

# Sward Antenna Report

Customer **Kaidiwei**

Project : **KG1**-Plastic Shell PC Box  
-Fn Link 6221C Module

Report Date **2024.06.28**

# Project Introduction

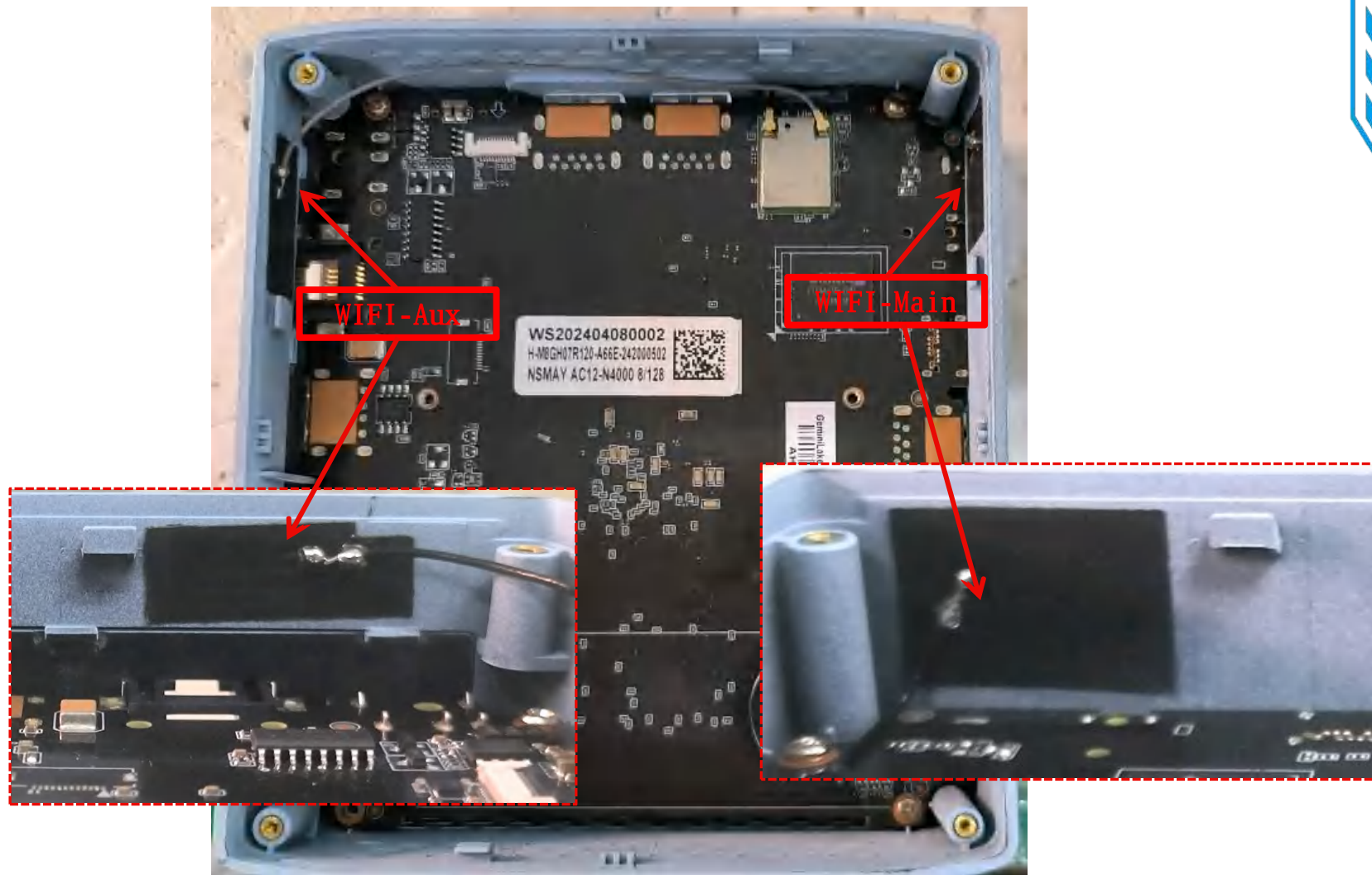
## 1.Resume

|                                    |        |
|------------------------------------|--------|
| Antennas                           | Type   |
| 2                                  | Tablet |
| • Shell Material Plastic Shell Box |        |

## 2.Description

| Num. | Function            | Frequency Band / MHz   | Material / Structure |
|------|---------------------|------------------------|----------------------|
| 1    | WIFI&BT&5Gwifi-Main | 2400MHz/2500MHz&5.8GHz | FPC                  |
| 2    | WIFI&BT&5Gwifi-Aux  | 2400MHz/2500MHz&5.8GHz | FPC                  |
|      |                     |                        |                      |

