

# JMGO Sample Confirmation Letter

Supplier Name: SHENZHEN YINGJIACHUANG TECHNOLOGY ELECTRONIC CO. LTD

Material Name: WiFi1 2.4G/5.8G Black FPC built-in Antenna (K970A0)

Material No.: 23040351&YJC-6N350-B09

Material Description: \_\_\_\_\_ / \_\_\_\_\_

Version: A0

Drawing Version: A0

|                                                                                                                              |              |                                                                                             |                           |     |                     |                               |
|------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------|---------------------------|-----|---------------------|-------------------------------|
| Supplier Approved<br><b>This needs to be stamped, and each acknowledgment letter needs to be stamped with a riding seal.</b> |              |                                                                                             | Shenzhen Holatek Approved |     |                     |                               |
| R&D/Engineering                                                                                                              | Quality      | Approved                                                                                    | Product Center            | R&D | Supply-Chain Center | Quality Management Department |
| Yin FeiJie                                                                                                                   | Yang YunGang |  Xiao Han |                           |     |                     |                               |

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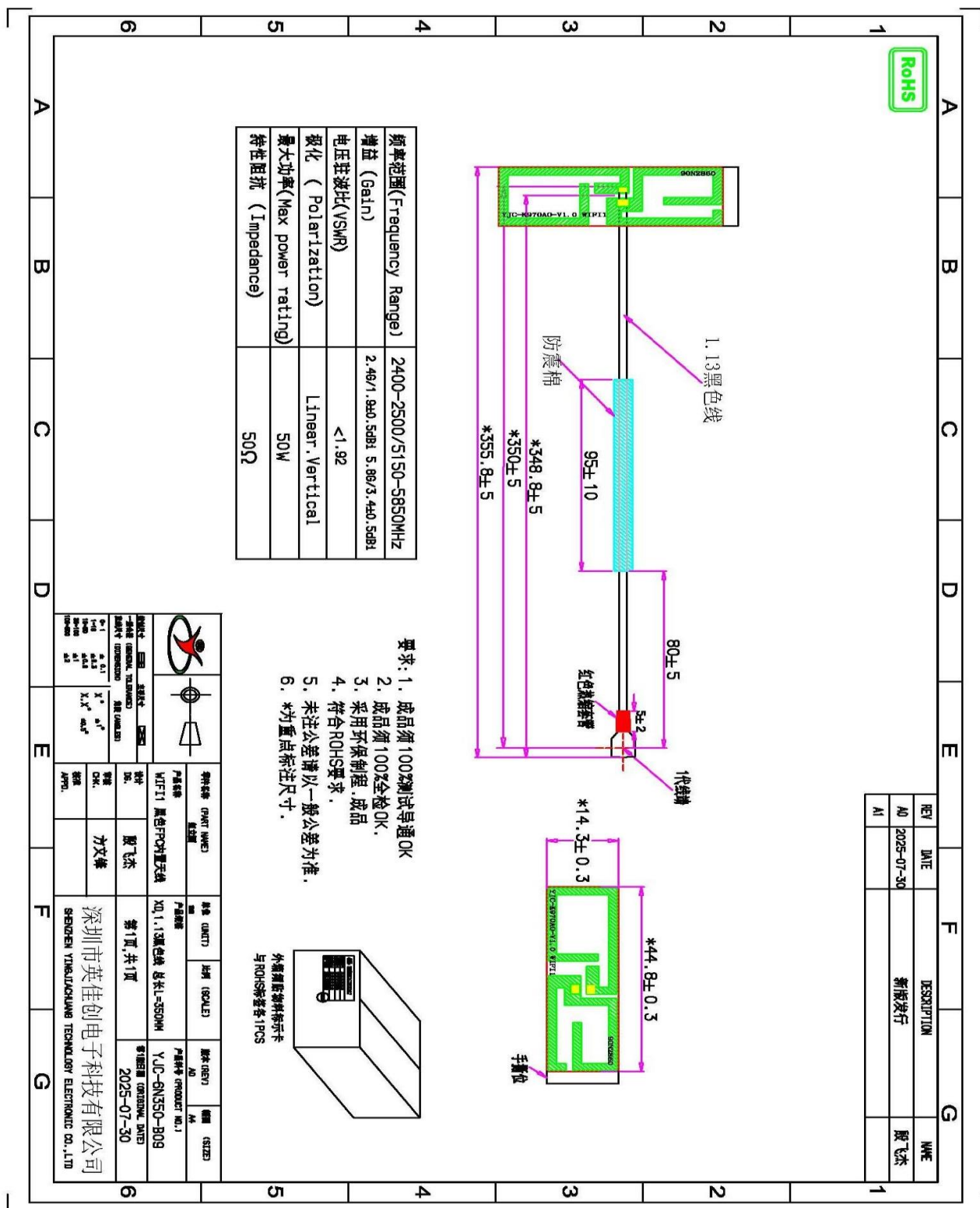
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Product drawings:



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## Specification:

| Electrical Specifications |                        |
|---------------------------|------------------------|
| Frequency Range           | 2400-2500/5150-5850MHz |
| VSWR                      | <1.92                  |
| Input Impedance           | 50 $\Omega$            |
| Direction                 | All                    |
| Gain(2.4G)                | 1.9 dBi                |
| Gain(5.1G)                | 3.4 dBi                |
| Gain(5.8G)                | 3.4 dBi                |
| Mechanical Specifications |                        |
| Cable Color               | Black                  |
| Input connector           | XD                     |
| Cable length              | 350mm (Total Length)   |
| Working Temperature       | -20℃~+70℃              |
| Working Humidity          | 20%~80%                |

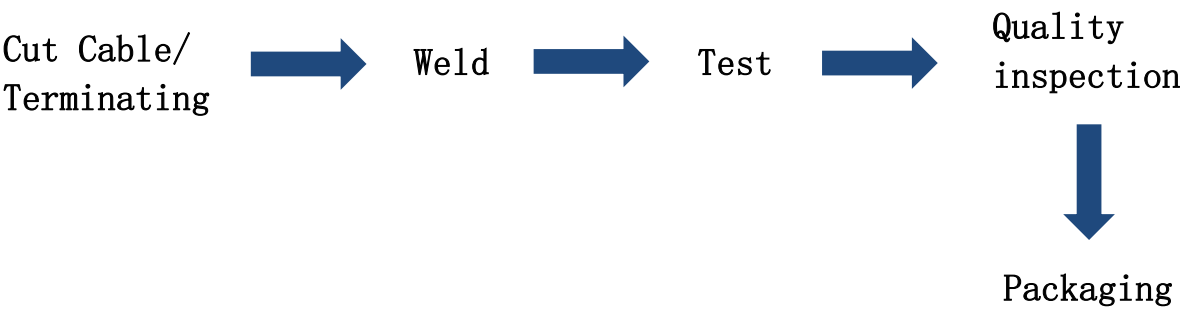
## Environmental performance test:

| Project                               | Test condition                                                                                                                                                                                                            | Standard                                                                                                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Storage Conditions                    | In the absence of specified test temperature, humidity, air pressure is as follows:<br>1. Temperature is - 20 ℃ ~ + 70 ℃<br>2. Relative humidity of 45% to 85%<br>3. Air pressure is 86 kpa to 106 kpa                    | Electrical and mechanical properties is normal                                                                 |
| High and low temperature test         | Between 70 ℃ and -20 ℃ for 5 loops, then 1-2 h under normal conditions, check the appearance quality.                                                                                                                     | Size should meet the requirements and should satisfy the content with the electrical and mechanical properties |
| Constant damp and hot resistance test | 95 + / - 3% relative humidity, temperature test: 40 ℃. Lasts 2 h after, try to take out the determination of electrical properties, within 5 min after try 1-2 h under article normal thing, check the appearance quality | Size should meet the requirements and should satisfy the content with the electrical and mechanical properties |
| vibration test                        | Vibration frequency range: 10-55 Hz, vibration frequency range of displacement amplitude: 0.35 MM, acceleration amplitude: 50.0 M/S, sweep cycles: 30 times                                                               | Electrical and mechanical properties is normal                                                                 |
| Fall down test                        | 1 m high altitude in accordance with the perpendicular axis free drop 3 times                                                                                                                                             | Electrical and mechanical properties is normal                                                                 |



