



# 產品承認書

## Specification for Approval

客戶 (Customer): 易通展科技股份有限公司

Customer Part No.: MAEAIZ5095XXW2GV

Product Description: DIR-X1550(Antenna)

Lynwave Part No.: AOX21X-091050-00

### 客戶簽核 (Customer Approval)

|                           |                 |               |
|---------------------------|-----------------|---------------|
| 客戶承認<br>Customer Approval | 核准 (Authorized) | 檢驗 (Approved) |
|                           |                 |               |
|                           | 日期： 年 月 日       |               |

內部簽核 (Signature) 日期： 2021 年 08 月 24 日

| Approved by     | Checked by      | Tested by        |
|-----------------|-----------------|------------------|
| <i>YungMing</i> | <i>Lisa Wei</i> | <i>Zero Chen</i> |

綠億科技股份有限公司

**Lynwave Technology Ltd.**

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E-mail: service@lynwave.com

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# Specification

Physical Properties :

1. Operation temperature :  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
2. Storage temperature:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
3. Storage period: 2years
4. Weight: 14.31g

F

E

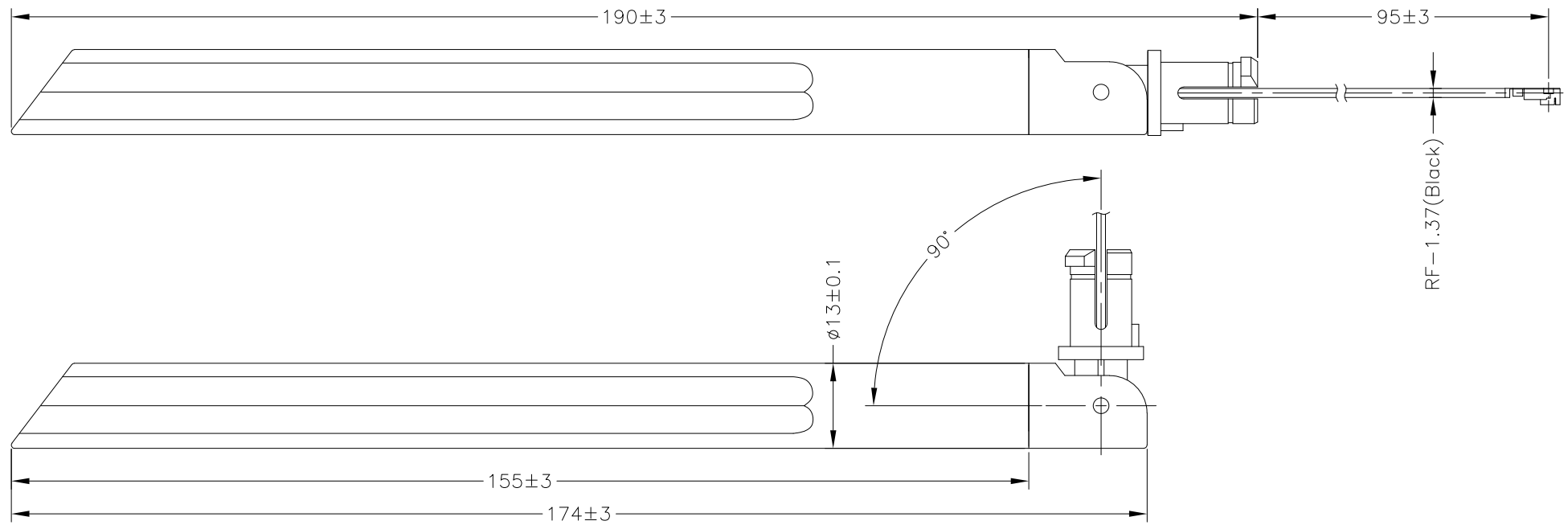
D

C

B

A

| Rev | Zone | Description | ENG | Approved | Date |
|-----|------|-------------|-----|----------|------|
|     |      |             |     |          |      |



- 備註:
- MHF compatible有方向性, 請依照圖面方向生產.
  - 外觀顏色: 白色

| TOLERANCE | CUSTOMER   | PART NO.  | DESCRIPTION: | DWG NO.          | REV.  |
|-----------|------------|-----------|--------------|------------------|-------|
| XXX. ±1.0 | ----       | ----      | Antenna      | ADX21X-091050-00 | A0    |
| XX. ±0.5  | PROJECTION | UNIT      | SCALE        | SIZE             | SHEET |
| X. ±0.3   |            | mm        | 1:1          | A4               | 1/1   |
| .X ±0.1   | APPROVED:  | DESIGNED: | DRAWN:       |                  |       |
| .XX ±0.05 | -----      | -----     | Anna         |                  |       |



F

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D

C

B

A

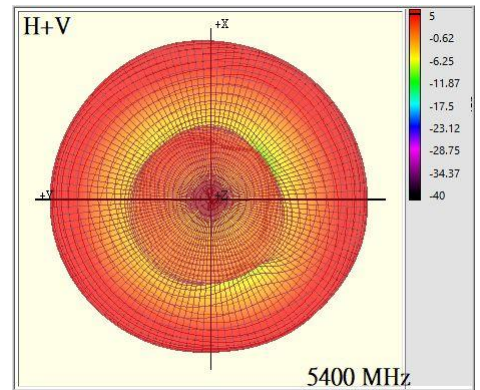
**Features**

- Single band IEEE 802.11 a/n/ac/ax standard
- Case mounting or on board mount
- High efficiency
- Quick integration



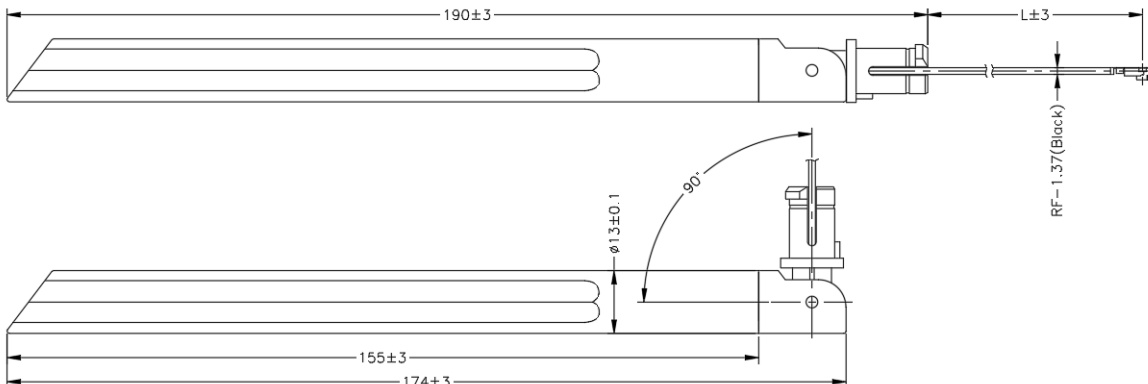
**Specification**

|                     |                |
|---------------------|----------------|
| Frequency (MHz)     | 4900 ~ 5825    |
| Peak Gain (dBi)     | 5.4            |
| VSWR                | 2.0:1          |
| Power (Watts)       | 1              |
| Impedance (Ohms)    | 50             |
| Dimension (mm)      | Ø13 x 190      |
| Color               | White          |
| Connector           | MHF compatible |
| Cable length (mm)   | 95             |
| Operating Temp (°C) | -40°C ~ +85°C  |



