         | -11.52    | 0            | 0          | -2.00     | 16.15        | 6.62         | -9.53        |
| 9             | 2480.0      | 2480.00   | 4.93       | 5.84              | 81.0%          | -0.91           | 4.93      | 90           | 75         | -11.69    | 135          | 135        | -1.66     | 16.62        | 6.59         | -10.03       |
| 10            | 2490.0      | 2490.00   | 4.64       | 5.84              | 75.9%          | -1.20           | 4.64      | 90           | 75         | -12.41    | 135          | 135        | -1.93     | 17.05        | 6.57         | -10.48       |
| 11            | 2500.0      | 2500.00   | 4.46       | 5.79              | 73.6%          | -1.33           | 4.46      | 90           | 75         | -12.39    | 135          | 135        | -2.06     | 16.85        | 6.52         | -10.33       |
| 12            | --          | --        | --         | --                | --             | --              | --        | --           | --         | --        | --           | --         | --        | --           | --           | --           |

## 5. 8G

| Test Point ID | Freq. (MHz) | TRP (dBm) | Gain (dBi) | Directivity (dBi) | Efficiency (%) | Efficiency (dB) | Max (dBm) | Theta of Max | Phi of Max | Min (dBm) | Theta of Min | Phi of Min | AVG (dBm) | Max/Min (dB) | Max/AVG (dB) | Min/AVG (dB) |
|---------------|-------------|-----------|------------|-------------------|----------------|-----------------|-----------|--------------|------------|-----------|--------------|------------|-----------|--------------|--------------|--------------|
| 1             | 5150.0      | 5150.00   | 5.14       | 6.02              | 81.5%          | -0.89           | 5.14      | 105          | 225        | -22.33    | 180          | 60         | -2.33     | 27.47        | 7.47         | -20.00       |
| 2             | 5250.0      | 5250.00   | 4.22       | 5.65              | 72.1%          | -1.42           | 4.22      | 90           | 315        | -26.52    | 180          | 45         | -3.16     | 30.74        | 7.38         | -23.36       |
| 3             | 5350.0      | 5350.00   | 4.87       | 6.28              | 72.2%          | -1.41           | 4.87      | 90           | 315        | -18.59    | 180          | 15         | -2.50     | 23.46        | 7.37         | -16.09       |
| 4             | 5450.0      | 5450.00   | 3.70       | 6.10              | 57.5%          | -2.40           | 3.70      | 90           | 300        | -23.19    | 180          | 0          | -3.55     | 26.89        | 7.25         | -19.64       |
| 5             | 5550.0      | 5550.00   | 3.47       | 5.61              | 61.0%          | -2.15           | 3.47      | 75           | 45         | -17.41    | 120          | 210        | -3.91     | 20.87        | 7.37         | -13.50       |
| 6             | 5650.0      | 5650.00   | 5.40       | 5.95              | 88.1%          | -0.55           | 5.40      | 75           | 45         | -15.00    | 15           | 180        | -2.37     | 20.40        | 7.77         | -12.64       |
| 7             | 5750.0      | 5750.00   | 4.62       | 5.84              | 75.6%          | -1.22           | 4.62      | 90           | 270        | -17.58    | 105          | 180        | -2.69     | 22.21        | 7.32         | -14.89       |
| 8             | 5850.0      | 5850.00   | 4.31       | 5.14              | 82.6%          | -0.83           | 4.31      | 90           | 270        | -16.69    | 135          | 15         | -2.38     | 21.00        | 6.68         | -14.31       |
| 9             | --          | --        | --         | --                | --             | --              | --        | --           | --         | --        | --           | --         | --        | --           | --           | --           |

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TEL: +86 0769 89208968      FAX: +86 0769 89208969  
ADD: 广东省东莞市松山湖工业东路现代企业加速器 6-402

## Reliability Test Report

Product Name : RF ANTENNA ASSEMBLY

SL Part. No:

SLEingA200140300-C06

Date :2020/01/08

Antenna Specification:

a.Frequency :2.4-2.5/5.15~5.85GHz

b.Mark-piont selected at 2.4GHz、2.5GHz、5.15 GHz、5.85GHz

c.Return Loss :< -10 dB

Test Results : ☒ PASS      ☐ NG

| Review By | Prepared By |
|-----------|-------------|
|           | 王星刚         |