## Antenna Position

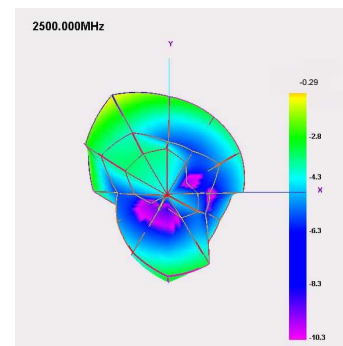


## WIFI Main Antenna S11



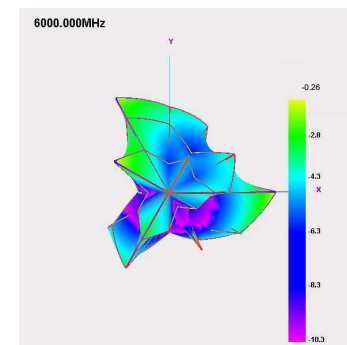
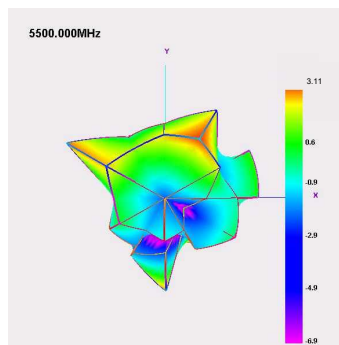
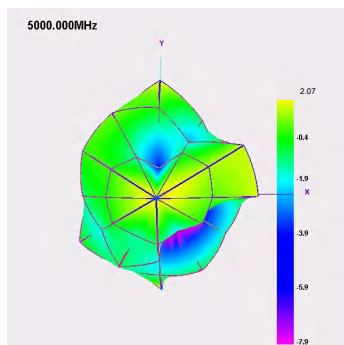
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# Main WIFI 5G Efficiency

| Passive Test For 5Gwifi |       |       |       |       |        |        |       |        |
|-------------------------|-------|-------|-------|-------|--------|--------|-------|--------|
| Freq                    | Effi  | Effi  | Gain  | Gain  | UHS    | DHIS   | Max   | Min    |
| (MHz)                   | (%)   | (dB)  | (dBi) | (dBd) | (%)    | (%)    | (dB)  | (dB)   |
| 5000                    | 53.93 | -2.68 | 2.07  | -0.08 | 26.549 | 27.378 | 2.07  | -13.86 |
| 5100                    | 47    | -3.28 | 2.22  | 0.07  | 22.566 | 24.433 | 2.22  | -19.4  |
| 5200                    | 36.31 | -4.4  | 1.76  | -0.39 | 18.337 | 17.977 | 1.76  | -16.2  |
| 5300                    | 33.87 | -4.7  | 2.02  | -0.13 | 17.056 | 16.818 | 2.02  | -18.38 |
| 5400                    | 61.55 | -2.11 | 4.38  | 2.23  | 31.8   | 29.75  | 4.38  | -15.89 |
| 5500                    | 62.26 | -2.06 | 3.11  | 0.96  | 34.173 | 28.089 | 3.11  | -10.49 |
| 5600                    | 43.54 | -3.61 | 0.83  | -1.32 | 23.165 | 20.377 | 0.83  | -12.03 |
| 5700                    | 56.92 | -2.45 | 2.3   | 0.15  | 29.262 | 27.656 | 2.3   | -11.51 |
| 5800                    | 66.6  | -1.77 | 3.38  | 1.23  | 32.276 | 34.321 | 3.38  | -13.23 |
| 5900                    | 41.65 | -3.8  | 1.11  | -1.04 | 19.126 | 22.525 | 1.11  | -17.49 |
| 6000                    | 29.57 | -5.29 | -0.26 | -2.41 | 12.397 | 17.173 | -0.26 | -12.95 |



## WIFI AUX Antenna S11

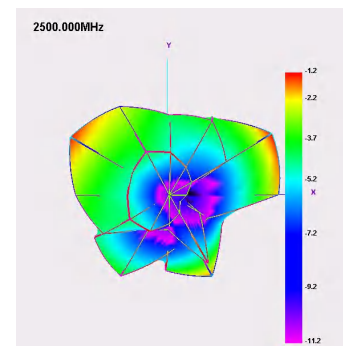
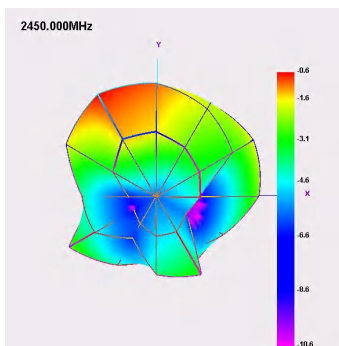
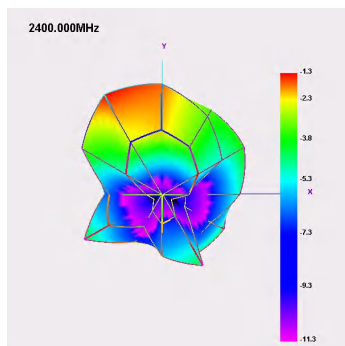