5GHz

**Mechanical Dimensions**



# **DIR-X1550**

# **Antenna Test Report**

**Report by Alex**  
**2020/12/24**

## A. Antenna Testing Conditions

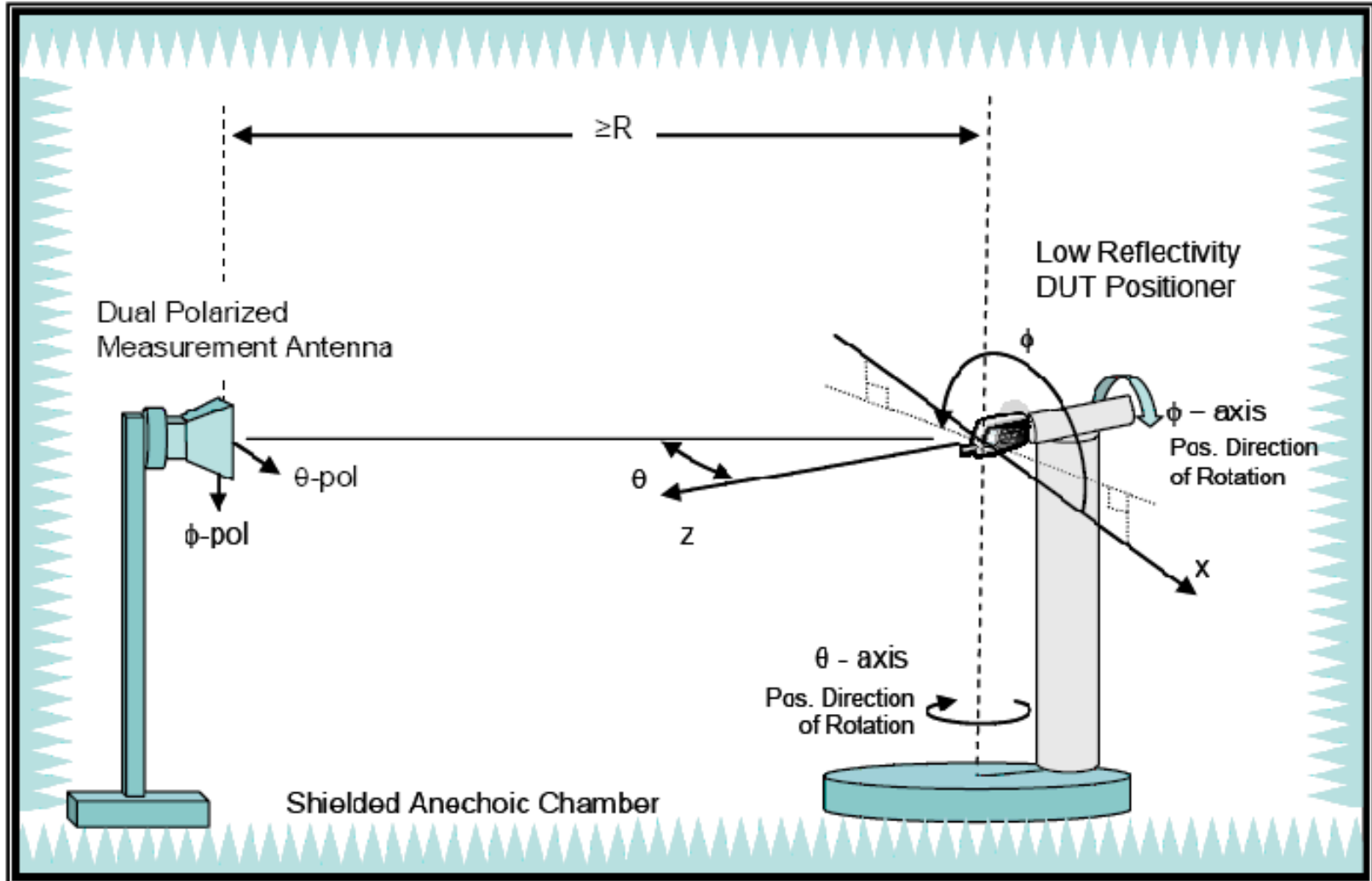
1. Test System
2. Antenna Under Test
3. Antenna Placement