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Process Flow Diagram



BOM list

FPC、Cable、Terminal、Heat shrinkable sleeve、Shockproof cotton、PE packaging bag、Carton

Performance testing reports:

Antenna physical image:



Antenna performance test chart:



|                 |      |      |      |      |      |      |
|-----------------|------|------|------|------|------|------|
| Frequency (MHZ) | 2400 | 2450 | 2500 | 5150 | 5725 | 5850 |
| VSWR (dB)       | 1.75 | 1.49 | 1.49 | 1.43 | 1.43 | 1.36 |

WIFI 1 and WIFI 2 isolation test diagram



WIFI 1 and BT isolation test diagram

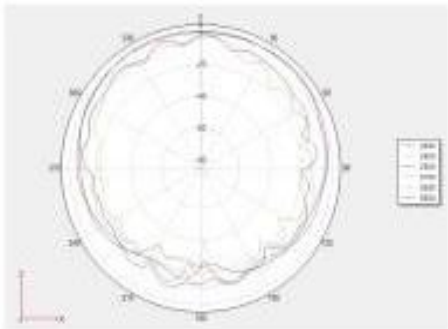


|                                |      |      |      |      |      |      |
|--------------------------------|------|------|------|------|------|------|
| Frequency (MHz)                | 2400 | 2450 | 2500 | 5150 | 5725 | 5850 |
| WIFI1 and BT isolation (dB)    | -40  | -36  | -36  | -44  | -37  | -39  |
| WIFI1 and WIFI2 isolation (dB) | -24  | -25  | -28  | -42  | -34  | -32  |

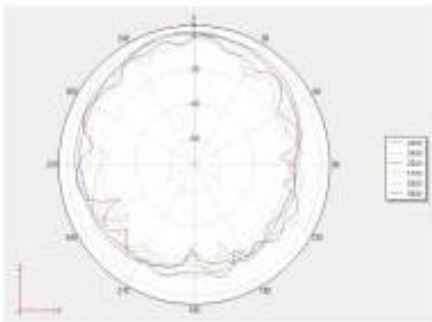
2D、3D test data (WIFI 1):

| Frequency | Efficiency (%) | Gain. (dBi) |
|-----------|----------------|-------------|
| 2400MHz   | 47.12          | 1.73        |
| 2410MHz   | 46.18          | 1.81        |
| 2420MHz   | 47.04          | 1.78        |
| 2430MHz   | 48.77          | 1.65        |
| 2440MHz   | 50.55          | 1.70        |
| 2450MHz   | 49.28          | 1.77        |
| 2460MHz   | 47.34          | 1.90        |
| 2470MHz   | 46.75          | 1.63        |
| 2480MHz   | 45.81          | 1.68        |
| 2490MHz   | 46.39          | 1.87        |
| 2500MHz   | 47.33          | 1.77        |
| 5150MHz   | 35.81          | 3.36        |
| 5250MHz   | 34.76          | 3.40        |
| 5350MHz   | 35.03          | 3.37        |
| 5450MHz   | 36.3           | 3.40        |
| 5550MHz   | 37.84          | 3.29        |
| 5650MHz   | 35.05          | 3.30        |
| 5750MHz   | 36.03          | 3.40        |
| 5850MHz   | 37.72          | 3.20        |

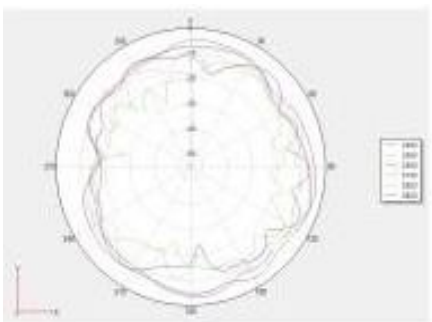
Phi 0 2D :