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# Aux WIFI 2.4G Efficiency

| Passive Test For 2.4Gwifi |       |       |       |       |        |        |       |        |
|---------------------------|-------|-------|-------|-------|--------|--------|-------|--------|
| Freq                      | Effi  | Effi  | Gain  | Gain  | UHS    | DHIS   | Max   | Min    |
| (MHz)                     | (%)   | (dB)  | (dBi) | (dBd) | (%)    | (%)    | (dB)  | (dB)   |
| 2400                      | 20.6  | -6.86 | -1.26 | -3.41 | 11.916 | 8.687  | -1.26 | -15.54 |
| 2410                      | 20.94 | -6.79 | -1.36 | -3.51 | 12.195 | 8.745  | -1.36 | -14.87 |
| 2420                      | 28.5  | -5.45 | -0.27 | -2.42 | 16.558 | 11.947 | -0.27 | -14.4  |
| 2430                      | 32.08 | -4.94 | -0.03 | -2.18 | 18.629 | 13.45  | -0.03 | -14.15 |
| 2440                      | 36.87 | -4.33 | 0.51  | -1.64 | 21.332 | 15.536 | 0.51  | -13.93 |
| 2450                      | 28.66 | -5.43 | -0.63 | -2.78 | 16.533 | 12.128 | -0.63 | -16.31 |
| 2460                      | 30.21 | -5.2  | -0.53 | -2.68 | 17.358 | 12.856 | -0.53 | -17.7  |
| 2470                      | 25.26 | -5.98 | -1.38 | -3.53 | 14.397 | 10.861 | -1.38 | -17.14 |
| 2480                      | 27.32 | -5.63 | -1.27 | -3.42 | 15.464 | 11.86  | -1.27 | -13.93 |
| 2490                      | 27.42 | -5.62 | -1.09 | -3.24 | 15.284 | 12.136 | -1.09 | -15.08 |
| 2500                      | 28.82 | -5.4  | -1.17 | -3.32 | 15.524 | 13.298 | -1.17 | -11.27 |



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## WiFi Throughput

| Iperf Test for Throughput |       |                     |               |                          |                          |                       |
|---------------------------|-------|---------------------|---------------|--------------------------|--------------------------|-----------------------|
| Type                      | KG1   | Module              | Fn-Link-6221C | Software version         | Windows_iperf            |                       |
| No.                       | Freq. | Status              | Angle         | Average Value (TX) /1min | Average Value (RX) /1min | Remarks (Packet loss) |
| 1                         | 2.4G  | 2.4G WIFI (R&D 15m) | 0°            | 58.4 Mbps                | 60.3 Mbps                | 0                     |
|                           |       |                     | 90°           | 56.7 Mbps                | 55.9 Mbps                | 0                     |
|                           |       |                     | 180°          | 60.8 Mbps                | 67.5 Mbps                | 0                     |
|                           |       |                     | 270°          | 61.6 Mbps                | 78.9 Mbps                | 0                     |
|                           | 5G    |                     |               |                          |                          |                       |
|                           |       |                     |               |                          |                          |                       |
|                           |       |                     |               |                          |                          |                       |
|                           |       |                     |               |                          |                          |                       |
|                           |       | 5F WIFI (R&D 15m)   | 0°            | 228 Mbps                 | 255 Mbps                 | 0                     |
|                           |       |                     | 90°           | 246 Mbps                 | 260 Mbps                 | 0                     |
|                           |       |                     | 180°          | 231 Mbps                 | 253 Mbps                 | 0                     |
|                           |       |                     | 270°          | 234 Mbps                 | 259 Mbps                 | 0                     |

## Measured Data of Throughput

Transmission link speed ( 2.4G: 150 Mbps / 5G: 433 Mbps )

### Network & internet > Wi-Fi > SWARD-RD

Your device is discoverable on the network. Select this if you need file sharing or use apps that communicate over this network. You should know and trust the people and devices on the network.

Configure firewall and security settings

Metered connection  
Some apps might work differently to reduce data usage when you're connected to this network. ☐

Set a data limit to help control data usage on this network

Random hardware addresses  
Help protect your privacy by making it harder for people to track your device location when you connect to this network. The setting takes effect the next time you connect to this network. ☐

IP assignment: Automatic (DHCP)

DNS server assignment: Automatic (DHCP)

SSID: SWARD-RD

Protocol: Wi-Fi 4 (802.11n)

Security type: Open

Manufacturer: Realtek Semiconductor Corp.

Description: Realtek 8821CE Wireless LAN 802.11n PCI-E NIC

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Network band: 2.4 GHz

Network channel: 6

Link speed (Receive/Transmit): 150/150 (Mbps)

Link local IPv6 address: fe80:d41e9368:68e:d502%16

IPv4 address: 192.168.1.111

IPv4 DNS servers: 192.168.1.1 (Unencrypted)