## B. Antenna RF Characteristics

1. Return Loss
2. Isolation
3. Gain Table
4. 2D Radiation Pattern
5. 3D Radiation Pattern

# Antenna Test System

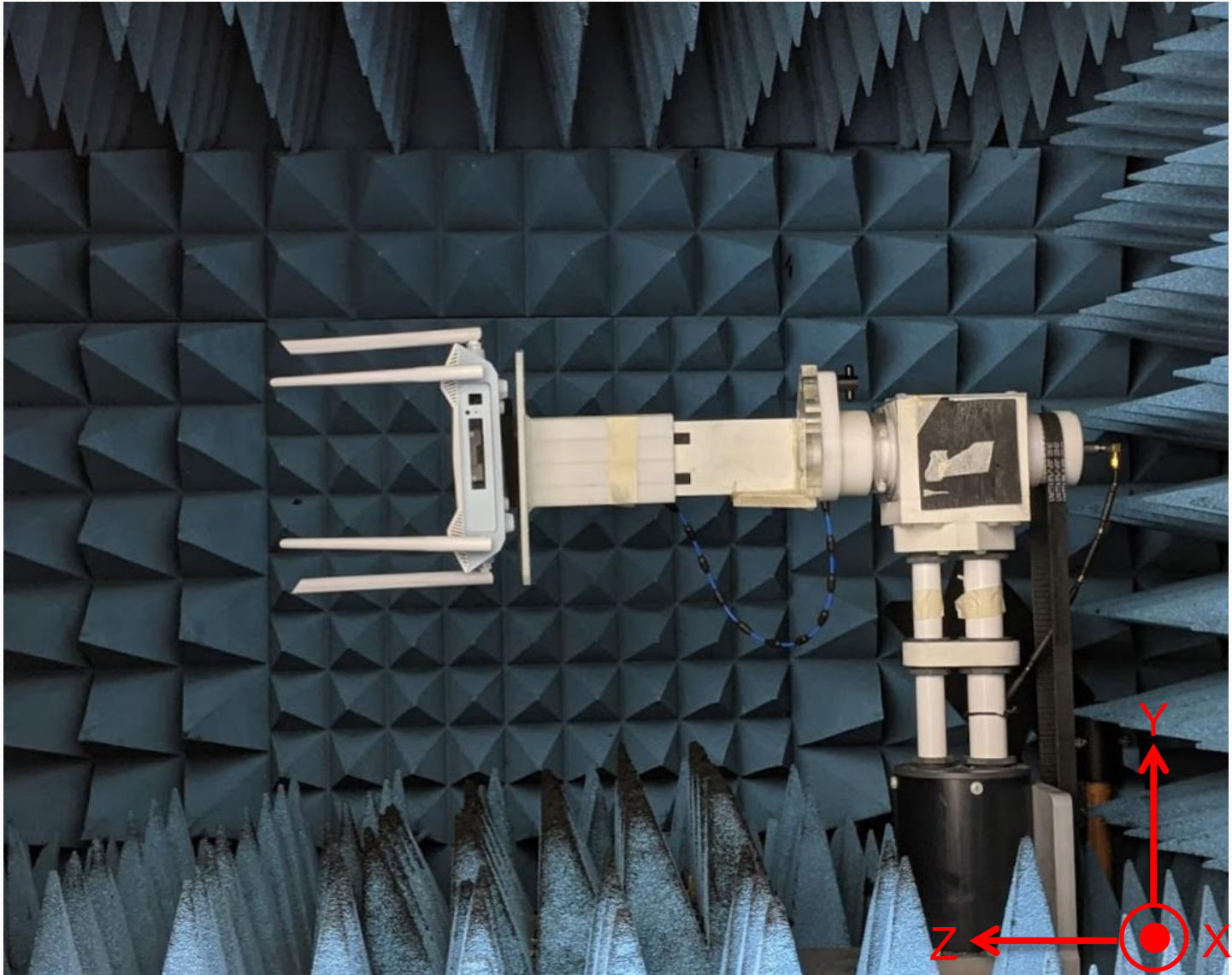
LYNwave





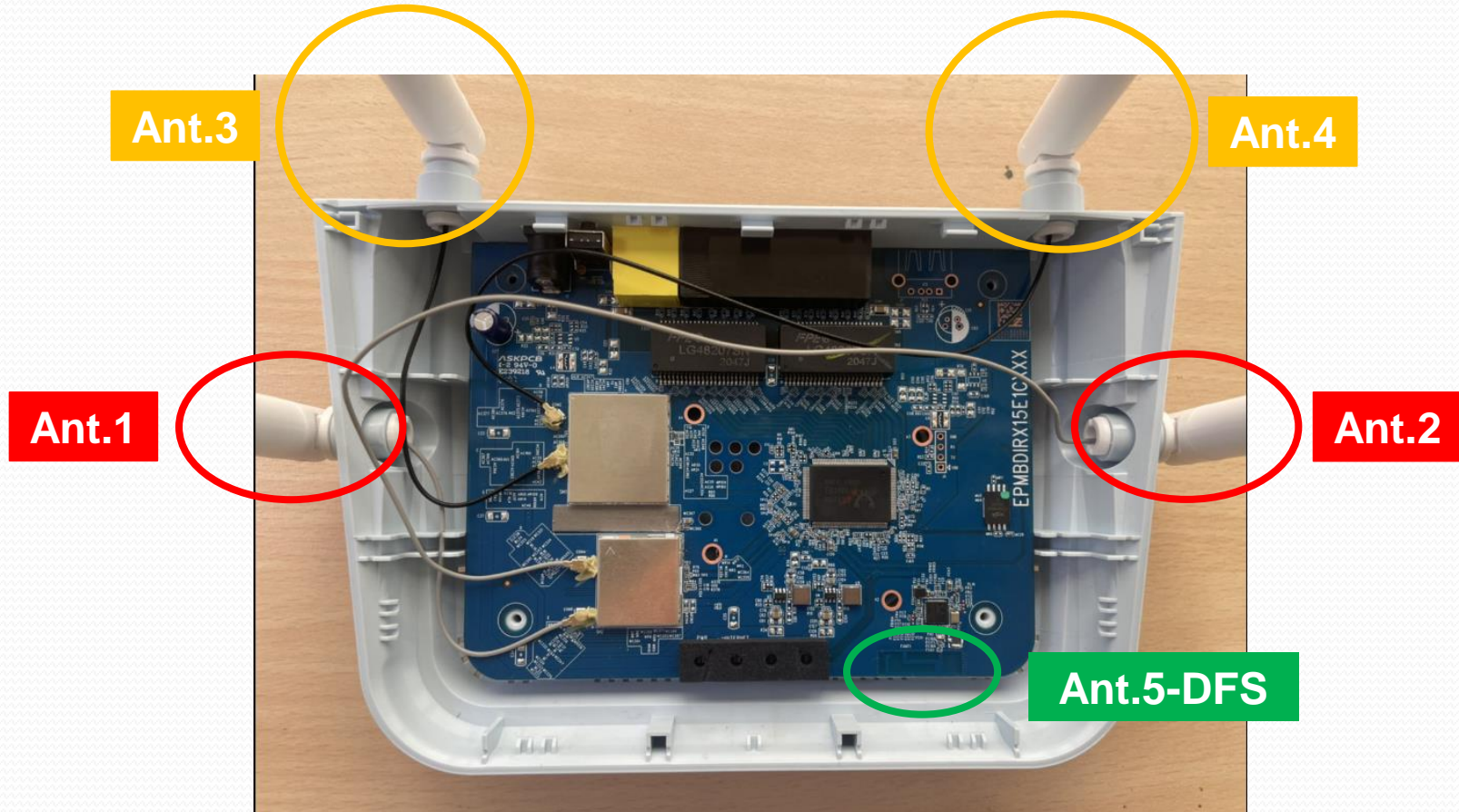
# Antenna Under Test

LYNwave



# Antenna Placement

LYNwave



- Ant.1 : 2.4GHz Single Band; Cable Length : Total 128mm, Outside 80mm, Gray**
- Ant.2 : 2.4GHz Single Band; Cable Length : Total 313mm, Outside 265mm, Gray**
- Ant.3 : 5GHz Single Band; Cable Length : Total 135mm, Outside 95mm, Black**
- Ant.4 : 5GHz Single Band; Cable Length : Total 235mm, Outside 195mm, Black**

# Return Loss

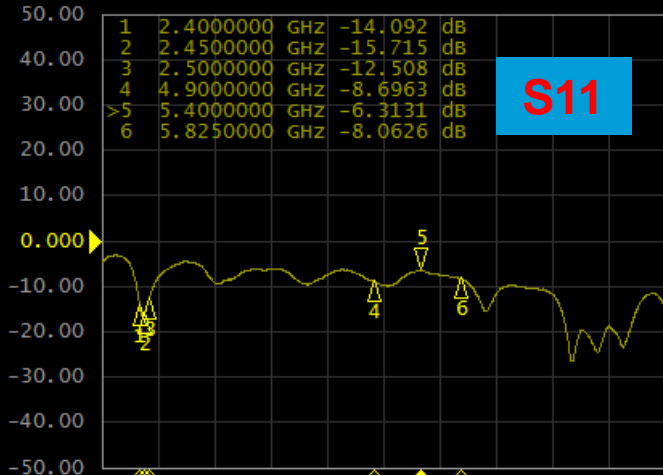
LYNwave

E5071C Network Analyzer

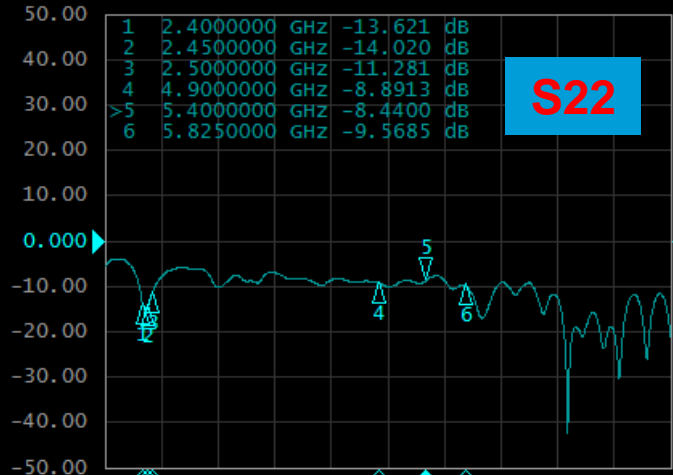
1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State

Resize

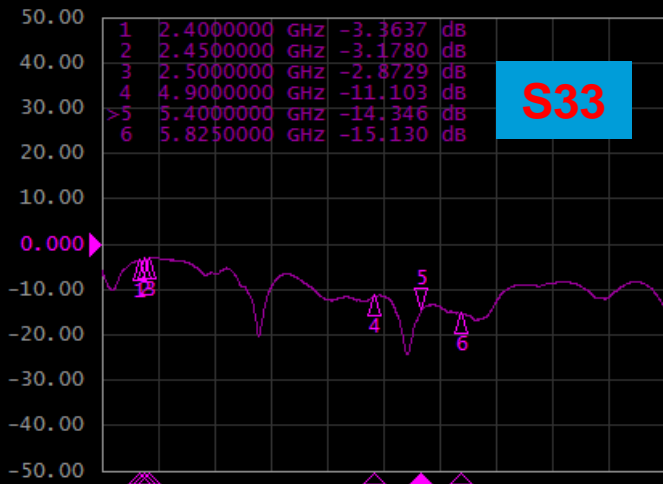
Tr1 S11 Log Mag 10.00dB/ Ref 0.000dB [F2 M]



