

EMC TEST REPORT  
For  
Dongguan Xing Yue Electronic co., Ltd  
Free Flow TWS earbuds in case  
Test Model: XO-9852-1

Prepared for :  
Address :

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.  
Address : 101, 201 Building A and 301 Building C, Juji Industrial  
Park, Yabianxueziwei, Shajing Street, Baoan District,  
Shenzhen, Guangdong, China  
Tel : (+86)755-82591330  
Fax : (+86)755-82591332  
Web : www.LCS-cert.com  
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : January 13, 2020  
Number of tested samples : 1  
Serial number : Prototype  
Date of Test : January 13, 2020 ~ January 15, 2020  
Date of Report : January 17, 2020



**EMC TEST REPORT****ETSI EN 301 489-17 V3.1.1(2017-02)&EN 55032:2015& EN 55035: 2017**

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

**Report Reference No. .... : LCS200102089AEA****Date Of Issue .... : January 17, 2020****Testing Laboratory Name ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.**

**Address ..... : 101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, Guangdong, China**

**Testing Location/ Procedure ..... : Full application of Harmonised standards ☒**  
 Partial application of Harmonised standards ☐  
 Other standard testing method ☐

**Applicant's Name ..... : Dongguan Xing Yue Electronic co., Ltd**

**Address ..... : #98 LiWu Swan Industrial District, Qiao Tou Town, Dong Guan City, Guang Dong, China**

**Test Specification**

**Standard ..... : ETSI EN 301 489-1 V2.1.1 (2017-02)**  
 ETSI EN 301 489-17 V3.1.1(2017-02)  
 EN 55032: 2015  
 EN 55035: 2017

**Test Report Form No. .... : LCSEMC-1.0****TRF Originator ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.****Master TRF ..... : Dated 2017-06****Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.**

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**Test Item Description..... : Free Flow TWS earbuds in case****Trade Mark..... : N/A****Test Model ..... : XO-9852-1**

**Ratings ..... : Input: 5V**  
 Headset: DC 3.7V by Li-ion Battery(35mAh)  
 Charging case: DC 3.7V by Li-ion Battery(500mAh)

**Result ..... : Positive****Compiled by:**

Vera Deng

**Supervised by:**

Jin Wang

**Approved by:**


Vera Deng / File administrators

Jin Wang/ Technique principal

Gavin Liang/ Manager

# EMC -- TEST REPORT

**Test Report No. : LCS200102089AEA**January 17, 2020

Date of issue

Test Model..... : XO-9852-1

EUT..... : Free Flow TWS earbuds in case

**Applicant..... :**

Address..... :

Telephone..... :

Fax..... :

**Manufacturer..... :**

Address..... :

Telephone..... :

Fax..... :

**Factory..... :**

Address..... :

Telephone..... :

Fax..... :

**Test Result****Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

## Revision History

| Revision | Issue Date       | Revisions     | Revised By  |
|----------|------------------|---------------|-------------|
| 000      | January 17, 2020 | Initial Issue | Gavin Liang |
|          |                  |               |             |
|          |                  |               |             |

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# 1. GENERAL INFORMATION

## 1.1. Product Description for Equipment Under Test (EUT)

|                     |  |
|---------------------|--|
| EUT                 | : Free Flow TWS earbuds in case  |
| Test Model          | :  |
| Power Supply        | : Input: 5V<br>Headset: DC 3.7V by Li-ion Battery(35mAh)<br>Charging case: DC 3.7V by Li-ion Battery(500mAh) |
| Hardware Version    | : V11  |
| Software Version    | : V10  |
| Bluetooth           |  |
| Frequency Range     | : 2.402-2.480GHz   |
| Channel Number      | : 79 channels for Bluetooth V5.0(BDR/EDR)  |
| Channel Spacing     | : 1/2/3MHz for Bluetooth V5.0(BDR/EDR)   |
| Modulation Type     | : GFSK, $\pi/4$ -DQPSK for Bluetooth V5.0(BDR/EDR)   |
| Bluetooth Version   | : V5.0   |
| Antenna Description | : Internal Antenna, -0.58 dBi (Max.)   |

## 1.2. Objective

|                    |   |
|--------------------|---|
| ETSI EN 301 489-1  | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;<br>Part 1: Common technical requirements;<br>Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU |
| ETSI EN 301 489-17 | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;<br>Part 17: Specific conditions for Broadband Data Transmission Systems;<br>Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU                                      |
| EN 55032           | Electromagnetic compatibility of multimedia equipment — Emission Requirements   |
| EN 55035           | Electromagnetic compatibility of multimedia equipment – Immunity requirements   |

The objective is to determine compliance with ETSI EN 301 489-1 V2.1.1 (2017-02), ETSI EN 301 489-17 V3.1.1(2017-02).EN 55032:2015 and EN 55035: 2017.

## 1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

## 1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.1.1 (2017-02), ETSI EN 301 489-17 V3.1.1(2017-02).EN 55032:2015 and EN 55035: 2017.

## 1.5. Description of Test Facility

FCC Registration Number is 254912.

Industry Canada Registration Number is 9642A-1.

EMSD Registration Number is ARCB0108.

UL Registration Number is 100571-492.

TUV SUD Registration Number is SCN1081.

TUV RH Registration Number is UA 50296516-001.

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier: CN0071.

## 1.6. Support equipment List

| Manufacturer | Description | Model | Serial Number | Certificate |
|--------------|-------------|-------|---------------|-------------|
| --           | Charger     | --    | --            | CE          |

Note: Auxiliary equipment is provided by the laboratory

## 1.7. External I/O

| I/O Port Description | Quantity | Cable |
|----------------------|----------|-------|
| DC in Port           | 1        | N/A   |

## 1.8. Measurement Uncertainty

| Item   | MU      | Remark      |
|--|---------|-------------|
| Uncertainty for Power point Conducted Emissions Test                     | 2.42dB  |             |
| Uncertainty for Radiation Emission test in 3m chamber<br>(30MHz to 1GHz) | 3.54dB  | Polarize: V |
|  | 5.0dB   | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber<br>(1GHz to 25GHz) | 2.08dB  | Polarize: H |
|  | 2.56dB  | Polarize: V |
| Uncertainty for radio frequency  | 0.01ppm |             |
| Uncertainty for conducted RF Power                                       | 0.65dB  |             |
| Uncertainty for temperature  | 0.2℃    |             |
| Uncertainty for humidity   | 1%      |             |
| Uncertainty for DC and low frequency voltages                            | 0.06%   |             |

## 1.9. Description Of Test Modes

There was 3 test Modes. TM1 to TM3 were shown below:

TM1: Operate in BT mode.

TM2: Charging mode.

TM3: Idle mode.

\*\*\*Note:

All test modes were tested, but we only recorded the worst case in this report.



