

## Antenna specification for approval

|                             |                                      |                               |           |
|-----------------------------|--------------------------------------|-------------------------------|-----------|
| Customer name               | Boshida                              |                               |           |
| Model                       | S1 Recorder (NT96675-8189FTV module) |                               |           |
| Antenna frequency           | 2.4GHZ                               |                               |           |
| Antenna function            | WIFI antenna                         |                               |           |
| Antenna material            | FPC                                  | FPC color                     | black     |
| model                       | SF1974F-1B2-A                        |                               |           |
| Material number             | SF1974F-1R23B-060-A                  |                               |           |
| Customer Part Number        |                                      |                               |           |
| Ward accepted the signature |                                      | Client acknowledges signature |           |
| structure                   |                                      | Purchase                      |           |
| Document control            |                                      | structure                     |           |
| radio frequency             |                                      | engineering                   |           |
| To examine                  |                                      | QC                            |           |
| Responsible LTT             |                                      | To examine                    |           |
| date<br>2023.08.22          | Seal area                            | date<br>2023.08.22            | Seal area |

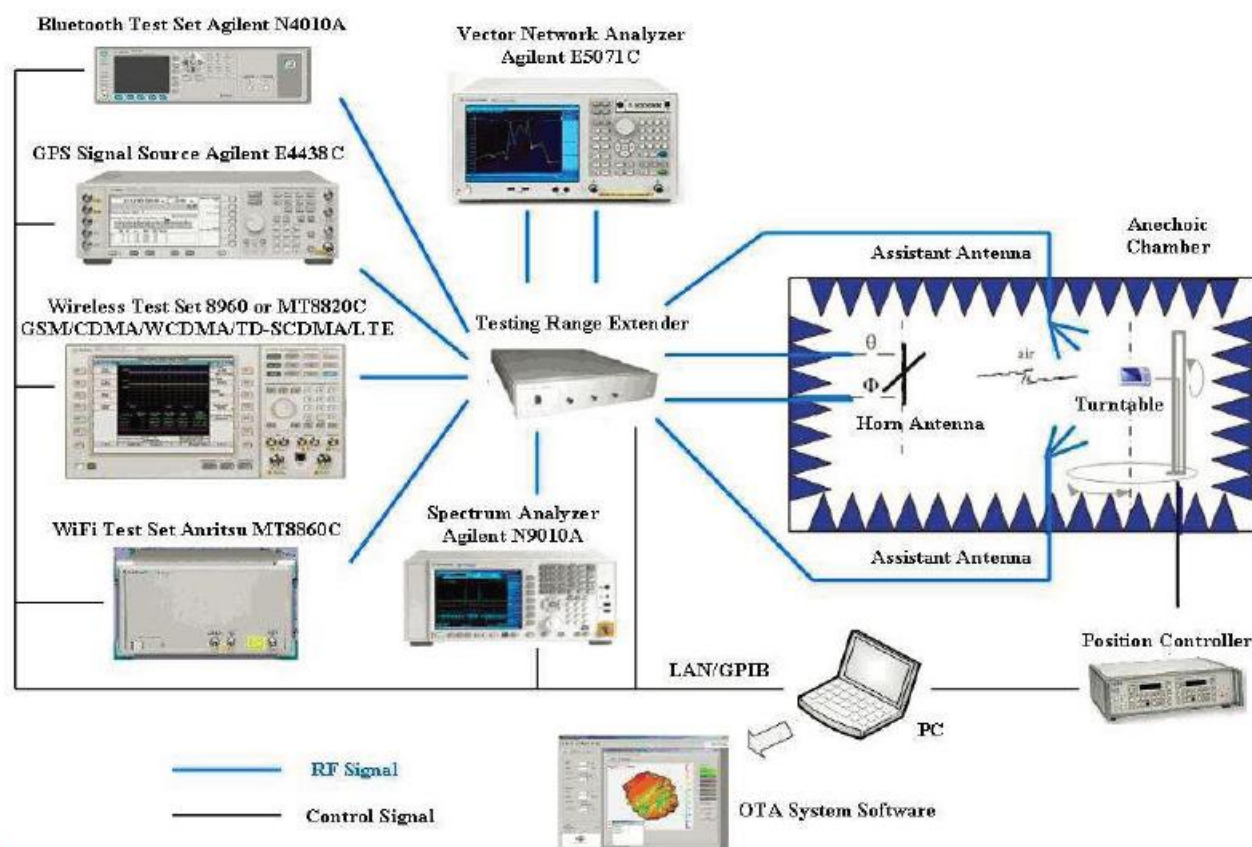
| Serial number | Certification number | Material type      | Date of issue | Remarks  |
|---------------|----------------------|--------------------|---------------|----------|
| 1             | A2230173541101001E   | Tinned copper wire | 2023-04-24    | One year |
| 2             | CANEC2227657302      | halogen            | 2022-12-28    | One year |
| 3             | CANEC2227657303      | Adhesive           | 2022-12-28    | One year |
| 4             | SHAEC23000346911     | FEP sheath         | 2023-01-13    | One year |
| 5             | SHAEC22004639301     | FEP insulation     | 2022-12-15    | One year |
| 6             | SZXEC2203054804      | Tin wire           | 2022-09-19    | One year |
| 7             | SZXEC2203054808      | Tin                | 2022-09-19    | One year |
| 8             | ETR23701480          | Printing ink       | 2023-07-13    | One year |
| 9             | A2230173918101001E   | Substrate          | 2023-04-18    | One year |
| 10            | CANEC2227574118      | EVA foam           | 2023-01-03    | One year |
| 11            | A2230383826101003    | Conductive cloth   | 2023-08-04    | One year |
| 12            | CANEC2218227002      | Gold plating       | 2022-08-30    | One year |