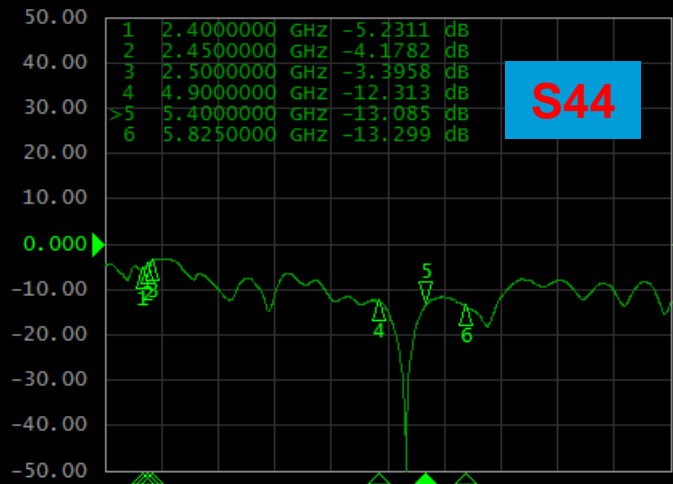
Tr2 S11 Log Mag 10.00dB/ Ref 0.000dB [F2 M]



Tr3 S11 Log Mag 10.00dB/ Ref 0.000dB [F2 M]



Tr4 S11 Log Mag 10.00dB/ Ref 0.000dB [F2 M]



System

Print

Invert Image  
ON

Dump  
Screen Image...

Multiport Test Set  
Setup

Misc Setup

Backlight  
ON

Firmware  
Revision

Service Menu

Help

Return

1 Start 2 GHz

IFBW 70 kHz

Stop 8 GHz Cor

# Isolation

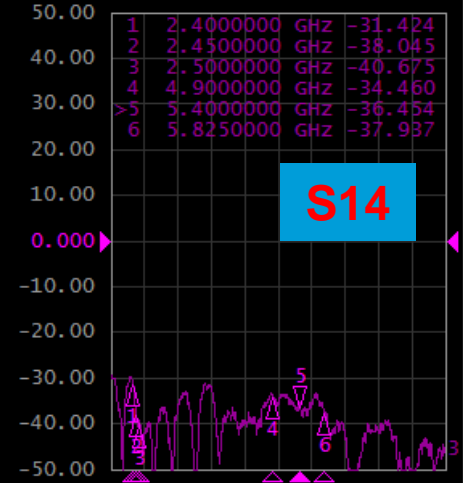
LYNwave

E5071C Network Analyzer

1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State

Resize

▶ Tr1 S21 Log Mag 10.00dB/ Ref 0.000d Tr2 S21 Log Mag 10.00dB/ Ref 0.000d Tr3 S21 Log Mag 10.00dB/ Ref 0.000d



System

Print

Invert Image  
ON

Dump  
Screen Image...

Multiport Test Set  
Setup

Misc Setup

Backlight  
ON

Firmware  
Revision

Service Menu

Help

Return

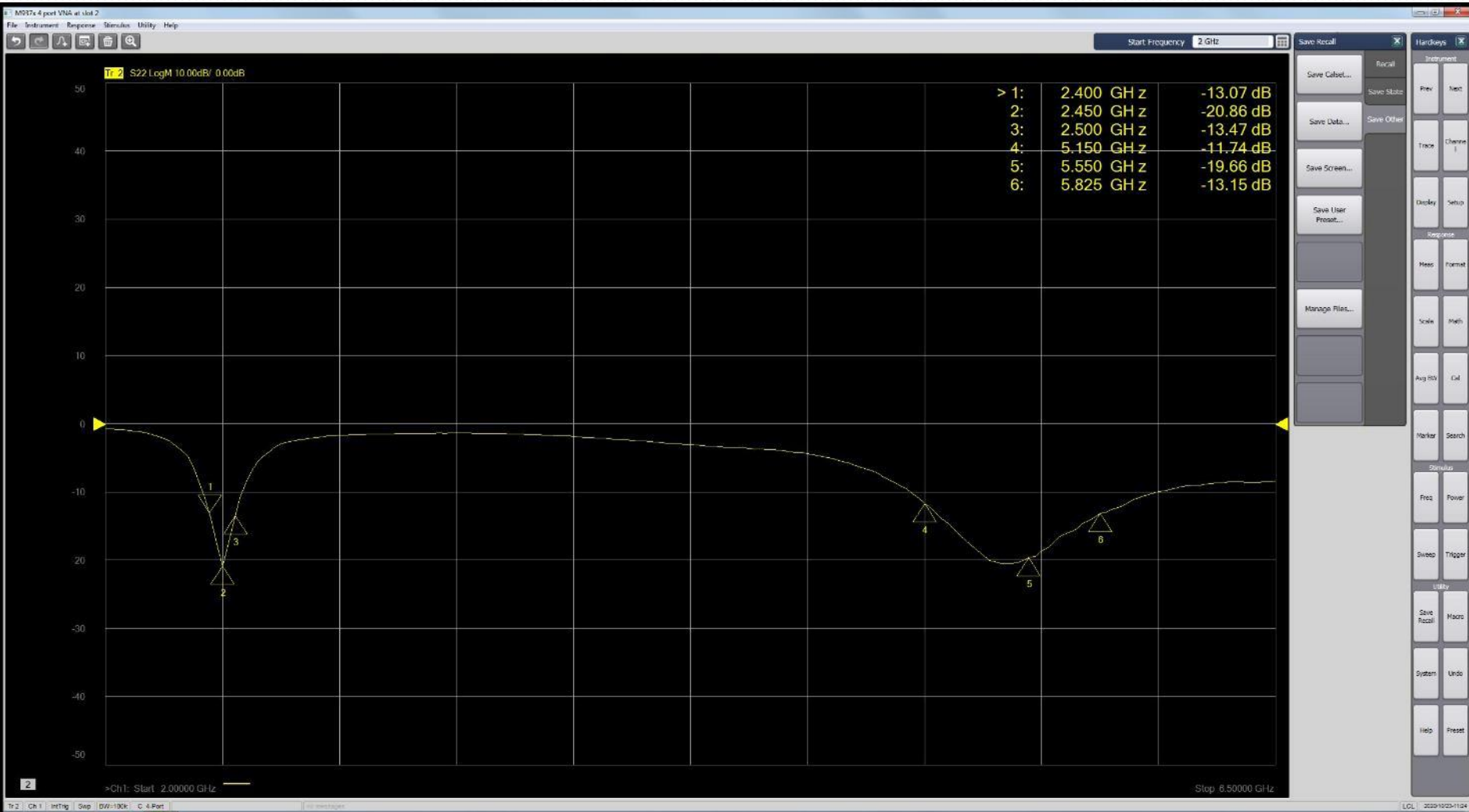
1 Start 2 GHz

IFBW 70 kHz

Stop 8 GHz Cor

# DFS S-parameter

LYNwave



# Gain Table

LYNwave

|                 | Ant.1 |      |      |      |      |      |
|-----------------|-------|------|------|------|------|------|
| Frequency (MHz) | 2400  |      | 2450 |      | 2500 |      |
| Peak Gain(dBi)  | 4.0   |      | 4.8  |      | 4.5  |      |
| Efficiency(%)   | 71    |      | 74   |      | 72   |      |
|                 | Ant.2 |      |      |      |      |      |
| Frequency (MHz) | 2400  |      | 2450 |      | 2500 |      |
| Peak Gain(dBi)  | 4.0   |      | 4.4  |      | 4.1  |      |
| Efficiency(%)   | 75    |      | 76   |      | 72   |      |
|                 | Ant.3 |      |      |      |      |      |
| Frequency (MHz) | 4900  |      | 5400 |      | 5825 |      |
| Peak Gain(dBi)  | 4.8   |      | 5.3  |      | 4.8  |      |
| Efficiency(%)   | 72    |      | 78   |      | 73   |      |
|                 | Ant.4 |      |      |      |      |      |
| Frequency (MHz) | 4900  |      | 5400 |      | 5825 |      |
| Peak Gain(dBi)  | 4.4   |      | 4.9  |      | 4.3  |      |
| Efficiency(%)   | 71    |      | 72   |      | 77   |      |
|                 | Ant.5 |      |      |      |      |      |
| Frequency (MHz) | 2400  | 2450 | 2500 | 5150 | 5550 | 5825 |
| Peak Gain(dBi)  | 1.9   | 1.9  | 1.5  | 3.9  | 4.1  | 3.1  |
| Efficiency(%)   | 63.1  | 61.8 | 60.5 | 62.6 | 66.8 | 63.2 |