## 2. SUMMARY OF TEST RESULTS

| Rule | Description of Test Items   | Result    |
|------|---|-----------|
| §7.1 | Reference to clauses EN 301 489-1<br>§8.4 AC mains power input/output ports   | Compliant |
| §7.1 | Reference to clauses EN 301 489-1 §8.3 DC power input/output ports  | N/A       |
| §7.1 | Reference to clauses EN 301 489-1<br>§8.2 Enclosure of ancillary equipment measured on a stand alone basis          | Compliant |
| §7.1 | Reference to clauses EN 301 489-1<br>§8.5 Harmonic current emissions (AC mains input port)                          | N/A       |
| §7.1 | Reference to clauses EN 301 489-1<br>§8.6 Voltage fluctuations and flicker (AC mains input port)                    | Compliant |
| §7.1 | Reference to clauses EN 301 489-1 §8.7 Telecommunication ports  | N/A       |
| §7.2 | Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)                                       | Compliant |
| §7.2 | Reference to clauses EN 301 489-1<br>§9.2 Radio frequency electromagnetic field (80 MHz to 6 000 MHz)(EN 61000-4-3) | Compliant |
| §7.2 | Reference to clauses EN 301 489-1 §9.4 Fast transients, common mode (EN 61000-4-4)                                  | Compliant |
| §7.2 | Reference to clauses EN 301 489-1 §9.8 Surges (EN 61000-4-5)  | Compliant |
| §7.2 | Reference to clauses EN 301 489-1 §9.5 Radio frequency, common mode (EN 61000-4-6)                                  | Compliant |
| §7.2 | Reference to clauses EN 301 489-1<br>§9.6 Transients and surges in the vehicular environment (ISO 7637-2)           | N/A       |
| §7.2 | Reference to clauses EN 301 489-1 §9.7 Voltage dips and interruptions (EN 61000-4-11)                               | Compliant |

### 3. LINE CONDUCTED EMISSION

#### 3.1. Conducted Emission Limit

ETSI EN 301 489-1 V2.1.1 (2017-02)/EN 55032

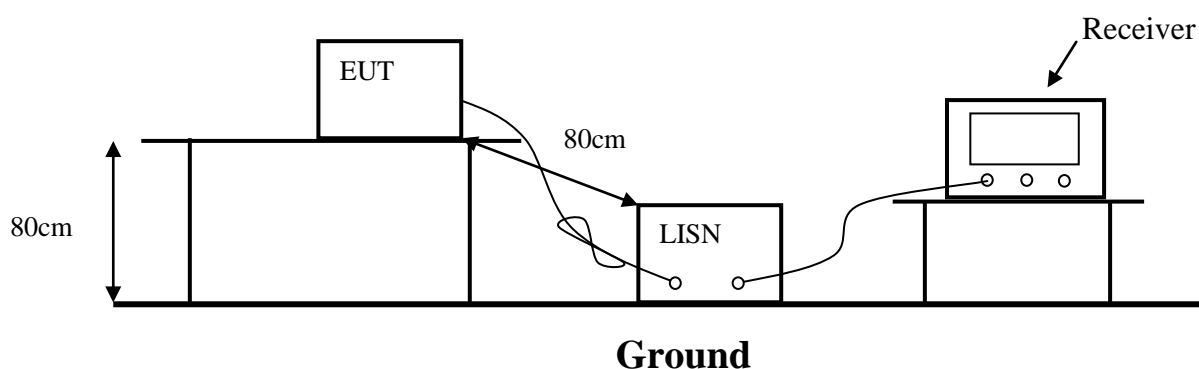
#### Limits for Line Conducted Emission

| Frequency (MHz) | Limit (dB $\mu$ V) |               |
|-----------------|--------------------|---------------|
|                 | Quasi-peak Level   | Average Level |
| 0.15~0.50       | 66.0 ~ 56.0 *      | 56.0 ~ 46.0 * |
| 0.50~5.00       | 56.0               | 46.0          |
| 5.00~30.00      | 60.0               | 50.0          |

NOTE1-The lower limit shall apply at the transition frequencies.

NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

#### 3.2. Test Configuration



The setup of EUT is according with per ETSI EN 301 489-1 measurement procedure. The specification used was with the ETSI EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

The EUT received DC 5V charging power from the notebook which received power through a LISN supplying power of AC 230V/50Hz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Receiver Parameter     | Setting       |
|------------------------|---------------|
| Attenuation            | Auto          |
| Start ~ Stop Frequency | 30MHz~1000MHz |
| (IF)RB                 | 9kHz          |

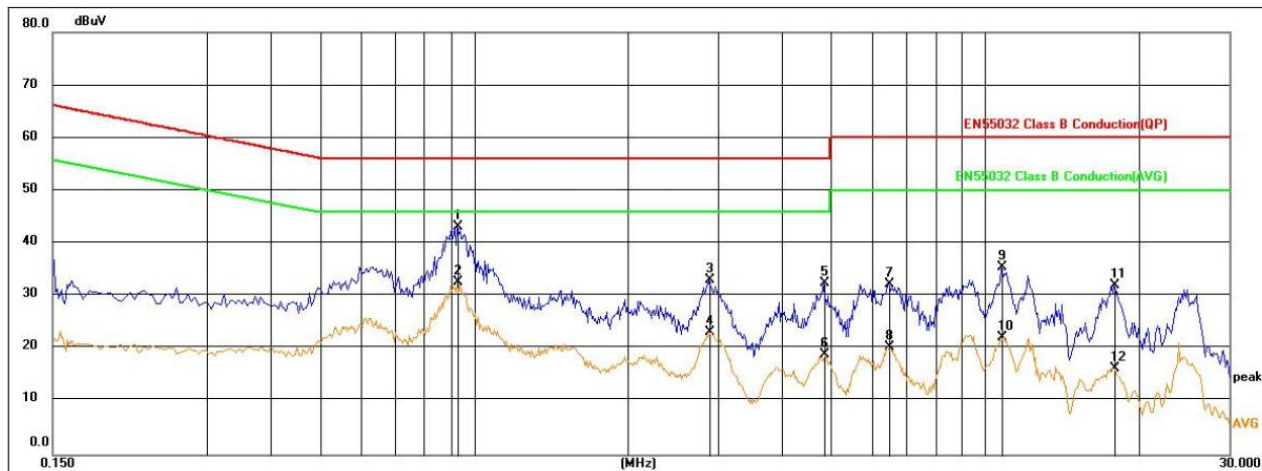
All data was recorded in the Quasi-peak and average detection mode.

Marked on both the 6 highest Quasi-Peak & 6 highest Average emissions points of the EUT.

### 3.3. Test Data

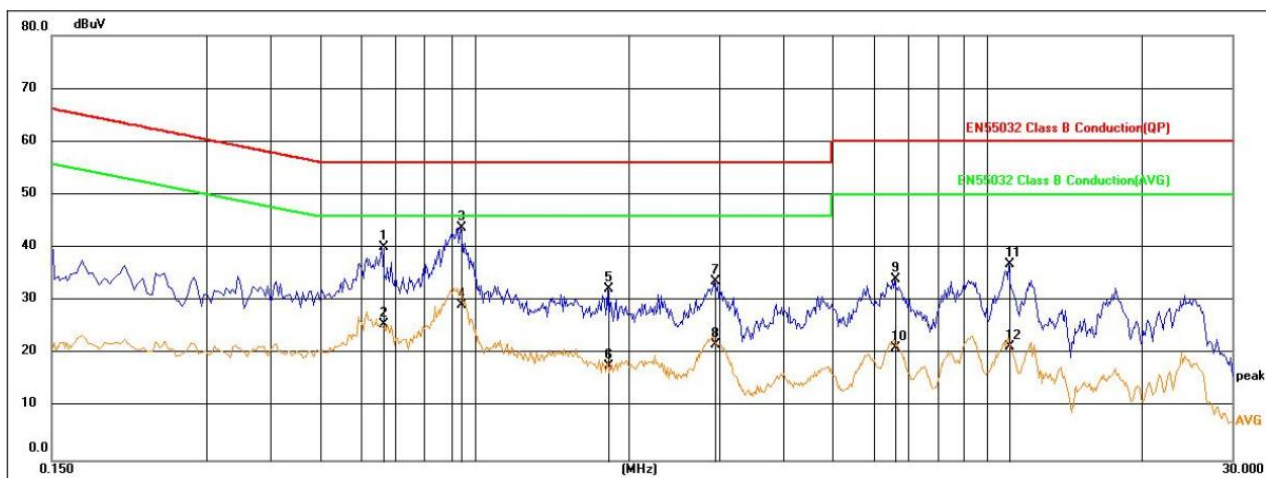
For pre-scan, the worst test case is TM1, and the test data was show as follow:

|                          |                  |               |              |
|--------------------------|------------------|---------------|--------------|
| Model No.                | XO-9852-1        | Test Mode     | TM1          |
| Environmental Conditions | 22.5°C, 54.3% RH | Test Engineer | Scout Wu     |
| Pol                      | Line             | Test Voltage  | AC 230V/50Hz |