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## 一: Device Support & Testable Antenna Type



| Antenna function                                       | Frequency Range                                            | test instrument                                     | test method                                                          | standard test                                 |
|--------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------|
| 2G antenna (GSM)                                       | 824MHz-960MHz,<br>1710MHz-1990MHz                          | 5071B、8960<br>OTA darkroom                          | Active test, passive test                                            | Soward standards,<br>customer<br>requirements |
| 3G antenna<br>(WCDMA/TDSCDMA/CDMA-EVDO/2000)           | 824MHz-960MHz,<br>1710MHz-2170MHz                          | 5071B、8960<br>OTA darkroom                          | Active test, passive test                                            | Soward standards,<br>customer<br>requirements |
| 4G antenna (LTE-FDD/LTE-TDD)                           |                                                            | 5071B、CMW500、<br>SP8011、OTA<br>darkroom             | Active test, passive test                                            | Soward standards,<br>customer<br>requirements |
| WIFI antenna                                           | 2.4GHz-2.48GHz,<br>5.15GHz-5.35GHz,<br>5.725GHz-5.825GHz   | 5071B、CMW500、OTA<br>darkroom、router、<br>PC          | Active test, passive<br>test,<br>APK actual test,<br>throughput test | Soward standards,<br>customer<br>requirements |
| BT antenna                                             | 2.4GHz-2.48GHz,                                            | 5071B、OTA darkroom<br>、Bluetooth Speaker            | Passive test, actual test                                            | Soward standards,<br>customer<br>requirements |
| Positioning antenna<br>(GPS, GLONASS, Beidou, Galileo) | 1.575.42MHz±10MHz<br>1602MHz±0.5625MHz<br>1561MHz±2.046MHz | 5071B、OTA darkroom<br>、APK                          | Passive test, actual test                                            | Soward standards,<br>customer<br>requirements |
| NFC antenna                                            | 13.56MHz                                                   | 5071B、Dedicated<br>test fixture、OTA<br>darkroom、APK | Passive test, actual test                                            | Soward standards,<br>customer<br>requirements |
| Remote control antenna                                 | 433MHz                                                     | 5071B、OTA darkroom                                  | Passive test, actual test                                            | Soward standards,<br>customer<br>requirements |

## 二: summarize

### (1)Antenna performance

- 1.This approval sheet supports for MID project. FPC antennas include in this project. This report is for the performance of WIFI antenna.
- 2.Antenna shape size: Meet the requirement of MID
- 3.Antenna band: 2400MHz~2500MHz
- 4.Antenna material: Antenna material meet the requirement of MID
- 5.Adhesive performance: Adhesive performance meet the requirement of MID
- 6.Antenna performance meet the spec below:

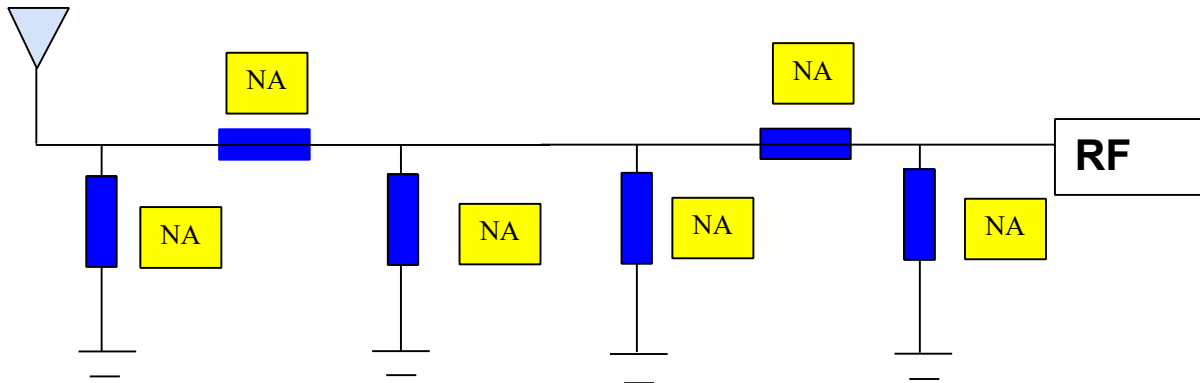
| Description            | 2. 4GHZ~2. 5GHz           | Units |
|------------------------|---------------------------|-------|
| VSWR                   | $\leq 2.0$                |       |
| Average Antenna Gain   | $\geq -4.5$               | dB    |
|                        |                           |       |
| Feed Impedance         | 50 ohms                   |       |
| Operating Temperature  | -40 to +85 deg C          |       |
| Polarization / Azimuth | Linear / Omni-directional |       |

### (2)Mechanical Information

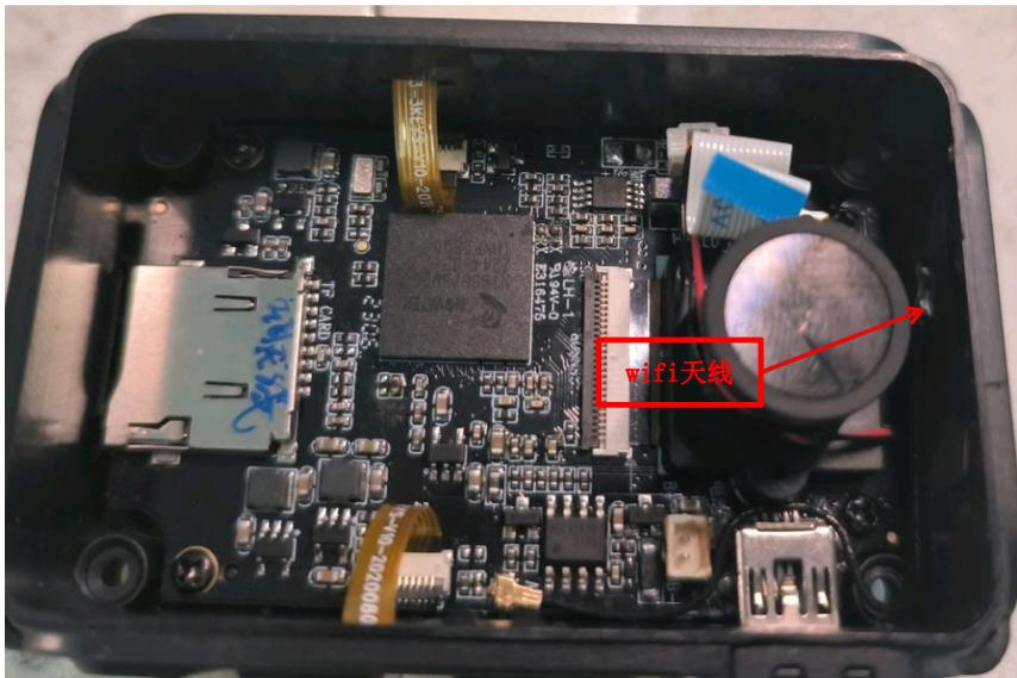
| Mechanical Dimension  |                            |
|-----------------------|----------------------------|
| Cable Length          | 060mm/BLACK                |
| Description           | WIFI antenna               |
| Material              | FPC                        |
| Coaxial Cable         | 50 $\Omega$ /O. D. 0. 81mm |
| Environmental         |                            |
| Operation Temperature | -40 to +85 deg C           |
| Storage Temperature   | -40 to +85 deg C           |