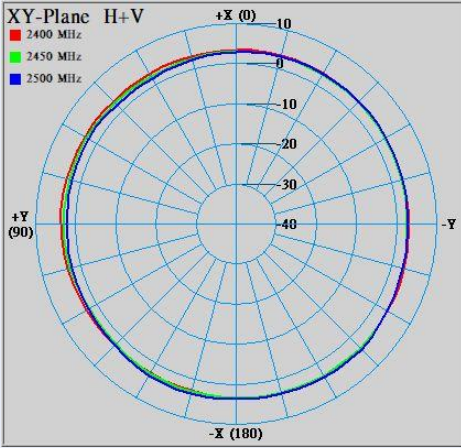
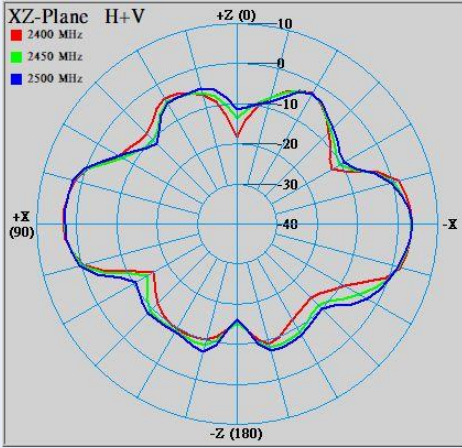
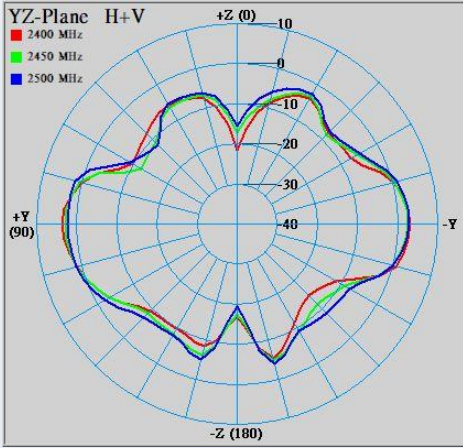



# Ant.1 2.4GHz 2D Radiation Pattern

LYNwave

| Frequency(MHz)    | 2400~2500 |    |    |
|-------------------|-----------|----|----|
| Plane             | XY        | XZ | YZ |
| Radiation Pattern |           |    |    |
| Setup             |           |    |    |

# Ant.2 2.4GHz 2D Radiation Pattern

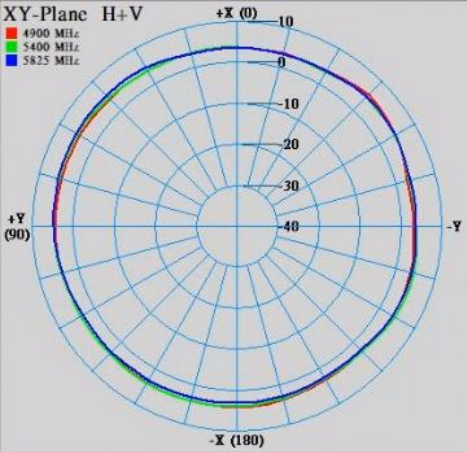
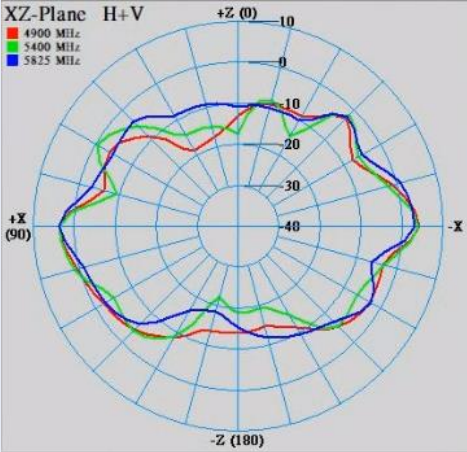
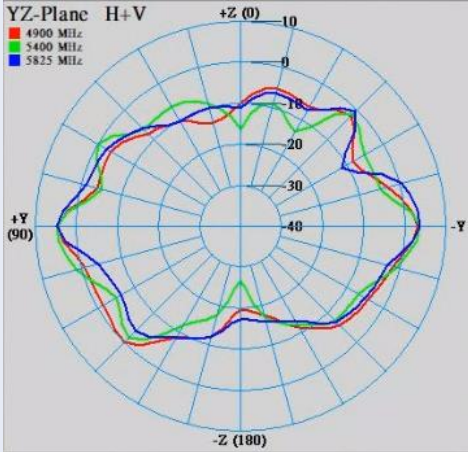



LYNwave

| Frequency(MHz)    | 2400~2500   |   |   |
|-------------------|---|---|---|
| Plane             | XY  | XZ  | YZ  |
| Radiation Pattern |    |     |    |
| Setup             |  |  |  |



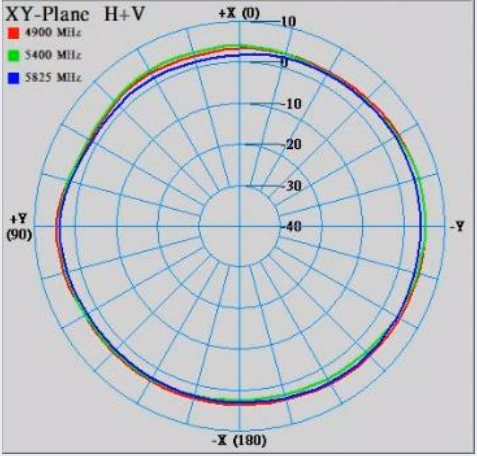
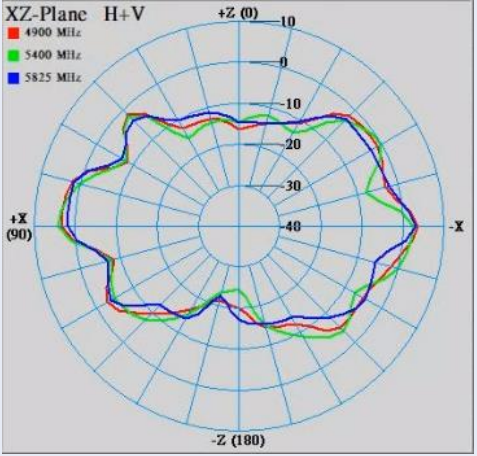
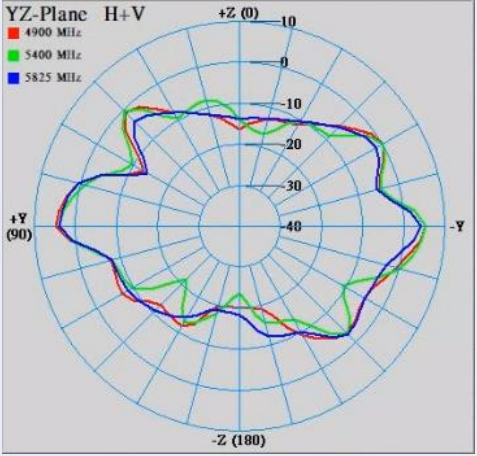