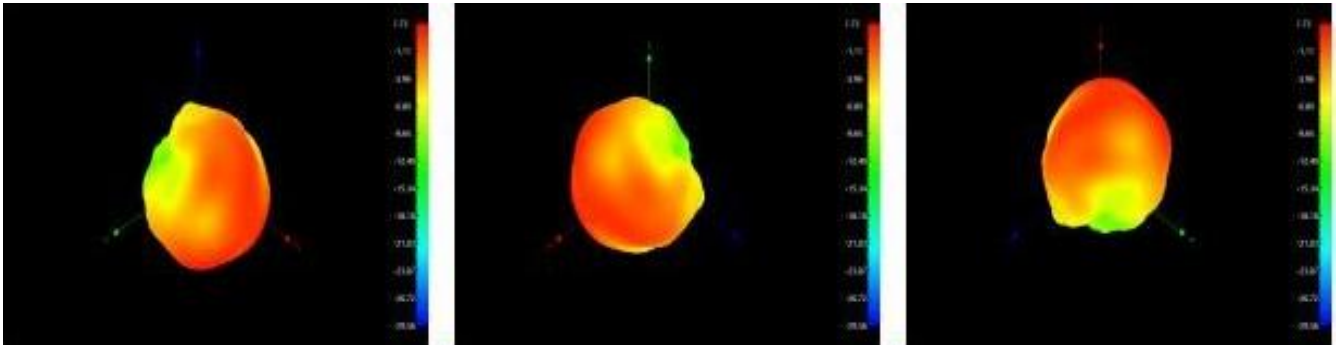
Phi 90 2D



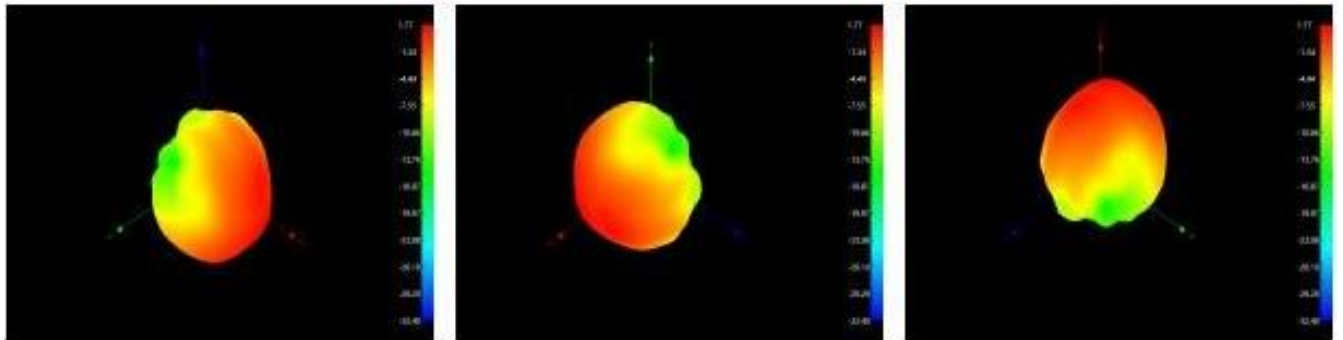
Theta 90 2D