Physical address (MAC): 64-82-14-7A-A2-DE

Advanced Wi-Fi network properties

```

iperf -s
Server listening on TCP port 5001
TCP window size: 64.0 KByte (default)

iperf -s
Server listening on TCP port 5001
TCP window size: 64.0 KByte (default)

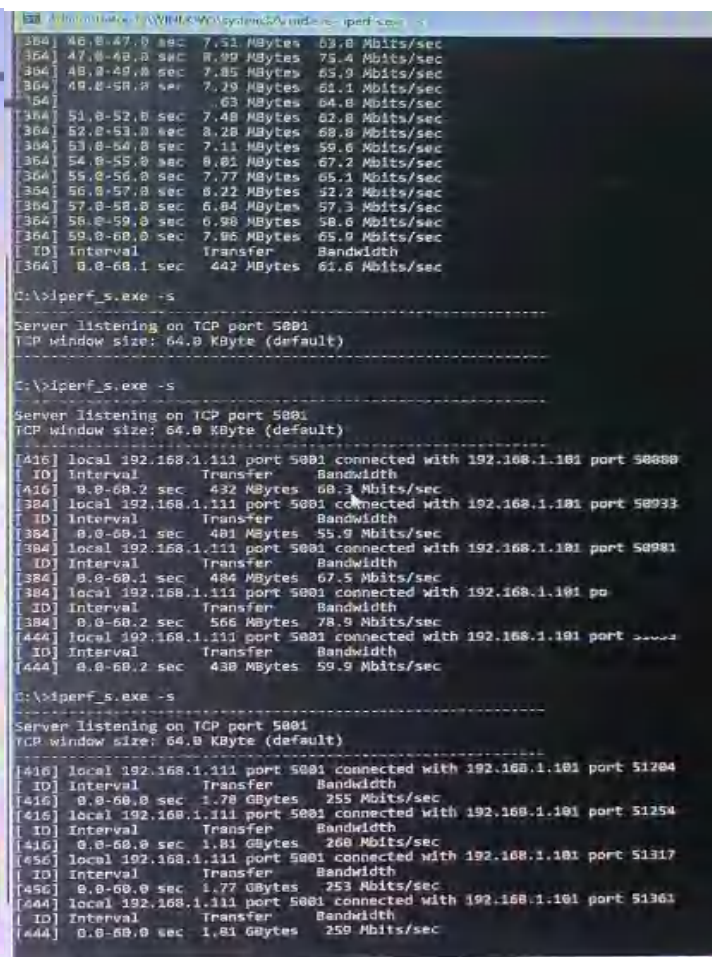
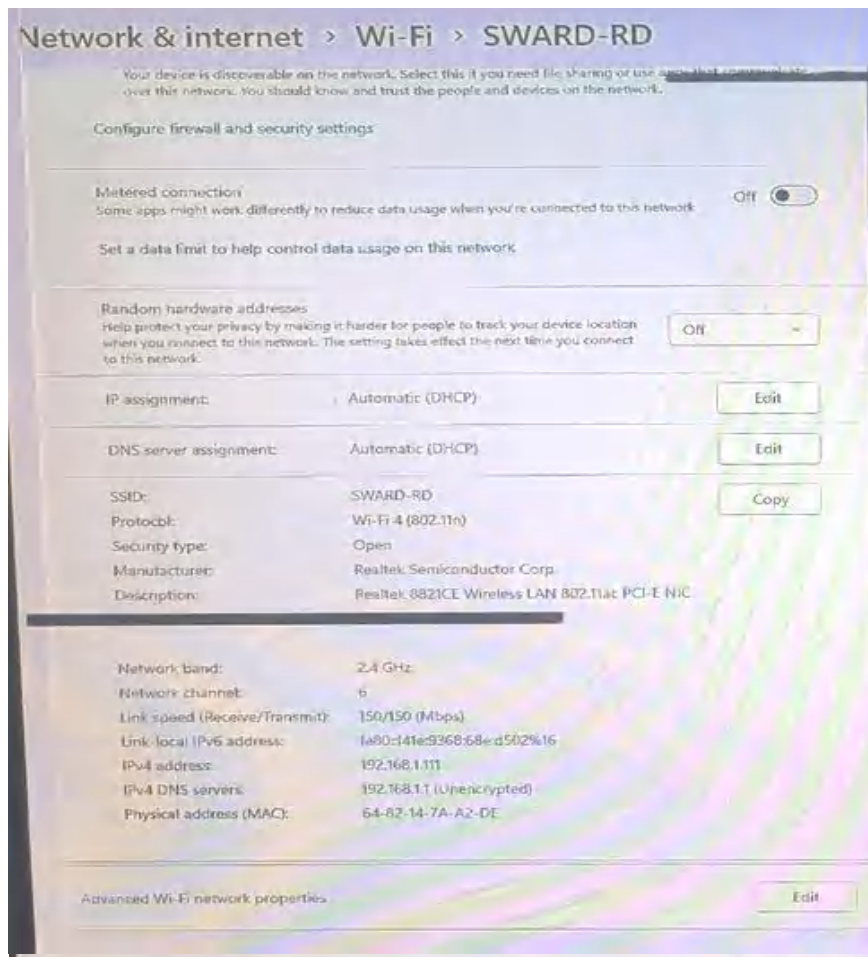
iperf -s
Server listening on TCP port 5001
TCP window size: 64.0 KByte (default)
[416] local 192.168.1.111 port 5001 connected with 192.168.1.101 port 5000
[416] 0.0-60.2 sec 432 MBytes 60.3 Mbits/sec
[384] local 192.168.1.111 port 5001 connected with 192.168.1.101 port 50033
[384] 0.0-60.1 sec 401 MBytes 55.9 Mbits/sec
[384] local 192.168.1.111 port 5001 connected with 192.168.1.101 port 50981
[384] 0.0-60.1 sec 404 MBytes 67.5 Mbits/sec
[384] local 192.168.1.111 port 5001 connected with 192.168.1.101 po