# Ant.3 5GHz 2D Radiation Pattern

LYNwave

| Frequency(MHz)    | 4900~5825   |   |   |
|-------------------|---|---|---|
| Plane             | XY  | XZ  | YZ  |
| Radiation Pattern |    |     |    |
| Setup             |  |  |  |

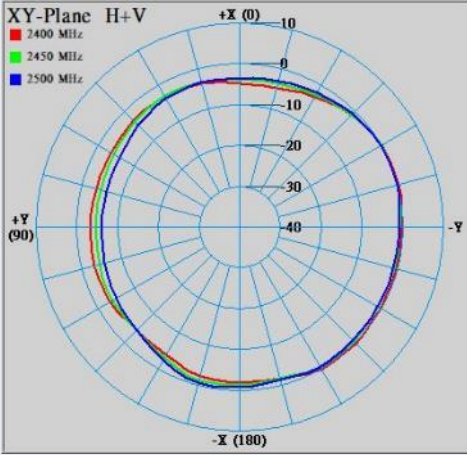
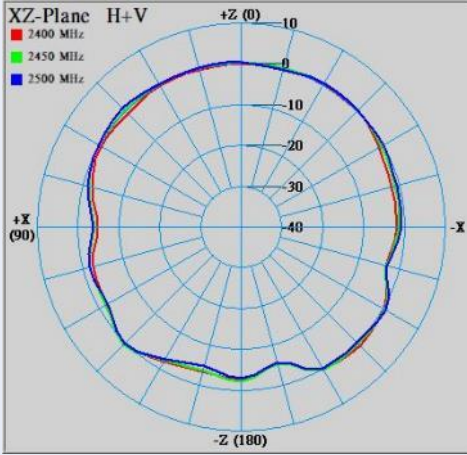
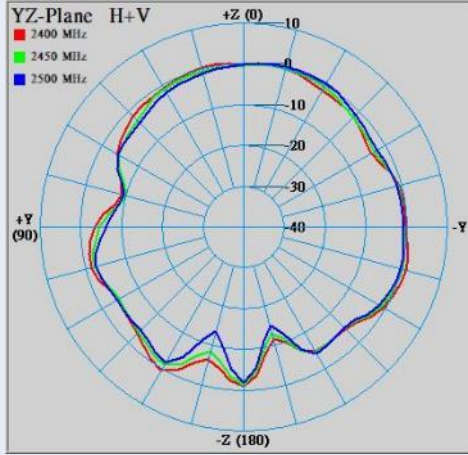



# Ant.4 5GHz 2D Radiation Pattern

LYNwave

| Frequency(MHz)    | 4900~5825   |   |   |
|-------------------|---|---|---|
| Plane             | XY  | XZ  | YZ  |
| Radiation Pattern |    |     |    |
| Setup             |  |  |  |

# Ant.5\_2G\_2D Radiation Pattern

LYNwave

| Frequency(MHz)    | 2400~2500   |   |   |
|-------------------|---|---|---|
| Plane             | XY  | ZX  | ZY  |
| Radiation Pattern |    |     |    |
| Setup             |  |  |  |

# Ant.5\_5G\_2D Radiation Pattern

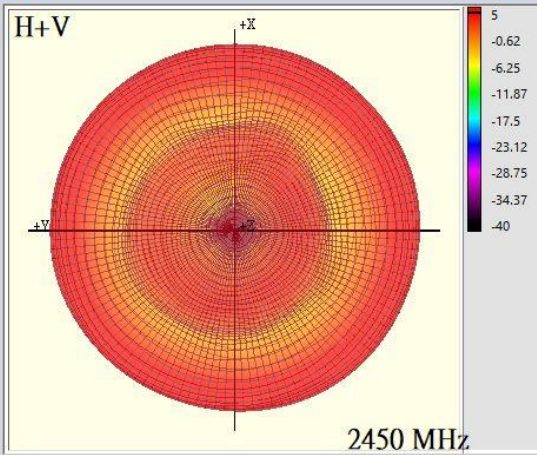
LYNwave

| Frequency(MHz)    | 5150~5825 |    |    |
|-------------------|-----------|----|----|
| Plane             | XY        | ZX | ZY |
| Radiation Pattern |           |    |    |
| Setup             |           |    |    |

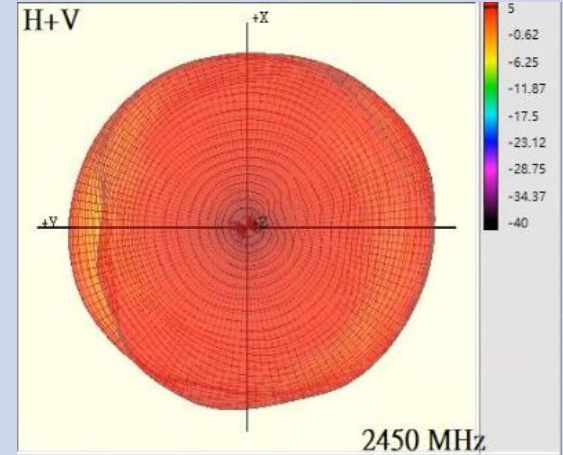
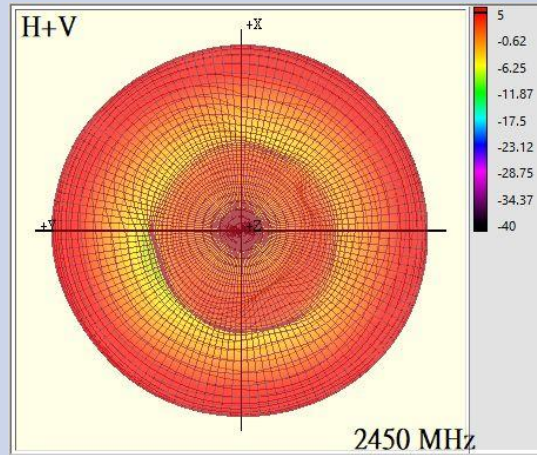
# 3D Radiation Pattern

LYNwave

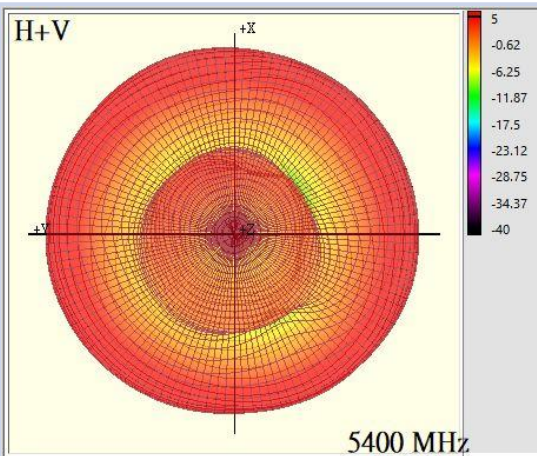
ANT1



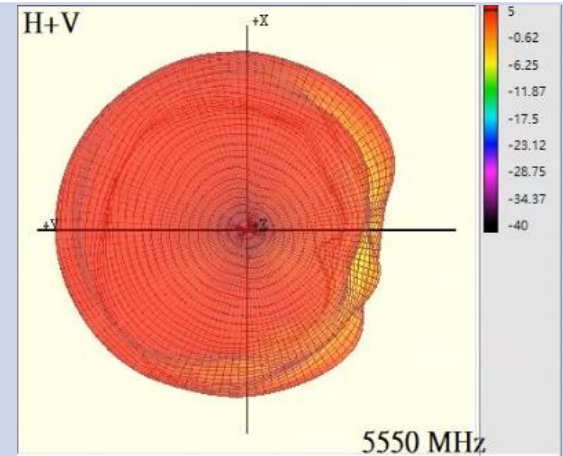
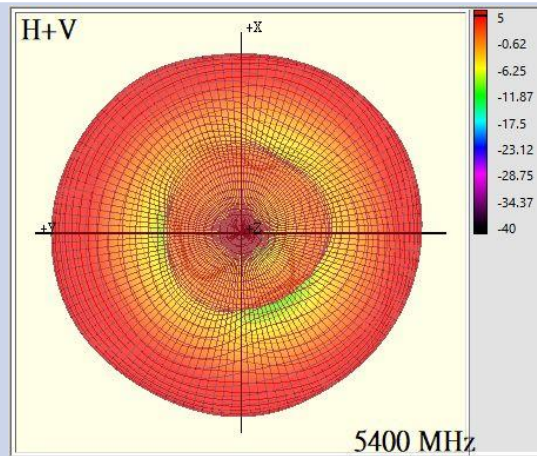
ANT2