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## Test Index :

| No. | Test Item                       | Specification                  | Refer STD              | Sample Q'ty(pcs ) | Result |
|-----|---------------------------------|--------------------------------|------------------------|-------------------|--------|
| 1   | High Temperature Test           | 80℃<br>24 hours                | Follow<br>Customer STD | 3                 | OK     |
| 2   | Low Temperature<br>Storage Test | - 40℃<br>8 hours               | Follow<br>Customer STD | 3                 | OK     |
| 3   | Thermal Shock Test              | - 40~80℃<br>30min<br>10 cycles | JIS C 0025             | 3                 | OK     |

### 1.Test Item : High Temperature Test

1-1 Test equipment : Thermal Shock Test Chamber

1-2 Test ambience : Temperature : 25±5℃

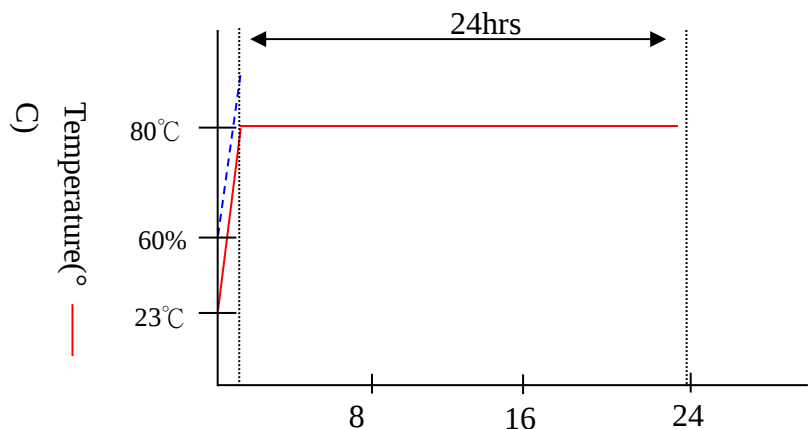
Humidity(R.H) : 30~65%

1-3 Sample quantity : 3 pcs

1-4 Test method : Follow Customer STD

Temperature: 80℃

Total Time: 24 Hrs



1-5 Test result : ☒ PASS      ☐ NG

1-5-1. Visual inspection : ☒ PASS      ☐ NG

1-5-2 Frequency :2.4-2.5/5.15~5.85GHz

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Mark-piont selected at 2.4-2.5/5.15~5.85GHz。

Return Loss :< -10 dB

## 1-5-3. Functional test as below :

| Sample | Before test (unit :dB) |         |          |          | After test (unie:dB) |         |          |          | Result     |
|--------|------------------------|---------|----------|----------|----------------------|---------|----------|----------|------------|
|        | Test frequency         |         |          |          | Test frequency       |         |          |          |            |
|        | 2. 4GHz                | 2. 5GHz | 5. 15GHz | 5. 85GHz | 2. 4GHz              | 2. 5GHz | 5. 15GHz | 5. 85GHz | (RL<-10dB) |
| 01     | -13. 88                | -15. 24 | -14. 32  | -12. 23  | -13. 64              | -12. 88 | -11. 29  | -14. 01  | PASS       |
| 02     | -12. 55                | -12. 34 | -13. 54  | -13. 27  | -13. 38              | -11. 55 | -13. 09  | -19. 22  | PASS       |
| 03     | -13. 96                | -13. 63 | -12. 16  | -13. 92  | -14. 15              | -13. 82 | -11. 88  | -14. 37  | PASS       |
|        |                        |         |          |          |                      |         |          |          |            |
|        |                        |         |          |          |                      |         |          |          |            |

## 1-5-4. Test condition :



High Temperature Test

## 2.Test Item : Low Temperature Storage Test

2-1 Test equipment : Thermal Shock Test Chamber

2-2 Test ambience : Temperature :  $25\pm 5^{\circ}\text{C}$

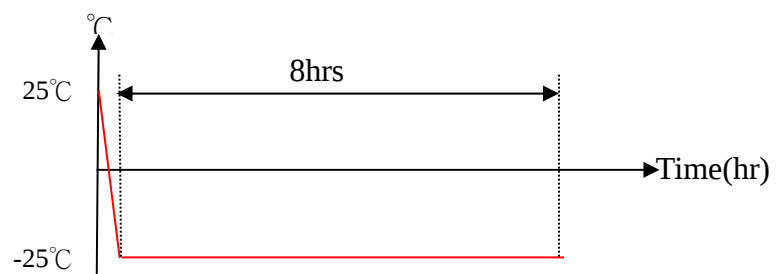
Humidity(R.H) : 30~65%

2-3 Sample quantity : 3 pcs

2-4 Test method : Follow Customer STD

Temperature: -  $25^{\circ}\text{C}$

Total Time: 8 Hrs



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2-5 Test result : ☒ PASS ☐ NG