[384] 0.0-60.2 sec 566 MBytes 78.9 Mbits/sec
[444] local 192.168.1.111 port 5001 connected with 192.168.1.101 port 5000
[444] 0.0-60.2 sec 430 MBytes 59.9 Mbits/sec

iperf -s
Server listening on TCP port 5001
TCP window size: 64.0 KByte (default)
[416] local 192.168.1.111 port 5001 connected with 192.168.1.101 port 51204
[416] 0.0-60.0 sec 1.70 GBytes 255 Mbits/sec
[416] local 192.168.1.111 port 5001 connected with 192.168.1.101 port 51254
[416] 0.0-60.0 sec 1.81 GBytes 260 Mbits/sec
[456] local 192.168.1.111 port 5001 connected with 192.168.1.101 port 51317
[456] 0.0-60.0 sec 1.77 GBytes 253 Mbits/sec
[444] local 192.168.1.111 port 5001 connected with 192.168.1.101 port 51361
[444] 0.0-60.0 sec 1.81 GBytes 259 Mbits/sec

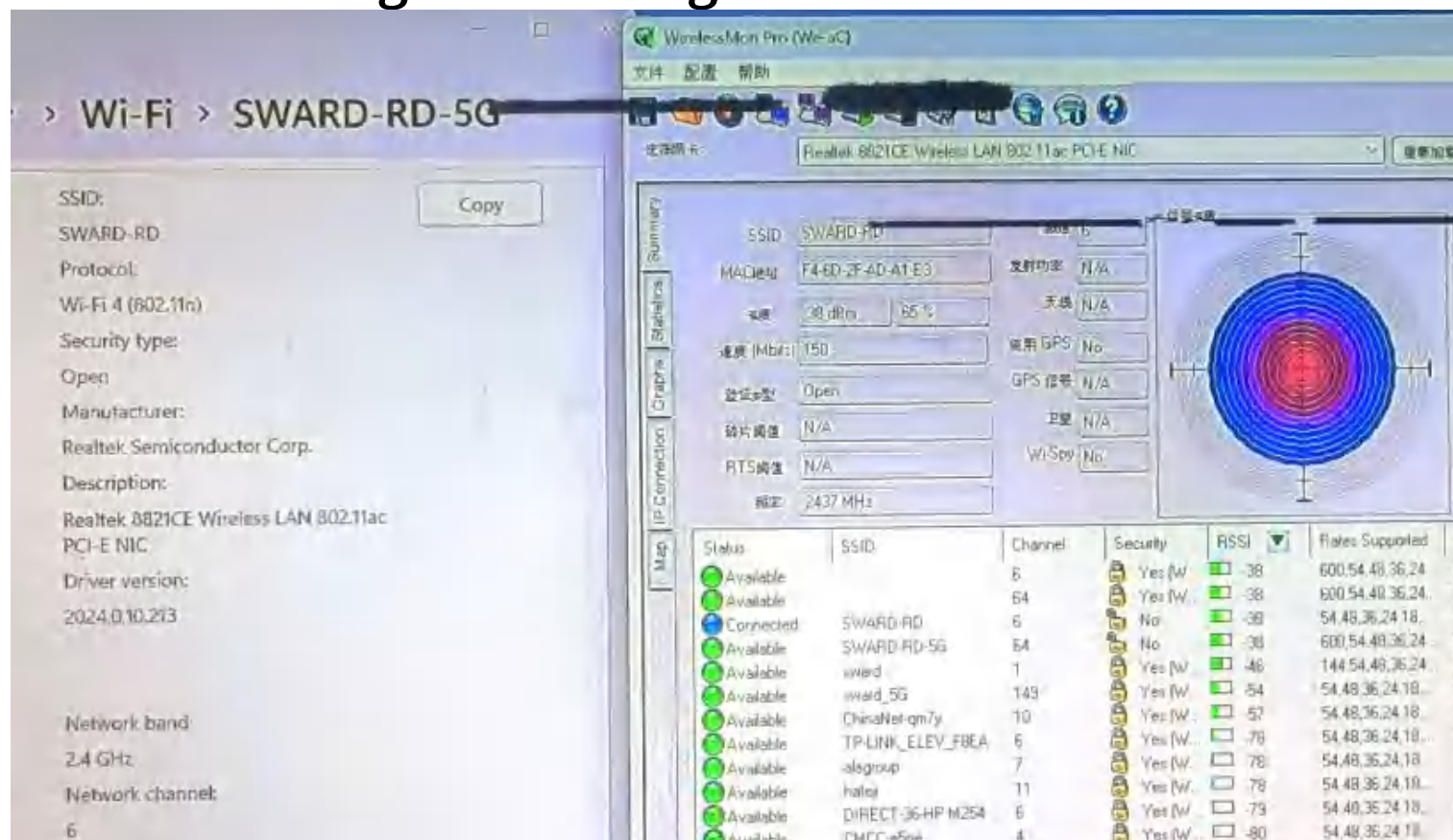
```