ANT3



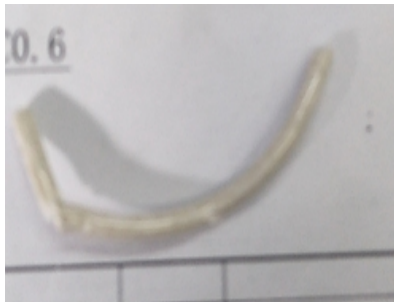



ANT4



- The antenna characteristics
  - Return loss  $< -10\text{dB}$  in operating band
  - Gain
    - Wifi 2.4GHz band  $4.0\sim 4.8\text{dBi}$  , Wifi 5GHz band  $4.3\sim 5.3\text{ dBi}$
    - DFS 2GHz  $1.5\sim 1.9\text{dBi}$  , 5GHz  $3.1\sim 4.1\text{dBi}$
  - Efficiency
    - Wifi 2.4GHz band  $> 70\%$  , Wifi 5GHz band  $> 70\%$
    - DFS  $> 60\%$
  - Isolation
    - Wifi 2.4GHz band  $> 20\text{dB}$
    - Wifi 5GHz band  $> 25\text{dB}$




# 熔體流動測試報告

|                      |   |       |  |        |                    |    |
|----------------------|---|-------|--|--------|--------------------|----|
| 部門                   | 注塑  |       |  | 圖面版本   | /版                 |    |
| 料號                   | 六脚刀鋒天线  |       |  | 測試日期   | 2021/3/25          |    |
| 模號                   |   |       |  | 塑膠材質   | TPEE               |    |
| 穴號 / 穴數              | 8   |       |  | 荷重 kg  | 2.16               |    |
| 設定溫度℃                | 260   |       |  | 烘烤時間 H | 烘烤時間 2H, 烘烤溫度 120℃ |    |
| 測試結果<br>(單位:g/10min) | MI 值規格  | 第一次切料 | 第二次切料  | 第三次切料  | MI 平均值             | 判定 |
|                      | ≦20   | 14.5  | 15.5   | 15     | 15.00              | OK |
| 測<br>試<br>照<br>片     | (原料)  |       | (第一次切料)  |        |                    |    |
|                      |   |       |   |        |                    |    |
|                      | (第二次切料)   |       | (第三次切料)  |        |                    |    |
|                      |  |       |  |        |                    |    |
| 备注：测试样品由 QC 提供       |   |       |  |        |                    |    |
| 測試判定                 | <input checked="" type="checkbox"/> 合格 <input type="checkbox"/> 不合格                 |       | 主管審核   |        | 測試者                |    |
|                      |   |       | 刘瑞琴  |        | 杨辉丽                |    |

表单编号： QE - TQA-0080A

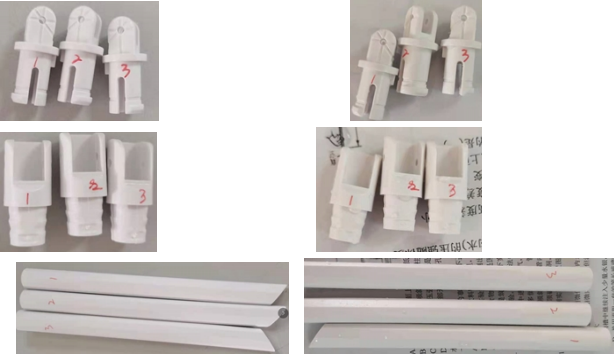
# 落球試驗報告

日期：2021/3/25

|                     |  |                  |                       |
|---------------------|--|------------------|-----------------------|
| 生产部门                | 注塑   | 試驗數量             | 5pcs /                |
| 零件編號                | 上下固  | 沖擊值              | 7.056 (根據 ASTM D2463) |
| 落球重量                | 1000g  | 模穴號              |                       |
| 落球高度                | 0.9m   | 綜合判定             | OK                    |
| 测试条件                | 落球测试机。落球重 1KG, 高度 0.9M, 冲击值 7.056 (根據 ASTM D2463)  |                  |                       |
| 試驗要求                | 鉚釘孔兩側各落球 3 次, 再用 20 倍放大鏡檢查, 不可破裂 (斷面光滑的裂痕)。  |                  |                       |
| 測試結果                | 鉚釘孔兩側各落球 3 次后, 用 20 倍放大鏡檢查無破裂 (無斷面光滑的裂痕)。  |                  |                       |
| 試驗圖片<br>(示意圖)       | <p>(以长管状物固定落球冲击点)      測試前圖片      測試后圖片 (无破裂)</p>    |                  |                       |
| 測試結果                | 樣品編號   | 是否破裂, 是否有斷面光滑的脆裂 | 判定                    |
|                     | 1  | 無破裂, 無斷面光滑的脆裂。   | OK                    |
|                     | 2  | 無破裂, 無斷面光滑的脆裂。   | OK                    |
|                     | 3  | 無破裂, 無斷面光滑的脆裂。   | OK                    |
|                     | 4  | 無破裂, 無斷面光滑的脆裂。   | OK                    |
|                     | 5  | 無破裂, 無斷面光滑的脆裂。   | OK                    |
| 備注：<br>測試樣品由 QC 提供。 |  |                  |                       |
| 核准： 刘瑞琴             |  | 審核： 杨晓中          | 制表： 李美娟               |



## 冰醋酸試驗報告

|  |        |  |           |    |     |
|--|--------|--|-----------|----|-----|
| 生产部门   | 注塑     | 試驗日期   | 2021/3/25 |    |     |
| 品名規格   | 六脚刀锋天线 | 綜合判定   | OK        |    |     |
| 零件編碼   |        |  |           |    |     |
| 試驗目的： <input type="checkbox"/> 新產品開發試驗 <input type="checkbox"/> 設計變更試驗<br><input checked="" type="checkbox"/> 量產追蹤試驗 <input type="checkbox"/> 其他特殊需求試驗<br>設備名稱： <u>冰醋酸 99.5%</u><br>試驗規格： <u>浸泡冰醋酸 3 分鐘後，用清水沖洗乾淨，用 20 倍放大鏡全檢不可破裂</u><br>試驗時間： <u> 3 </u> 分鐘<br>試驗數量： <u> 3PCS </u> |        |  <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="border: 1px solid black; padding: 2px; color: cyan;">試驗前产品状态</div> <div style="border: 1px solid black; padding: 2px; color: cyan;">試驗后产品状态</div> </div> |           |    |     |
| Sample   | 外觀檢驗   |  |           | 判定 |     |
| 1  | 無破裂    |  |           | OK |     |
| 2  | 無破裂    |  |           | OK |     |
| 3  | 無破裂    |  |           | OK |     |
| 4  | 無破裂    |  |           | OK |     |
| 5  | 無破裂    |  |           | OK |     |
| 補充說明：<br><br>測試樣品由 QC 提供.  |        |  |           |    |     |
| 核 准  | 刘瑞琴    | 確 認  | 杨晓中       | 製表 | 杨辉丽 |

表单编号： QE-TQA-0033A

# 實照



## MATERIAL BOM LIST

Customers: Amigo

2021/8/5

Customer Model No.:

Lynwave Model No.: AOX21X-091050-00

Product Description:

| NO | 部位名稱       | 供應商   | 材質名稱   | 規格描述                   | UL No.  |
|----|------------|---|--------|------------------------|---------|
| 1  | PCB        | GOLDENMAX INTERNATIONAL TECHNOLOGY (ZHUHAI) LTD | FR4    | GF21 + MASK INK(GREEN) | E330731 |
| 2  | CABLE      | SHENYU COMMUNICATION TECHNOLOGY INC             | 1354   | RF1.37 NORMAL(BLACK)   | E318898 |
| 3  | RIVET      | POLYPLASTICS CO LTD                             | M90-44 | POM(BLACK)             | E45034  |
| 4  | POLE COVER | SHINKONG SYNTHETIC FIBERS CORP                  | S201   | TPEE(BLACK)            | E107536 |

## 实际生产地&零件单重

| 生产地  | 零件 | 材质     | 单重     |
|------|----|--------|--------|
| 广东东莞 | 杆套 | TPEE   | 9.218g |
|      | 上固 | PC+PBT | 1.867g |
|      | 下固 | PC+PBT | 1.449g |
|      | 铆钉 | POM    | 0.025g |

# Antenna 成品編碼原則

共 14 碼

X X X X X X - X X X X X X - X X

① ② ③ ④~⑤ ⑥ ⑦~⑧ ⑨ ⑩~⑪ ⑫ 【⑬~⑭】←2017 年改為最後二碼流水號

E.g.

ALA120-092031-125055

ALA150-051020-000000

ALX17P-051XX0-00

ALX18M-221AA0-00

AEX19P-051AA0-00

| Number | Item   |
|--------|--|
| ①      | <b>Product category</b><br>A – Antenna<br>C – Cable Assembly → 另有 Cable Assembly 編碼原則<br>S – Smart antenna<br>M – Module<br>I – Integration system<br>O – Outdoor antenna (e.g. Patch) |
| ②      | <b>Research and development</b><br>L – Lynwave<br>O – Purchased<br>E – OEM   |
| ③      | <b>應用類別碼</b><br>X –  |
| ④~⑤    | <b>Years</b><br>取西元的末 2 碼, 例: 2018 年取 “18”   |
| ⑥      | <b>Antenna Material</b><br>P – PCB<br>F – FPCB<br>M – Metal<br>X – Other   |

|            |  |
|------------|--|
| <p>⑦~⑧</p> | <p><b>Frequency band</b></p> <p>01 – LTE (791~960MHz,1710~2170MHz,2500~2690MHz)</p> <p>02 – LoRa (780~1020 MHz )</p> <p>03 – Z-wave (868~915MHz)</p> <p>04 – DECT (1880~1920MHz)</p> <p>05 – 11 b / g / n (2400~2500MHz)</p> <p>06 –低頻 (470~510MHz)</p> <p>07 – 2G/3G (868~960MHz,1710~2170MHz)</p> <p>08 – 13.56MHz</p> <p>09 – 11 a / n / ac / ax (5150~5825MHz)</p> <p>10 – GPS (1575MHz) 、 (1565~1585MHz)</p> <p>11 –其他 (e.g.RFID)</p> <p>12 – Numerous Frequency band</p> <p>15 – 5GNR</p> <p>16 – WiFi 6E (5950~7225MHz)</p> <p>21 – GSM+IMT (880/920/960MHz,1920/2000/2170MHz)</p> <p>22 – 11 a / b / g / n / ac / ax (2400~2500MHz+5150~5825MHz)</p> <p>23 – GPRS (850/900/1800/1900MHz)</p> |
| <p>⑨</p>   | <p><b>Antenna type</b></p> <p>0 – Monopole</p> <p>1 – Dipole</p> <p>2 – PIFA</p> <p>3 – Loop</p> <p>4 – Chip</p> <p>5 – Coil</p> <p>6 – Numerous types</p> <p>7 – Patch</p>  |
| <p>⑩~⑪</p> | <p><b>Antenna gain</b></p> <p>XX – Embedded 及 Other product 適用 → 僅 2017 年使用 目前不使用</p> <p>AA – Embedded 及 Other product 適用</p> <p>----- ↓ 以下 patch 及 外接 dipole 適用</p> <p>01 – 1 dBi</p> <p>02 – 2 dBi</p> <p>…以此類推</p>  |
| <p>⑫</p>   | <p><b>流水號 (主體不同時)</b></p> <p>0 ~ 9 ~ A ~ Z (不使用 I 與 O) , 共 34 碼可用</p>  |
| <p>⑬~⑭</p> | <p><b>流水號 (線材/輔料不同時)</b></p> <p>00~99</p>  |

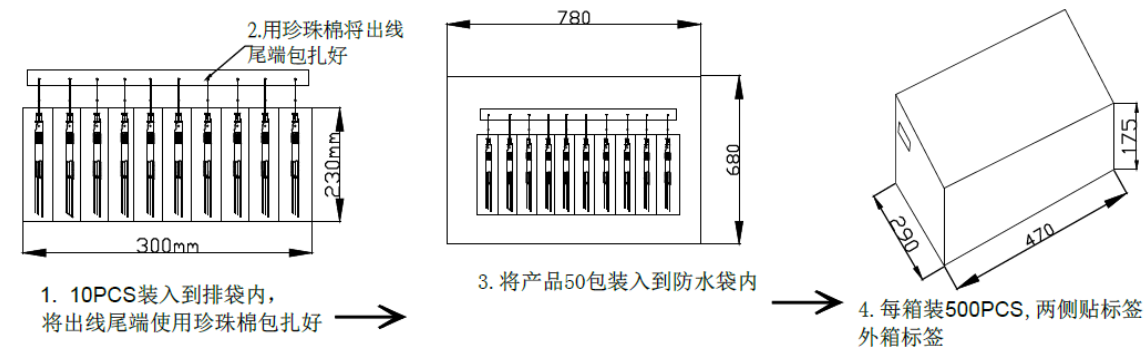
# 水口料比例

| 材料     | 原料   | 水口 |
|--------|------|----|
| POM    | 100% | 0% |
| TPEE   | 100% | 0% |
| PC+PBT | 100% | 0% |
|        |      |    |

# LYNwave 綠億科技股份有限公司

## LYNwave Technology Limited

### 包裝規範書

|  |  |      |   |      |          |
|--|--|------|---|------|----------|
| 產品名稱   | Dipole天線   | 客戶名稱 | 易通展   | 版次   | A        |
| 綠億料號   | AOX20X-051040-00<br>AOX20X-051041-00<br>AOX21X-091050-00<br>AOX21X-091051-00 | 客戶料號 | MAEAIIF5080XXW1GV<br>MAEAIIF4080XXW1GV<br>MAEAIIZ5095XXW2GV<br>MAEAIIZ5195XXW2GV  | 製作日期 | 2021/8/5 |
| 產品包裝說明   |  |      | 產品包裝圖示  |      |          |
| <p>一、包裝：</p> <p>(1)10 pcs/排袋</p> <p>(2)將出線尾端使用珍珠棉包紮好</p> <p>(3)將50包裝入到防水袋內</p> <p>(4)每箱500 pcs</p> <p>二、裝箱：</p> <p>(1)每箱50袋</p> <p>(2)外箱須貼外箱標籤</p> <p>(3)封箱並用打包袋固定</p> <p style="color: red;">註: 以實際裝箱數量為準</p> |  |      |  <p>1. 10PCS裝入到排袋內，將出線尾端使用珍珠棉包紮好</p> <p>2. 用珍珠棉將出線尾端包紮好</p> <p>3. 將產品50包裝入到防水袋內</p> <p>4. 每箱裝500PCS, 兩側貼標籤外箱標籤</p> |      |          |

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