## 三: Match circuit diagram & machine picture & antenna picture

### (1) Matching circuit



### (2) Machine picture & antenna picture





## 四:Antenna standing wave ratio & Antenna Efficiency & measured results



| Passive Test For 2.4G |             |              |               |               |            |             |             |             |
|-----------------------|-------------|--------------|---------------|---------------|------------|-------------|-------------|-------------|
| Freq<br>(MHz)         | Effi<br>(%) | Effi<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | UHS<br>(%) | DHIS<br>(%) | Max<br>(dB) | Min<br>(dB) |
| 2400                  | 33.01       | -4.81        | -0.18         | -2.33         | 15.365     | 17.65       | -0.18       | -13.81      |
| 2410                  | 31.96       | -4.95        | -0.42         | -2.57         | 15.122     | 16.838      | -0.42       | -14.68      |
| 2420                  | 32.8        | -4.84        | -0.46         | -2.61         | 15.983     | 16.82       | -0.46       | -17.21      |
| 2430                  | 33.49       | -4.75        | -0.45         | -2.6          | 16.784     | 16.711      | -0.45       | -17.9       |
| 2440                  | 34.91       | -4.57        | -0.33         | -2.48         | 17.895     | 17.018      | -0.33       | -15.49      |
| 2450                  | 36.2        | -4.41        | -0.22         | -2.37         | 18.875     | 17.33       | -0.22       | -13.77      |
| 2460                  | 35.19       | -4.54        | -0.41         | -2.56         | 18.597     | 16.59       | -0.41       | -13.81      |
| 2470                  | 33.63       | -4.73        | -0.8          | -2.95         | 18.047     | 15.58       | -0.8        | -14.7       |
| 2480                  | 34.44       | -4.63        | -0.79         | -2.94         | 18.741     | 15.697      | -0.79       | -15.99      |
| 2490                  | 38.31       | -4.17        | -0.17         | -2.32         | 21.101     | 17.206      | -0.17       | -15.83      |
| 2500                  | 41.06       | -3.87        | 0.26          | -1.89         | 22.822     | 18.237      | 0.26        | -15.33      |

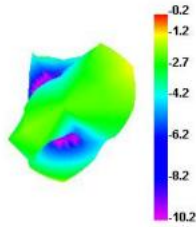
Measured effect

| 实测效果 |               |
|------|---------------|
| 机型编号 | 1             |
| 测试环境 | 索沃德研发中心       |
| 测试设备 | Redmi K50 Pro |
| 测试距离 | 15 米          |

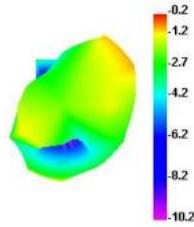
| 下载速率 |               |
|------|---------------|
| 机型编号 | 1             |
| 测试环境 | 索沃德研发中心-1米    |
| 测试设备 | Redmi K50 Pro |
| 测试速率 | 3.2Mbps左右     |

## 五:3D pattern

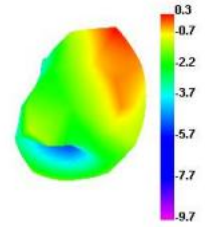
2400.000MHz



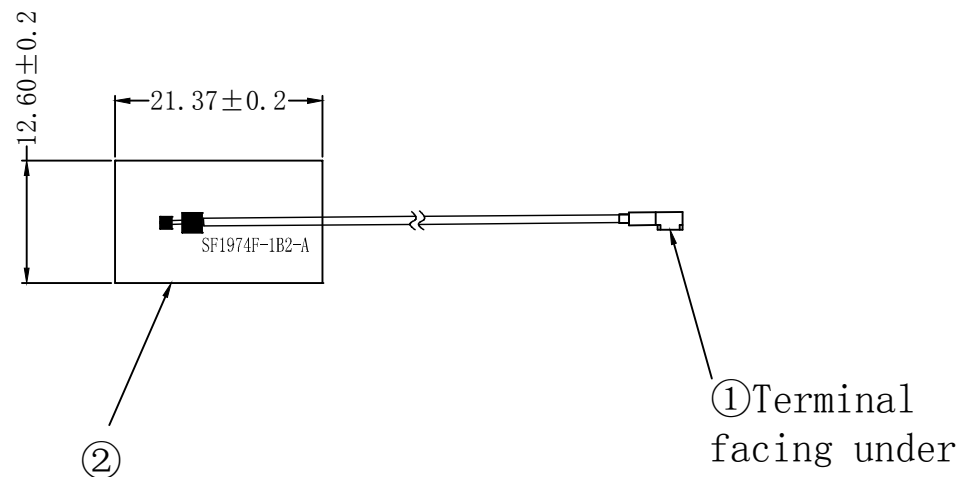
2450.000MHz



2500.000MHz



## 六:Structural drawing



- 1.\* for critical dimensions;
- 2.Size conform to the requirements of the drawings;
- 3.No virtual welding welding point, false welding. Require full welding points.
- 4.Network test pass.
- 5.No marked tolerance according toSJ/T 10628 1995 6classes;

[illegible]