## Measured Data of Throughput

Transmission link speed ( 2.4G: 150 Mbps / 5G: 433 Mbps )



## Antenna 2.4G Signal Strength / RSSI



Test Location: R & D of Sward

Test Time : 16:00-16:30

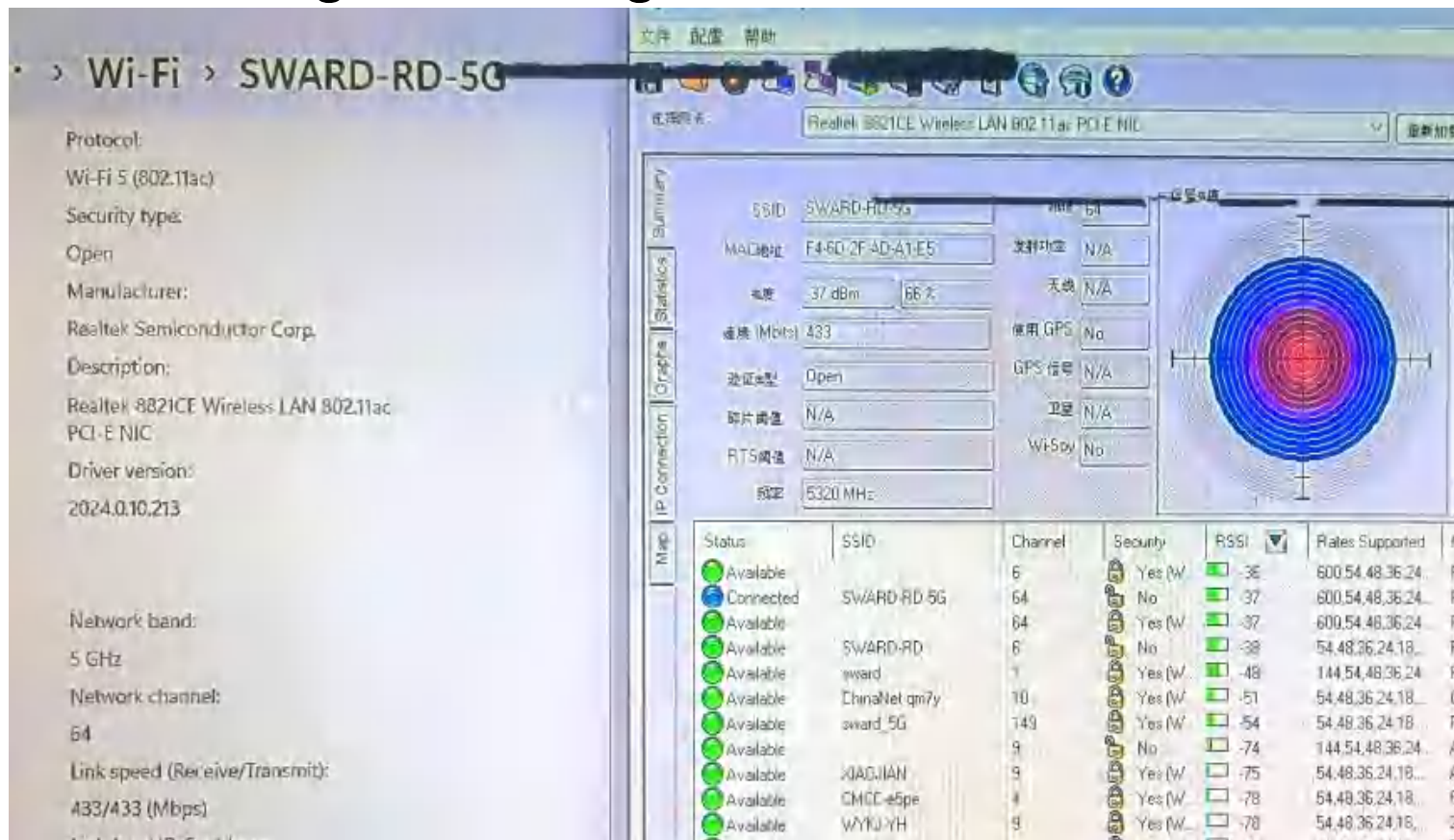
Test Distance: 10-15 meters

Test Result : -44dbm to -38dbm -38dbm~

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Building B, Hexi Hangcheng Industrial Zone, No. 135 Qianjin No. 2 Road, Baoan District, Shenzhen