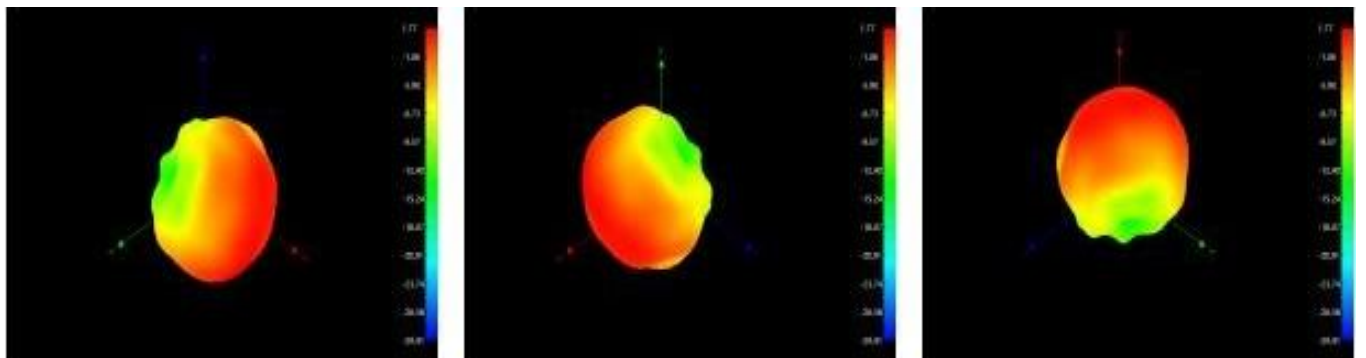
3D 2400:



3D 2450:

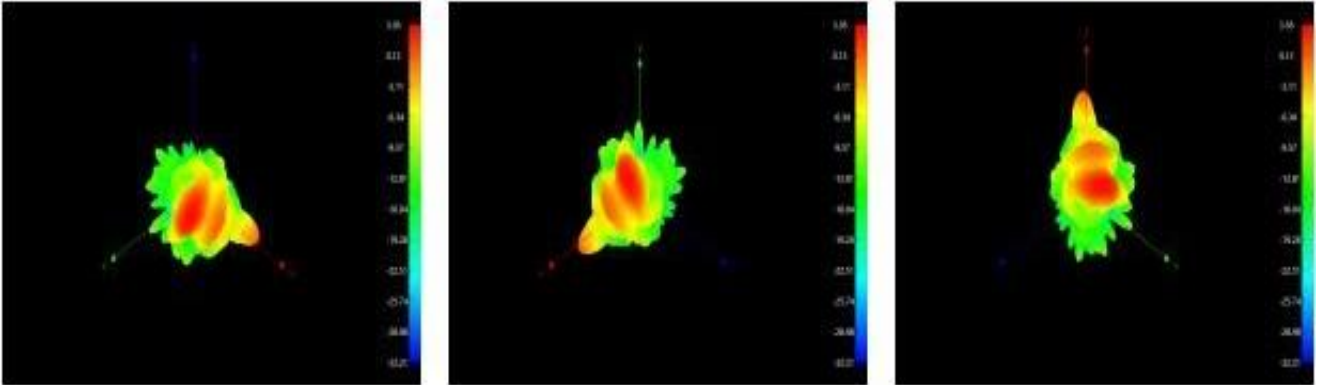


3D 2500:

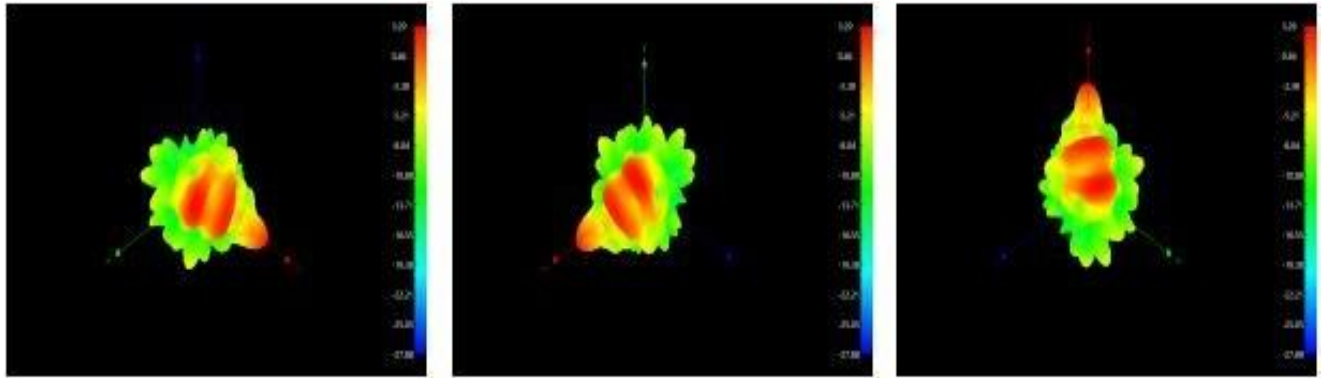


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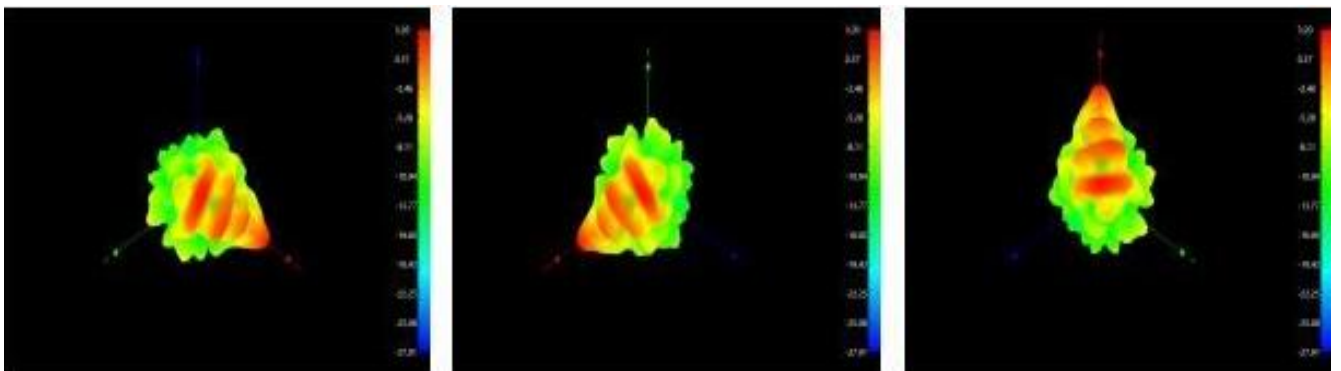
3D 5150:



3D 5500:



3D 5850:



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OTA active test data:

| Item | Measurement | Band             | Channel | Frequency | Total  |
|------|-------------|------------------|---------|-----------|--------|
| 1    | TRP         | WIFI_B (11M)     | 1       | 2412      | 15.81  |
| 2    | TRP         | WIFI_B (11M)     | 6       | 2437      | 14.25  |
| 3    | TRP         | WIFI_B (11M)     | 11      | 2462      | 15.12  |
| 4    | TIS(EIRP)   | WIFI_B (11M)     | 1       | 2412      | -83.4  |
| 5    | TIS(EIRP)   | WIFI_B (11M)     | 6       | 2437      | -82.13 |
| 6    | TIS(EIRP)   | WIFI_B (11M)     | 11      | 2462      | -83.74 |
| 7    | TRP         | WIFI_G (54M)     | 1       | 2412      | 13.39  |
| 8    | TRP         | WIFI_G (54M)     | 6       | 2437      | 13.79  |
| 9    | TRP         | WIFI_G (54M)     | 11      | 2462      | 14.51  |
| 10   | TIS(EIRP)   | WIFI_G (54M)     | 1       | 2412      | -69.4  |
| 11   | TIS(EIRP)   | WIFI_G (54M)     | 6       | 2437      | -70.13 |
| 12   | TIS(EIRP)   | WIFI_G (54M)     | 11      | 2462      | -70.74 |
| 13   | TRP         | WIFI_N_ISM (65M) | 1       | 2412      | 13.43  |
| 14   | TRP         | WIFI_N_ISM (65M) | 6       | 2437      | 13.5   |
| 15   | TRP         | WIFI_N_ISM (65M) | 11      | 2462      | 13.52  |
| 16   | TIS(EIRP)   | WIFI_N_ISM (65M) | 1       | 2412      | -68    |
| 17   | TIS(EIRP)   | WIFI_N_ISM (65M) | 6       | 2437      | -69.66 |
| 18   | TIS(EIRP)   | WIFI_N_ISM (65M) | 11      | 2462      | -68.56 |
| 19   | TRP         | WIFI_A (54M)     | 36      | 5180      | 11.6   |
| 20   | TRP         | WIFI_A (54M)     | 149     | 5745      | 12.19  |
| 21   | TRP         | WIFI_A (54M)     | 165     | 5825      | 12.46  |
| 22   | TIS(EIRP)   | WIFI_A (54M)     | 36      | 5180      | -73.44 |
| 23   | TIS(EIRP)   | WIFI_A (54M)     | 149     | 5745      | -73.74 |
| 24   | TIS(EIRP)   | WIFI_A (54M)     | 165     | 5825      | -74.37 |