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB) | Result<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1   | 0.9330             | 23.92             | 19.29           | 43.21            | 56.00           | -12.79         | QP     |
| 2   | 0.9330             | 13.38             | 19.29           | 32.67            | 46.00           | -13.33         | AVG    |
| 3   | 2.8860             | 13.69             | 19.47           | 33.16            | 56.00           | -22.84         | QP     |
| 4   | 2.8860             | 3.74              | 19.47           | 23.21            | 46.00           | -22.79         | AVG    |
| 5   | 4.8300             | 13.02             | 19.49           | 32.51            | 56.00           | -23.49         | QP     |
| 6   | 4.8300             | -0.47             | 19.49           | 19.02            | 46.00           | -26.98         | AVG    |
| 7   | 6.4860             | 12.81             | 19.56           | 32.37            | 60.00           | -27.63         | QP     |
| 8   | 6.4860             | 0.83              | 19.56           | 20.39            | 50.00           | -29.61         | AVG    |
| 9   | 10.7430            | 15.78             | 19.76           | 35.54            | 60.00           | -24.46         | QP     |
| 10  | 10.7430            | 2.53              | 19.76           | 22.29            | 50.00           | -27.71         | AVG    |
| 11  | 17.9070            | 11.90             | 20.27           | 32.17            | 60.00           | -27.83         | QP     |
| 12  | 17.9070            | -3.79             | 20.27           | 16.48            | 50.00           | -33.52         | AVG    |

|                          |                  |               |              |
|--------------------------|------------------|---------------|--------------|
| Model No.                | XO-9852-1        | Test Mode     | TM1          |
| Environmental Conditions | 22.5°C, 54.3% RH | Test Engineer | Scout Wu     |
| Pol                      | Neutral          | Test Voltage  | AC 230V/50Hz |



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB) | Result<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1   | 0.6630             | 21.04             | 19.25           | 40.29            | 56.00           | -15.71         | QP     |
| 2   | 0.6630             | 6.52              | 19.25           | 25.77            | 46.00           | -20.23         | AVG    |
| 3   | 0.9420             | 24.55             | 19.29           | 43.84            | 56.00           | -12.16         | QP     |
| 4   | 0.9420             | 10.07             | 19.29           | 29.36            | 46.00           | -16.64         | AVG    |
| 5   | 1.8240             | 12.93             | 19.39           | 32.32            | 56.00           | -23.68         | QP     |
| 6   | 1.8240             | -1.48             | 19.39           | 17.91            | 46.00           | -28.09         | AVG    |
| 7   | 2.9400             | 14.23             | 19.47           | 33.70            | 56.00           | -22.30         | QP     |
| 8   | 2.9400             | 2.35              | 19.47           | 21.82            | 46.00           | -24.18         | AVG    |
| 9   | 6.6075             | 14.61             | 19.56           | 34.17            | 60.00           | -25.83         | QP     |
| 10  | 6.6075             | 1.69              | 19.56           | 21.25            | 50.00           | -28.75         | AVG    |
| 11  | 11.0219            | 17.18             | 19.79           | 36.97            | 60.00           | -23.03         | QP     |
| 12  | 11.0219            | 1.68              | 19.79           | 21.47            | 50.00           | -28.53         | AVG    |

Note: For conducted emission and radiated emission test, a power supply of 230VAC and 120VAC was used for testing respectively, and only recorded the worst case of 230VAC.

## 4. RADIATED DISTURBANCE

### 4.1. Radiated Emission Limit

ETSI EN 301 489-1 V2.1.1 (2017-02)/EN 55032 Class B

#### Limits for radiated disturbance Blow 1GHz

| FREQUENCY<br>(MHz) | DISTANCE<br>(Meters) | FIELD STRENGTHS LIMIT<br>(dB $\mu$ V/m) |
|--------------------|----------------------|---|
| 30 ~ 230           | 3                    | 42-35                                   |
| 230 ~ 1000         | 3                    | 42                                      |

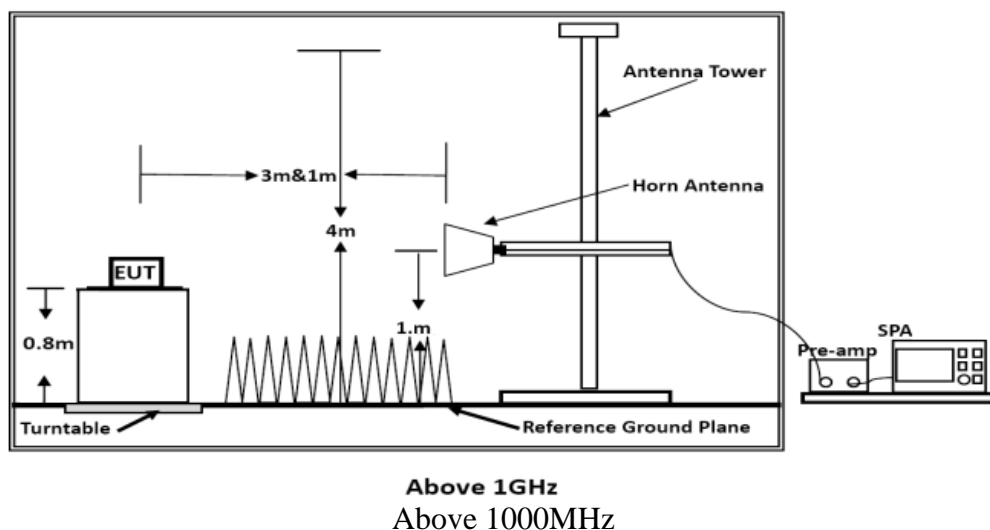
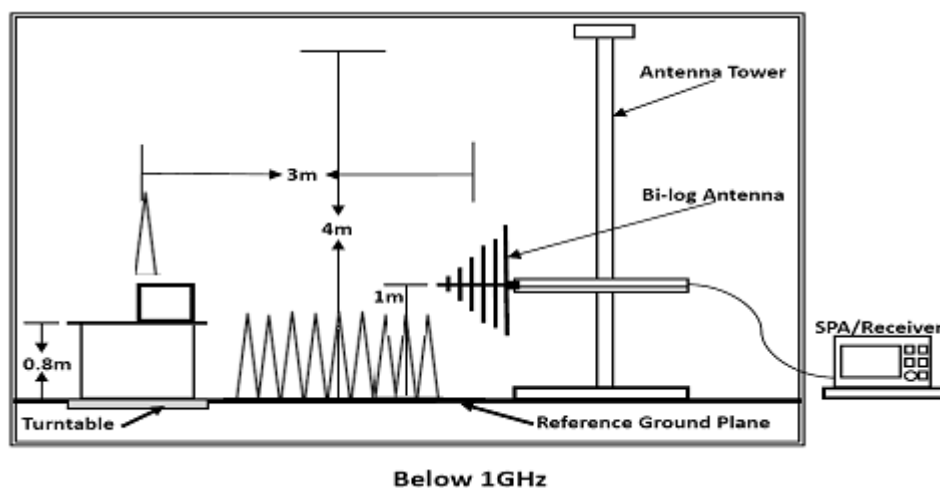
Note: (1) The smaller limit shall apply at the combination point between two frequency bands. (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

#### Limits for radiated disturbance Above 1GHz

| FREQUENCY<br>(MHz) | DISTANCE<br>(Meters) | Average Limit<br>(dB $\mu$ V/m) | Peak Limit<br>(dB $\mu$ V/m) |
|--------------------|----------------------|---------------------------------|------------------------------|
| 1000-3000          | 3                    | 50                              | 70                           |
| 3000-6000          | 3                    | 54                              | 74                           |

Note: The lower limit applies at the transition frequency.