## Antenna 5G Signal Strength / RSSI



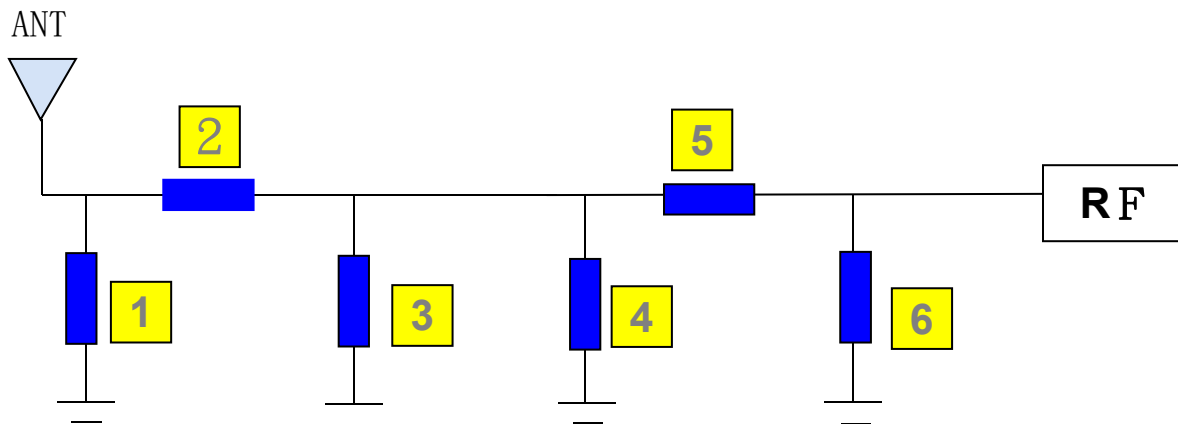
Test Location: R & D of Sward

Test Time : 16:00-16:30

Test Distance: 10-15 meters

Test Result : -44dbm to -38dbm (-37dbm)

## Antenna Matching Network



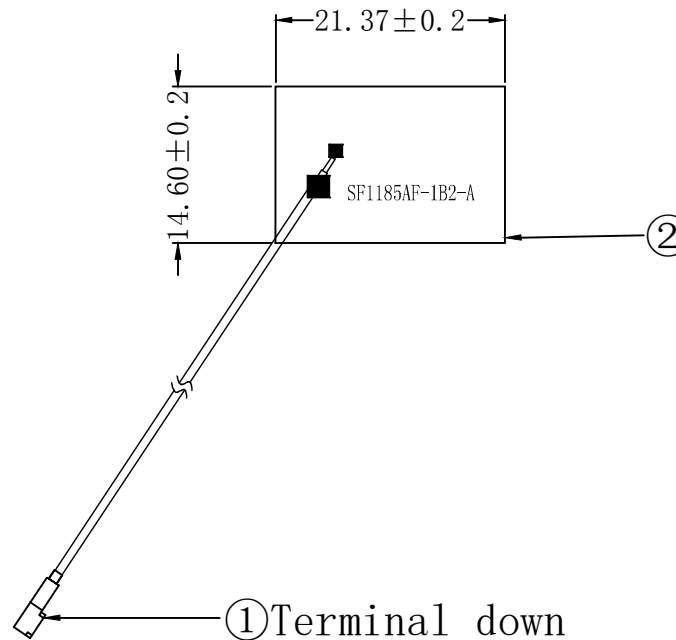
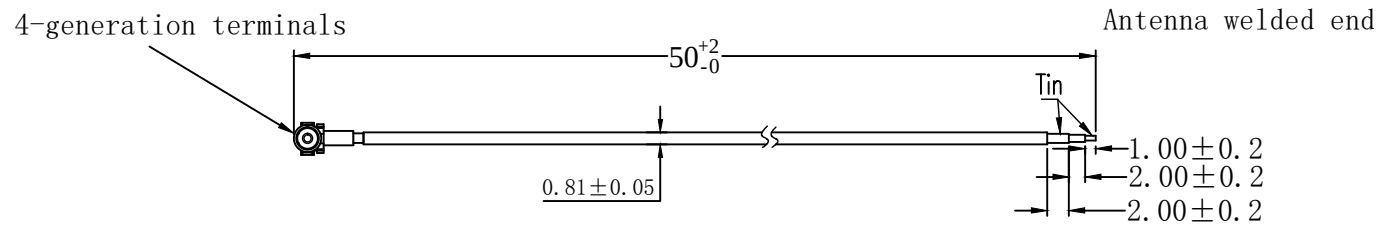
**Antenna matching has not been changed.**

| Main Ant       | 1 | 2 | 3 | 4 | 5 | 6 | Remarks |
|----------------|---|---|---|---|---|---|---------|
| Original Match | — | — | — | — | — | — | —       |
| Changed Match  | — | — | — | — | — | — | —       |

## Assembly Instructions



**No changes have been made.**



# Technical requirements:

1. Hit \* as the key size.
2. The dimensions shall meet the requirements of the drawing.
3. No virtual welding or false welding. The requirements shall be rounded and full.
4. The network test has passed (the specified waveform appeared).
5. The linear dimension without marked tolerance is in accordance with SJ/T 10628 1995 level 6, and the tolerance value is equally divided by the upper and lower deviations.

|               |              |                        |        |          |                |         |     |             |            |  |  |
|---------------|--------------|------------------------|--------|----------|----------------|---------|-----|-------------|------------|--|--|
| 5             |              |                        |        |          |                |         |     |             |            |  |  |
| 4             |              |                        |        |          |                |         |     |             |            |  |  |
| 3             |              |                        |        |          |                |         |     |             |            |  |  |
| 2             | FPC          |                        | black  | 1        | SF1185AF-1B2-A | RD      | ZYA | 2024. 5. 23 | Q C        |  |  |
| 1             | Coaxial line | 4-generation terminals | black  | 1        | Φ=0.81mm       | RF      |     |             |            |  |  |
| Serial number | Name         | Materials              | Colour | Quantity | Description    | Examine |     |             | Permission |  |  |