| Material RoHS conformity declaration form                                                                                                                                                                                                                                                             |                                             |                    |              |           |                                     |    |    |                  |     |      |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------|--------------|-----------|-------------------------------------|----|----|------------------|-----|------|-------|
| This is to certify that the delivery to your company's components, raw materials, auxiliary materials used and the additives in the production engine      ord<br>with RoHS environmental requirements of the restrictions on the use of hazardous substances directive (RoHS directive 2011/65 / EC) |                                             |                    |              |           |                                     |    |    |                  |     |      |       |
| About components used raw materials, packaging materials, auxiliary materials and additives used in the production process such<br>as composition of the report is as follows:                                                                                                                        |                                             |                    |              |           |                                     |    |    |                  |     |      |       |
| Component<br>/Part Name                                                                                                                                                                                                                                                                               | Material<br>Composition                     | ICP report #       | Test<br>Org. | Test Date | Content of harmful substances (ppm) |    |    |                  |     |      | PASS? |
|                                                                                                                                                                                                                                                                                                       |                                             |                    |              |           | Cd                                  | Pb | Hg | Cr <sup>6+</sup> | PBB | PBDE | PASS  |
| FPC                                                                                                                                                                                                                                                                                                   | Ink                                         | ETR24902229M01     | SGS          | 24/09/23  | ND                                  | ND | ND | ND               | ND  | ND   | PASS  |
|                                                                                                                                                                                                                                                                                                       | Copper                                      | SHAEC24027480901   | SGS          | 24/12/06  | ND                                  | ND | ND | ND               | ND  | ND   | PASS  |
|                                                                                                                                                                                                                                                                                                       | FPC                                         | SHAEC24028809006   | SGS          | 24/12/20  | ND                                  | ND | ND | ND               | ND  | ND   | PASS  |
| Wire                                                                                                                                                                                                                                                                                                  | Series<br>Coaxial<br>Cables                 | NGBPC24007471212   | SGS          | 24/12/23  | ND                                  | ND | ND | ND               | ND  | ND   | PASS  |
| Terminal                                                                                                                                                                                                                                                                                              | Copper                                      | CANEC24029407216   | SGS          | 25/01/08  | ND                                  | 4  | ND | ND               | ND  | ND   | PASS  |
|                                                                                                                                                                                                                                                                                                       | Au plating                                  | A2240410234101001E | CTI          | 24/07/16  | ND                                  | ND | ND | ND               | ND  | ND   | PASS  |
|                                                                                                                                                                                                                                                                                                       | Rubber core                                 | ETR24705772        | CTI          | 24/08/05  | ND                                  | ND | ND | ND               | ND  | ND   | PASS  |
| Environm<br>entally<br>friendly<br>Tin wire                                                                                                                                                                                                                                                           | Environmen<br>tally<br>friendly<br>Tin wire | SZXPC25000282511   | SGS          | 25/02/27  | ND                                  | 71 | ND | ND               | ND  | ND   | PASS  |