2-5-1. Visual inspection : ☒ PASS ☐ NG

2-5-2 Frequency :2.4-2.5/5.15~5.85GHz

Mark-piont selected at 2.4GHz、2.5GHz、5.1 5GHz、5.85GHz

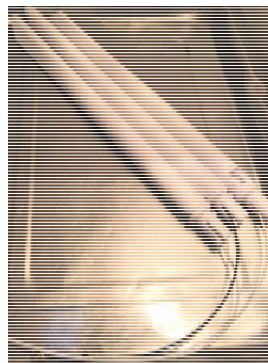
Return Loss :< -10 dB

2-5-3. Functional test as below :

| Sample | Before test (unit :dB) |         |          |          | After test (unie:dB) |         |          |          | Result     |
|--------|------------------------|---------|----------|----------|----------------------|---------|----------|----------|------------|
|        | Test frequency         |         |          |          | Test frequency       |         |          |          |            |
|        | 2. 4GHz                | 2. 5GHz | 5. 15GHz | 5. 85GHz | 2. 4GHz              | 2. 5GHz | 5. 15GHz | 5. 85GHz | (RL<-10dB) |
| 1      | -13. 64                | -12. 88 | -11. 29  | -14. 01  | -13. 87              | -13. 76 | -11. 93  | -14. 28  | PASS       |
| 2      | -13. 38                | -11. 55 | -13. 09  | -19. 22  | -13. 85              | -13. 58 | -12. 35  | -13. 91  | PASS       |
| 3      | -14. 15                | -13. 82 | -11. 88  | -14. 37  | -13. 98              | -12. 54 | -12. 94  | -12. 88  | PASS       |
|        |                        |         |          |          |                      |         |          |          |            |
|        |                        |         |          |          |                      |         |          |          |            |

2-5-4. Test conditio

## Low Temperature Storage Test



## 3.Test Item : Thermal Shock Test

3-1 Test equipment : Thermal Shock Test Chamber

3-2 Test ambience : Temperature : 25±5℃

Humidity(R.H) : 30~65%

[illegible]

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## 3-5-4. Test condition :



**Thermal Shock Test**

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ADD: 中国广东省东莞市松山湖工业东路现代企业加速器6-402-5

## 摇摆测试记录报告

|                                                                                     |                       |              |                                                                                      |  |  |
|-------------------------------------------------------------------------------------|-----------------------|--------------|--------------------------------------------------------------------------------------|--|--|
| PART NO.                                                                            | :SLEingA200140300-C06 |              |                                                                                      |  |  |
| DATE OF INSPECTION                                                                  | : 2020-01-08          |              |                                                                                      |  |  |
| INSPECTION ITEM                                                                     | : 摇摆测试                |              |                                                                                      |  |  |
| TEST EQUIPMENT                                                                      | : 摇摆机                 |              |                                                                                      |  |  |
| SPECIFICATION                                                                       | : 天线摆动测试              |              |                                                                                      |  |  |
| 测试项目:                                                                               |                       |              |                                                                                      |  |  |
| 1.测试天线摆动后，固定座与杆套的松紧度状况。                                                             |                       |              |                                                                                      |  |  |
| 测试条件:                                                                               |                       |              |                                                                                      |  |  |
| 1.天线90°、45° 摇摆200次后，距铆钉80.0mm、160.0mm分别吊重25g、20g砝码静止10秒钟。                           |                       |              |                                                                                      |  |  |
|   |                       |              |   |  |  |
|  |                       |              |  |  |  |
| 测试样品                                                                                | 1#                    | 2#           | 3#                                                                                   |  |  |
| 摇摆次数                                                                                | 200                   | 200          | 200                                                                                  |  |  |
| 测试结果                                                                                | 天线杆套没有掉落，OK.          | 天线杆套没有掉落，OK. | 天线杆套没有掉落，OK.                                                                         |  |  |
| 备注:                                                                                 |                       |              |                                                                                      |  |  |

审核：刘长兴

制作：张青