### 4.2. Test Configuration



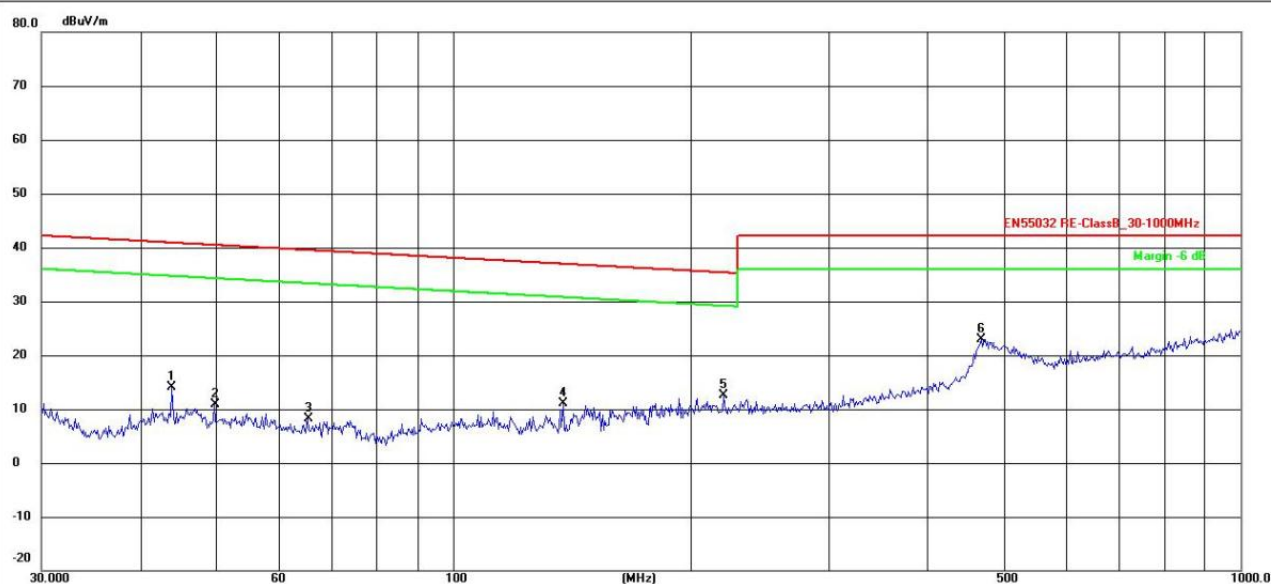
### 4.3. Test Procedure

Please refer to ETSI EN 301 489-1 Clause 8.2.3 and EN 55032 Annex A.2 for the measurement methods.

### 4.4. Test Data

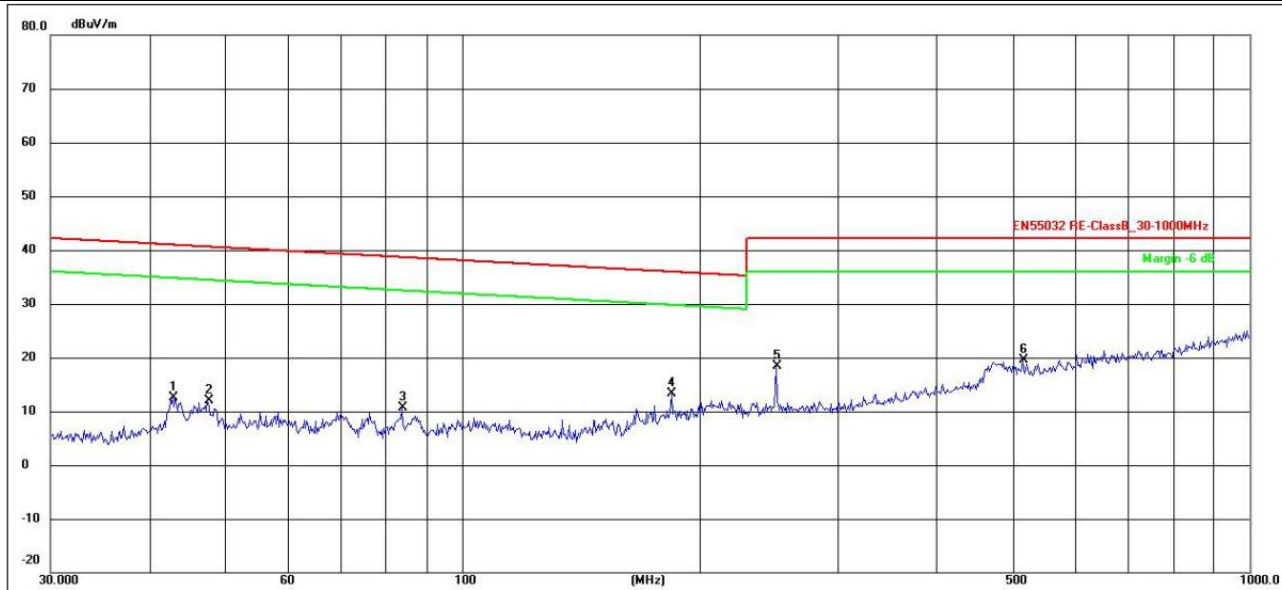
The worst test mode of the EUT was TM1, and its test data was showed as the follow:

|                                 |                  |                          |            |
|---------------------------------|------------------|--------------------------|------------|
| <b>Model No.</b>                | XO-9852-1        | <b>Test Mode</b>         | TM1        |
| <b>Environmental Conditions</b> | 23.8°C, 52.9% RH | <b>Detector Function</b> | Quasi-peak |
| <b>Pol</b>                      | Vertical         | <b>Distance</b>          | 3m         |
| <b>Test Engineer</b>            | Scout Wu         |                          |            |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|------|
| 1   | 43.9658         | 29.93          | -15.89        | 14.04          | 40.69          | -26.65      | QP   |
| 2   | 49.7068         | 26.51          | -15.66        | 10.85          | 40.26          | -29.41      | QP   |
| 3   | 65.3432         | 26.76          | -18.54        | 8.22           | 39.32          | -31.10      | QP   |
| 4   | 137.9028        | 32.21          | -21.11        | 11.10          | 36.76          | -25.66      | QP   |
| 5   | 220.6171        | 29.22          | -16.76        | 12.46          | 35.14          | -22.68      | QP   |
| 6 * | 468.8762        | 33.76          | -10.78        | 22.98          | 42.00          | -19.02      | QP   |

|                          |                  |                   |            |
|--------------------------|------------------|-------------------|------------|
| Model No.                | XO-9852-1        | Test Mode         | TM1        |
| Environmental Conditions | 23.8°C, 52.9% RH | Detector Function | Quasi-peak |
| Pol                      | Horizontal       | Distance          | 3m         |
| Test Engineer            | Scout Wu         |                   |            |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|------|
| 1   | 42.8998         | 28.72          | -16.09        | 12.63          | 40.77          | -28.14      | QP   |
| 2   | 47.4918         | 27.64          | -15.68        | 11.96          | 40.42          | -28.46      | QP   |
| 3   | 83.8156         | 31.22          | -20.64        | 10.58          | 38.47          | -27.89      | QP   |
| 4 * | 184.4898        | 32.15          | -18.86        | 13.29          | 35.76          | -22.47      | QP   |
| 5   | 250.3012        | 34.31          | -15.91        | 18.40          | 42.00          | -23.60      | QP   |
| 6   | 515.4374        | 29.25          | -9.77         | 19.48          | 42.00          | -22.52      | QP   |