**SWARD**

Sward Communications Technologies LTD

SF1185AF-1L24B-050-A

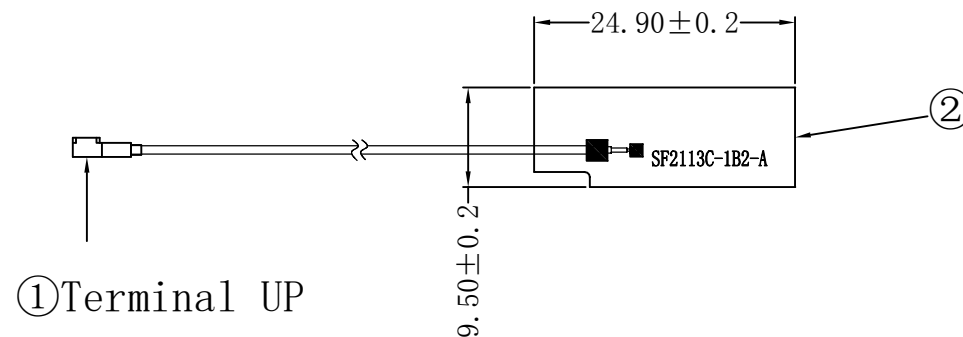
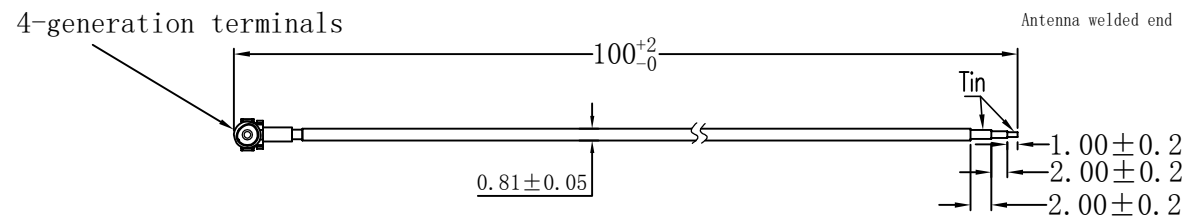
Phase marker

scale

1 : 1

1 in total The 1st one

ROHS



1Technical requirements:

1. Hit \* as the key size.
2. The dimensions shall meet the requirements of the drawing.
3. No virtual welding or false welding. The requirements shall be rounded and full.
4. The network test has passed (the specified waveform appeared).
5. The linear dimension without marked tolerance is in accordance with SJ/T 10628 1995 level 6, and the tolerance value is equally divided by the upper and lower deviations.

|               |              |                      |        |          |                |             |           |      |                 |           |                  |              |  |  |                      |             |       |                 |       |
|---------------|--------------|----------------------|--------|----------|----------------|-------------|-----------|------|-----------------|-----------|------------------|--------------|--|--|----------------------|-------------|-------|-----------------|-------|
| 5             |              |                      |        |          |                |             |           |      |                 |           | <div>SWORD</div> |              |  |  | SF1185AF-1L24B-050-A |             |       |                 |       |
| 4             |              |                      |        |          |                |             |           |      |                 |           |                  |              |  |  |                      |             |       |                 |       |
| 3             |              |                      |        |          |                | <div></div> | Signature | Date | Mass production | Signature | Date             | Phase marker |  |  |                      |             |       |                 | scale |
| 2             | FPC          |                      | black  | 1        | SF1185AF-1B2-A |             | RD        | ZYA  | 2024. 5. 23     | Q C       |                  |              |  |  |                      |             |       |                 |       |
| 1             | Coaxial line | 4-generati terminals | black  | 1        | ϕ=0. 81mm      | RF          |           |      |                 |           |                  | 1            |  |  | A                    |             | 1 : 1 | <div>ROHS</div> |       |
| Serial number | Name         | Materials            | Colour | Quantity | Description    | Examine     |           |      | Permission      |           |                  | 1 in total   |  |  |                      | The 1st one |       |                 |       |

**Notes:**

1. This report is based on the actual commissioning and testing of the commissioning prototype, including the assembly instructions, antenna position and assembly position of each device. **It cannot be changed at will;**
2. If there is **any change** in the materials used in the prototype, it is necessary to timely feed back to our company for **re-verification;**
3. List of sensitive devices:
  - TP** (material, coating, wiring, etc.)
  - Screen** (amplification circuit, led, cable layout design, etc.)
  - Shell material** (antenna assembly method, structural interference, shell material, antenna position height and area, etc.)
  - Mainboard** (mainboard conduction, RF circuit matching, PA, duplex, filter, LNA, power circuit, etc.)
  - Camera, battery, motor, MIC, fingerprint identification module, etc.**
4. Due to the small number or only one sample adjusting machine, some probabilistic problems cannot be completely found. **It is recommended to Check the problem points in small batch trial production before mass production**( screen flashes , horn noise, TP jump point, black screen OR crash, signal diving, etc.).