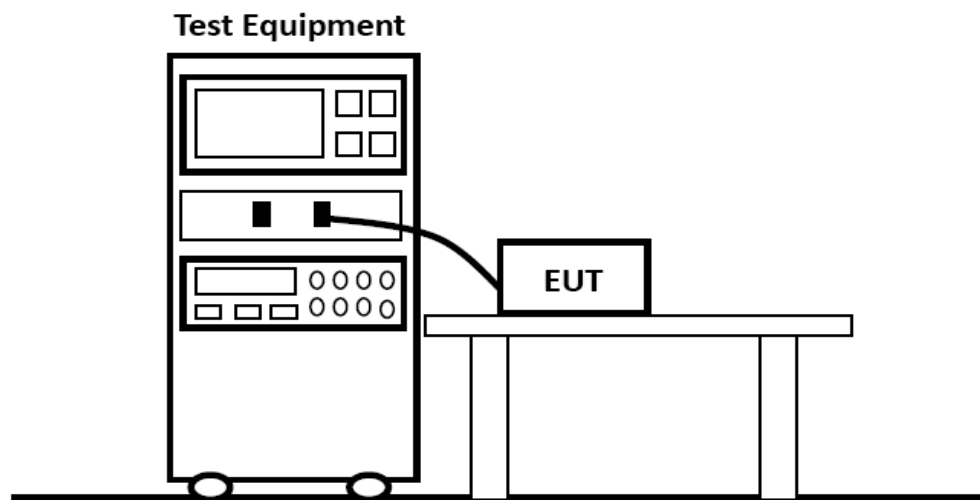
|                                   |                             |
|-----------------------------------|-----------------------------|
| <b>Test Mode:</b> TM1(above 1GHz) | <b>Tested by:</b> Scout Wu  |
| <b>Test voltage:</b> DC 3.7V      | <b>Test Distance:</b> 3m    |
| <b>Detector Function:</b> Peak+AV | <b>Test Results:</b> Passed |

| Frequency<br>MHz | Emission Level<br>dB $\mu$ V/m |       | Limits<br>dB $\mu$ V/m |       | Margin<br>dB $\mu$ V/m |        | Polarization |
|------------------|--------------------------------|-------|------------------------|-------|------------------------|--------|--------------|
|                  | Peak                           | AV    | Peak                   | AV    | Peak                   | AV     |              |
| 1133.28          | 50.83                          | 37.36 | 70.00                  | 50.00 | -19.17                 | -12.64 | H            |
| 1860.74          | 46.48                          | 33.92 | 70.00                  | 50.00 | -23.52                 | -16.08 | H            |
| 2081.03          | 47.77                          | 32.06 | 70.00                  | 50.00 | -22.23                 | -17.94 | H            |
| 3589.87          | 56.13                          | 32.30 | 74.00                  | 54.00 | -17.87                 | -21.70 | H            |
| 4136.49          | 46.17                          | 34.88 | 74.00                  | 54.00 | -27.83                 | -19.12 | H            |
| 5572.29          | 50.63                          | 40.94 | 74.00                  | 54.00 | -23.37                 | -13.06 | H            |
| 1282.62          | 58.27                          | 40.46 | 70.00                  | 50.00 | -11.73                 | -9.54  | V            |
| 1716.90          | 51.81                          | 30.91 | 70.00                  | 50.00 | -18.19                 | -19.09 | V            |
| 2952.32          | 46.34                          | 30.85 | 70.00                  | 50.00 | -23.66                 | -19.15 | V            |
| 3468.49          | 49.48                          | 34.32 | 74.00                  | 54.00 | -24.52                 | -19.68 | V            |
| 4685.39          | 46.27                          | 40.21 | 74.00                  | 54.00 | -27.73                 | -13.79 | V            |
| 5386.02          | 57.44                          | 40.16 | 74.00                  | 54.00 | -16.56                 | -13.84 | V            |



## 5. HARMONIC CURRENT EMISSIONS

### 5.1. Test Configuration



### 5.2. Test Standard

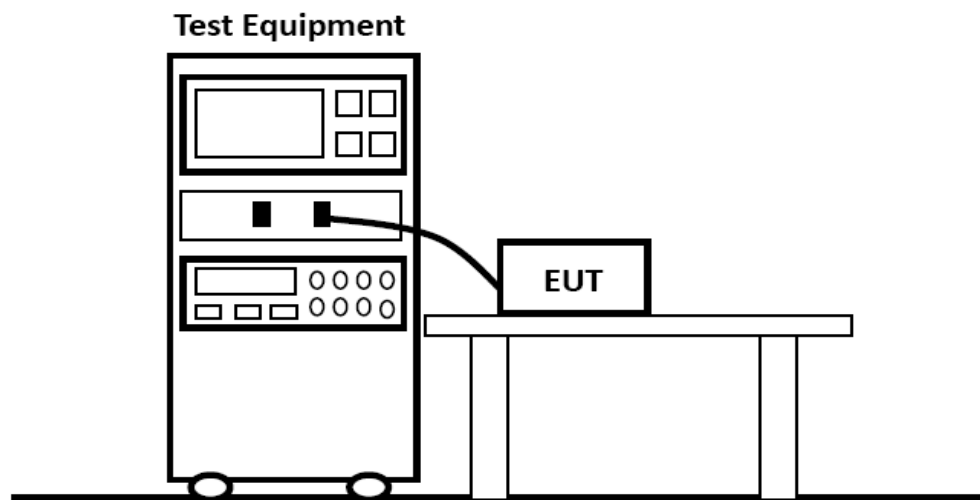
According to ETSI EN 301 489-1 V2.1.1 (2017-02) & EN 61000-3-2: 2014

### 5.3. Test Data

Because the power of EUT is less than 75W, according to standard EN 61000-3-2, harmonic current unnecessary to test.

## 6. VOLTAGE FLUCTUATION AND FLICKER

### 6.1. Test Configuration



### 6.2. Test Standard

According to ETSI EN 301 489-1 V2.1.1 (2017-02) & EN 61000-3-3: 2013

### 6.3. Test Data

| Test Model      | Free Flow TWS earbuds in case   | Test Engineer | Scout Wu |
|-----------------|---|---------------|----------|
| Type of Test:   | Flickermeter Test - Table (EN61000-3-3:2013)                                      |               |          |
| Power Analyzer: | Voltech PM6000 SN: 200006700523 Firmware Version: v1.21.07RC2                     |               |          |
|                 | Channel(s):   |               |          |
|                 | 1. SN: 090015502053, 28 Adjusted Date: 22 JUN 2011. 2. SN:None Adjusted Date:None |               |          |
|                 | 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None                       |               |          |
|                 | 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None                       |               |          |
|                 | Shunt(s):   |               |          |
|                 | 1. SN: 091024301916, 4 Adjusted Date: 23 JUN 2011. 2. SN:None Adjusted Date:None  |               |          |
|                 | 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None                       |               |          |
|                 | 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None                       |               |          |
| AC Source:      | Mains / Manual Source   |               |          |
| Overall Result: | Notes:  |               |          |
| <b>PASS</b>     | Measurement method - Voltage  |               |          |

|           | Pst   | dc (%) | dmax (%) | Tmax(> 3.3%)(ms) |
|-----------|-------|--------|----------|------------------|
| Limit     | 1.000 | 3.300  | 4.000    | 500              |
| Reading 1 | 0.091 | 0.005  | 0.262    | 0                |

## 7. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

### 7.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

### 7.2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

### 7.3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

### 7.4. Performance criteria for Transient phenomena applied to Receiver (TR)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

**Performance criteria for ETSI EN 301 489-17 V3.1.1(2017-02)**

| Criteria | During test   | After test   |
|----------|---|--|
| A        | Shall operate as intended.<br>(see note 1).<br>Shall be no loss of function.<br>Shall be no unintentional transmissions.                  | Shall operate as intended.<br>Shall be no degradation of performance (see note 3).<br>Shall be no loss of function.<br>Shall be no loss of stored data or user programmable functions.                         |
| B        | May show loss of function (one or more).<br>May show degradation of performance (see note 2).<br>Shall be no unintentional transmissions. | Functions shall be self-recoverable.<br>Shall operate as intended after recovering.<br>Shall be no degradation of performance (see note 3).<br>Shall be no loss of stored data or user programmable functions. |
| C        | May be loss of function (one or more).  | Functions shall be recoverable by the operator.<br>Shall operate as intended after recovering.<br>Shall be no degradation of performance (see note 3).   |

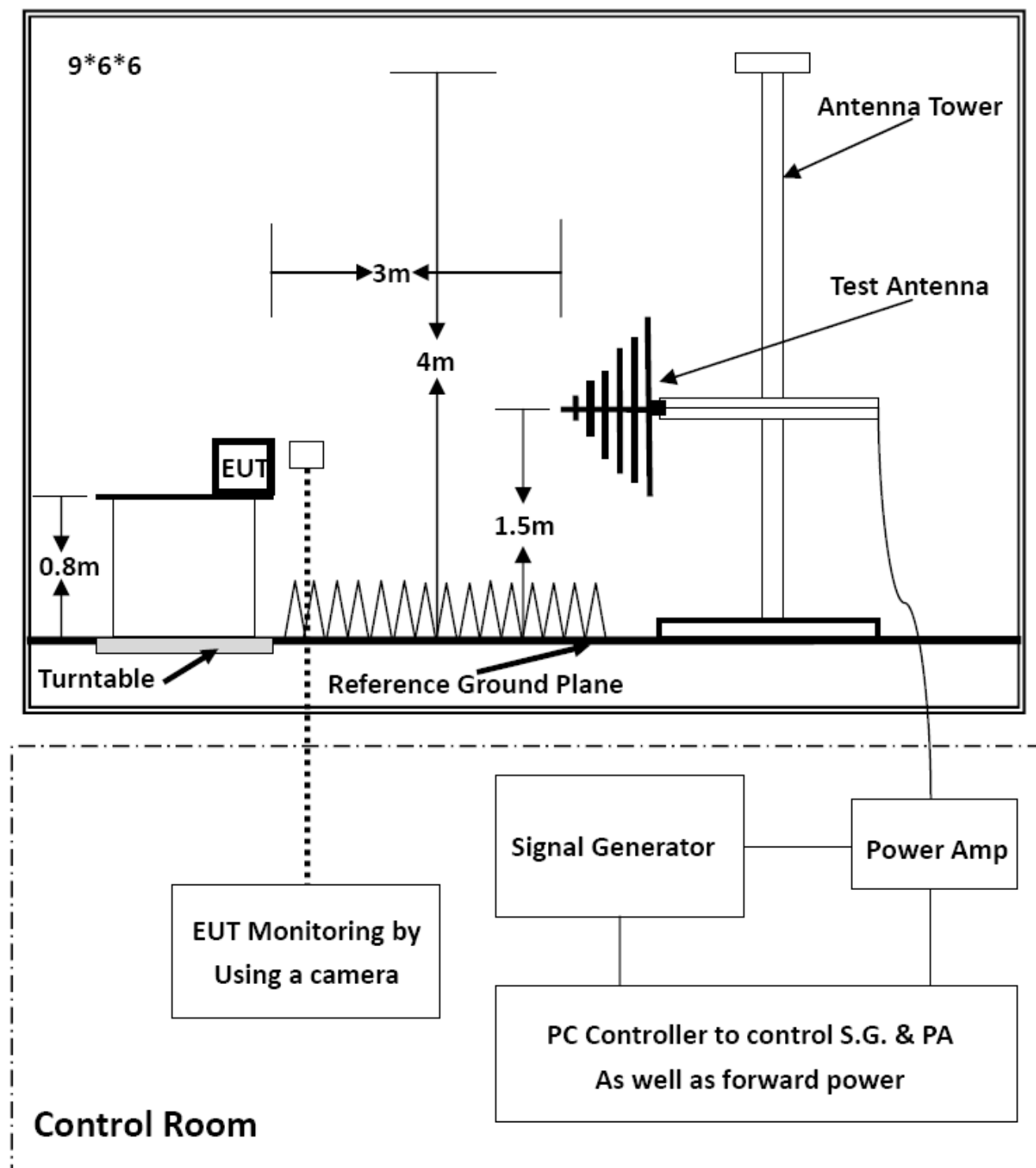
NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

## 8. RF ELECTROMAGNETIC FIELD (80 MHz - 6000 MHz)

### 8.1. Test Configuration



## 8.2. Test Standard

ETSI EN 301 489-1, ETSI EN 301 489-17 / (EN 61000-4-3: 2006+A2: 2010)

Test level 2 at 3V/m.

## 8.3. Severity Level

| Level                    | Field Strength<br>(V/m) |
|--------------------------|-------------------------|
| 1                        | 1                       |
| 2                        | 3                       |
| 3                        | 10                      |
| X                        | Special                 |
| Performance Criterion: A |                         |

## 8.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

| Condition of Test      | Remark                   |
|------------------------|--------------------------|
| Fielded Strength       | 3 V/m (Severity Level 2) |
| Radiated Signal        | Unmodulated              |
| Scanning Frequency     | 80-6000MHz               |
| Dwell time of radiated | 0.0015 decade/s          |
| Waiting Time           | 3 Sec.                   |

## 8.5. Test Result

| RF ELECTROMAGNETIC FIELD |   |             |       |
|--------------------------|---|-------------|-------|
| Standard                 | <input type="checkbox"/> IEC 61000-4-3 <input checked="" type="checkbox"/> EN 61000-4-3 |             |       |
| Applicant                | Dongguan Xing Yue Electronic co., Ltd   |             |       |
| EUT                      | Free Flow TWS earbuds in case   | Temperature | 23.8℃ |
| M/N                      | XO-9852-1   | Humidity    | 52.9% |
| Test Mode                | TM1-TM3   | Criterion   | B     |
| Test Engineer            | Scout Wu  |             |       |

## BULETOOTHTest Result:

| EUT Working Mode | Antenna Polarity | Frequency (MHz) | Fielded Strength (V/m) | Observation | Position                 | Conclusion |
|------------------|------------------|-----------------|------------------------|-------------|--------------------------|------------|
| Operating Mode   | Vertical         | 80-6000         | 3                      | CT, CR      | Front, Right, Left, Back | Pass       |
|                  | Horizontal       | 80-6000         | 3                      | CT, CR      | Front, Right, Left, Back | Pass       |
| Idle             | Vertical         | 80-6000         | 3                      | See Note    | Front, Right, Left, Back | Pass       |
|                  | Horizontal       | 80-6000         | 3                      | See Note    | Front, Right, Left, Back | Pass       |

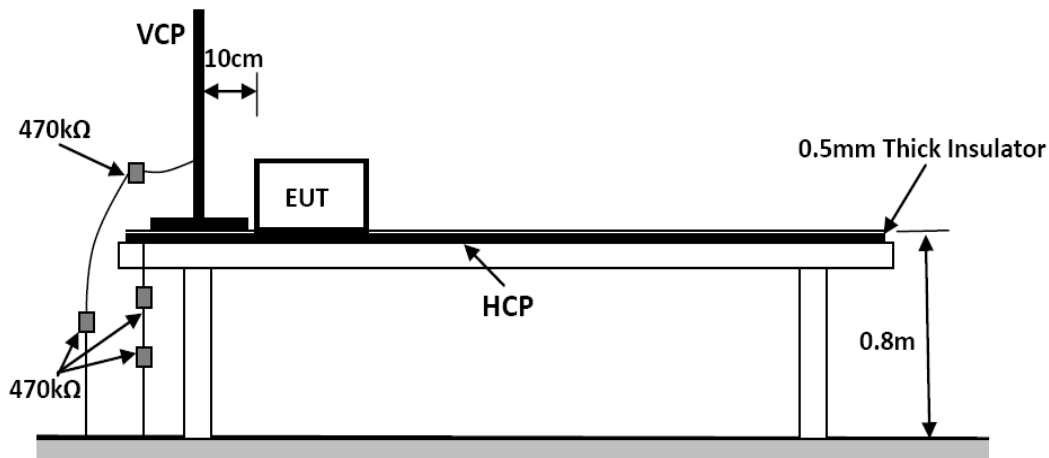
## TM2-TM3 Test Result:

| EUT Working Mode | Antenna Polarity | Frequency (MHz) | Fielded Strength (V/m) | Observation | Position                 | Conclusion |
|------------------|------------------|-----------------|------------------------|-------------|--------------------------|------------|
| Operating Mode   | Vertical         | 80-6000         | 3                      | See Note    | Front, Right, Left, Back | Pass       |
|                  | Horizontal       | 80-6000         | 3                      | See Note    | Front, Right, Left, Back | Pass       |
| Idle             | Vertical         | 80-6000         | 3                      | See Note    | Front, Right, Left, Back | Pass       |
|                  | Horizontal       | 80-6000         | 3                      | See Note    | Front, Right, Left, Back | Pass       |

## 9. ELECTROSTATIC DISCHARGE

Please refer to ETSI EN 301 489-1 and EN 61000-4-2.

### 9.1. Test Configuration



EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.5 by 1.0-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

### 9.2. Test Procedure

ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 61000-4-2: 2009

Test level 3 for Air Discharge at  $\pm 8$  kV

Test level 2 for Contact Discharge at  $\pm 4$  kV

#### 9.2.1. Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

#### 9.2.2. Contact Discharge

All the procedure shall be same as Section 9.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

#### 9.2.3. Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

#### 9.2.4. Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one



vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

### 9.3. Test Data

**PASS.**

Please refer to the following page.

# Electrostatic Discharge Test Results

|                  |   |                      |          |
|------------------|---|----------------------|----------|
| <b>Standard</b>  | <input type="checkbox"/> IEC 61000-4-2 <input checked="" type="checkbox"/> EN 61000-4-2 |                      |          |
| <b>Applicant</b> | Dongguan Xing Yue Electronic co., Ltd   |                      |          |
| <b>EUT</b>       | Free Flow TWS earbuds in case   | <b>Temperature</b>   | 24.6℃    |
| <b>M/N</b>       | XO-9852-1   | <b>Humidity</b>      | 54.3%    |
| <b>Criterion</b> | B   | <b>Pressure</b>      | 1021mbar |
| <b>Test Mode</b> | TM1-TM3   | <b>Test Engineer</b> | Scout Wu |

## TEST RESULT OF BULETOOTH

| Test Voltage     | Coupling               | Observation | Result (Pass/Fail) |
|------------------|------------------------|-------------|--------------------|
| ±2KV, ±4kV       | Contact Discharge      | CT, CR      | Pass               |
| ±2KV, ±4kV, ±8kV | Air Discharge          | CT, CR      | Pass               |
| ±2KV, ±4kV       | Indirect Discharge HCP | CT, CR      | Pass               |
| ±2KV, ±4kV       | Indirect Discharge VCP | CT, CR      | Pass               |

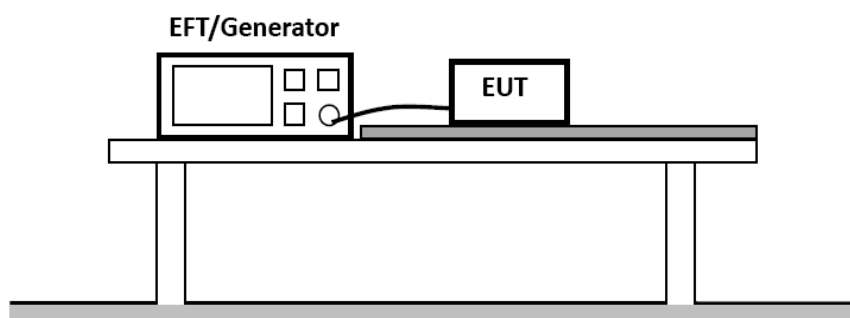
## TEST RESULT OF TM2-TM3

| Test Voltage     | Coupling               | Result (Pass/Fail) |
|------------------|------------------------|--------------------|
| ±2KV, ±4kV       | Contact Discharge      | Pass               |
| ±2KV, ±4kV, ±8kV | Air Discharge          | Pass               |
| ±2KV, ±4kV       | Indirect Discharge HCP | Pass               |
| ±2KV, ±4kV       | Indirect Discharge VCP | Pass               |

Note: The EUT performance complied with performance criteria for CT&CR to MS Function and there is no any degradation of performance and function.

## 10. ELECTRICAL FAST TRANSIENT IMMUNITY

### 10.1. Test Configuration



### 10.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN61000-4-4: 2012

Test level 2 at 1 kV

| Test Level                                  |                       |  |
|---|-----------------------|--|
| Open Circuit Output Test Voltage $\pm 10\%$ |                       |  |
| Level                                       | On Power Supply Lines | On I/O (Input/Output)<br>Signal data and control lines |
| 1   | 0.5 kV                | 0.25 kV  |
| 2   | 1 kV                  | 0.5 kV   |
| 3   | 2 kV                  | 1 kV   |
| 4   | 4 kV                  | 2 kV   |
| X   | Special               | Special  |
| Performance Criterion: B                    |                       |  |

### 10.3. Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

10.3.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

10.3.2. For signal lines and control lines ports: No I/O ports. It's unnecessary to test.

10.3.3. For DC output line ports: It's unnecessary to test.

### 10.4. Test Data

**PASS.**

Please refer to the following page.

## Electrical Fast Transient/Burst Test Results

|                      |   |                    |       |
|----------------------|---|--------------------|-------|
| <b>Standard</b>      | <input type="checkbox"/> IEC 61000-4-4 <input checked="" type="checkbox"/> EN 61000-4-4 |                    |       |
| <b>Applicant</b>     | Dongguan Xing Yue Electronic co., Ltd   |                    |       |
| <b>EUT</b>           | Free Flow TWS earbuds in case   | <b>Temperature</b> | 24.8℃ |
| <b>M/N</b>           | XO-9852-1   | <b>Humidity</b>    | 53.8% |
| <b>Test Mode</b>     | TM1-TM3   | <b>Criterion</b>   | B     |
| <b>Test Engineer</b> | Scout Wu  |                    |       |

### TEST RESULT OF TM1-TM4

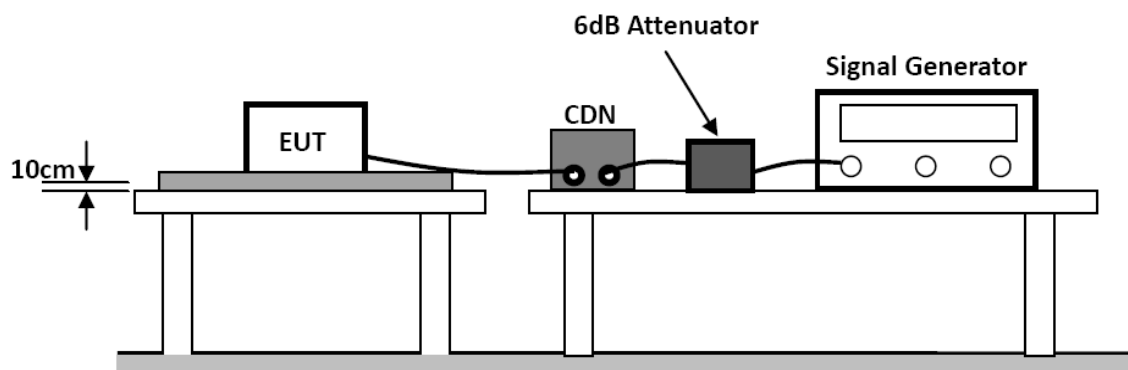
| Line | Test Voltage | Polarity | Observation | Result (Pass/Fail) |
|------|--------------|----------|-------------|--------------------|
| L    | 1KV          | +/-      | CT, CR      | Pass               |
| N    | 1KV          | +/-      | CT, CR      | Pass               |
| L-N  | 1KV          | +/-      | CT, CR      | Pass               |

### TEST RESULT OF TM2-TM3

| Line | Test Voltage | Polarity | Result (Pass/Fail) |
|------|--------------|----------|--------------------|
| L    | 1KV          | +/-      | Pass               |
| N    | 1KV          | +/-      | Pass               |
| L-N  | 1KV          | +/-      | Pass               |

## 11. RF COMMON MODE

### 11.1. Test Configuration



### 11.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-6: 2014

Test level: 3V (r.m.s.) for 0.15MHz ~ 10MHz; 3V (r.m.s.) to 1V (r.m.s.) for 10MHz ~ 30MHz;

1V (r.m.s.) for 30MHz ~ 80MHz

Modulation type: AM

Modulation depth: 80%

Modulation signal: 1 kHz

| Test Level               |                            |
|--------------------------|----------------------------|
| Level                    | Voltage Level (r.m.s.) (V) |
| 1                        | 1                          |
| 2                        | 3                          |
| 3                        | 10                         |
| X                        | Special                    |
| Performance Criterion: A |                            |

### 11.3. Test Procedure

11.3.1. Let the EUT work in test mode and test it.

11.3.2. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible).

11.3.3. The disturbance signal described below is injected to EUT through CDN.

11.3.4. The EUT operates within its operational mode(s) under intended climatic conditions after power on.

11.3.5. The frequency range is swept from 150kHz to 10MHz using 3V signal level, 10MHz to 30MHz using 3V to 1V signal level, 30MHz to 80MHz using 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

11.3.6. The rate of sweep shall not exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

11.3.7. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

### 11.4. Test Data

**PASS.**

Please refer to the following page.

## Injected Currents Susceptibility Test Results

|               |   |             |       |
|---------------|---|-------------|-------|
| Standard      | <input type="checkbox"/> IEC 61000-4-6 <input checked="" type="checkbox"/> EN 61000-4-6 |             |       |
| Applicant     | Dongguan Xing Yue Electronic co., Ltd   |             |       |
| EUT           | Free Flow TWS earbuds in case   | Temperature | 22.6℃ |
| M/N           | XO-9852-1   | Humidity    | 52.9% |
| Test Mode     | TM1-TM3   | Criterion   | A     |
| Test Engineer | Scout Wu  |             |       |

### TEST RESULT OF TM1-TM4

| Frequency Range (MHz) | Strength (Unmodulated) | Injected Position | Observation | Result (Pass/Fail) |
|-----------------------|------------------------|-------------------|-------------|--------------------|
| 0.15 ~ 10             | 3V                     | AC Mains          | CT, CR      | Pass               |
| 10 ~ 30               | 3V to 1V               |                   |             |                    |
| 30 ~ 80               | 1V                     |                   |             |                    |

### TEST RESULT OF TM2-TM3

| Frequency Range (MHz) | Strength (Unmodulated) | Injected Position | Result (Pass/Fail) |
|-----------------------|------------------------|-------------------|--------------------|
| 0.15 ~ 10             | 3V                     | AC Mains          | Pass               |
| 10 ~ 30               | 3V to 1V               |                   |                    |
| 30 ~ 80               | 1V                     |                   |                    |

**Remark:**

1. Modulation Signal:1kHz 80% AM

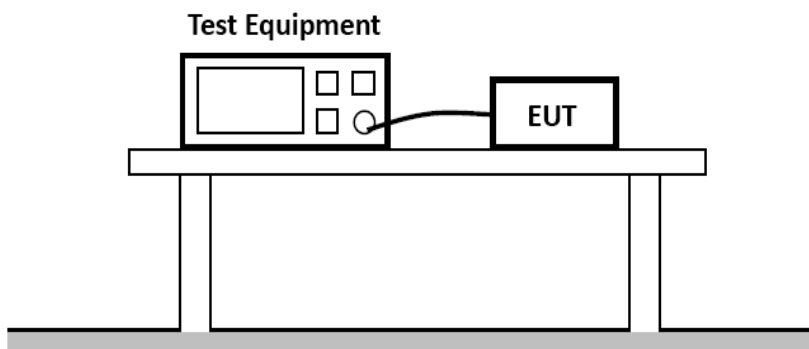
2. Measurement Equipment :

Simulator: CIT-10 (FRANKONIA)

CDN : ☒CDN-M2 (FRANKONIA)☐CDN-M3 (FRANKONIA)

## 12. SURGES, LINE TO LINE AND LINE TO GROUND

### 12.1. Test Configuration



### 12.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 61000-4-5: 2014

L-N: Test level 2 at 1 kV

L-PE, N-PE Test Level 3 at 2kV

| Test Level                                  |                       |  |
|---|-----------------------|--|
| Open Circuit Output Test Voltage $\pm 10\%$ |                       |  |
| Level                                       | On Power Supply Lines | On I/O (Input/Output)<br>Signal data and control lines |
| 1   | 0.5 kV                | 0.25 kV  |
| 2   | 1 kV                  | 0.5 kV   |
| 3   | 2 kV                  | 1 kV   |
| 4   | 4 kV                  | 2 kV   |
| X   | Special               | Special  |
| Performance Criterion: B                    |                       |  |

### 12.3. Test Procedure

- 12.3.1. For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).
- 12.3.2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 12.3.3. Different phase angles are done individually.
- 12.3.4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.



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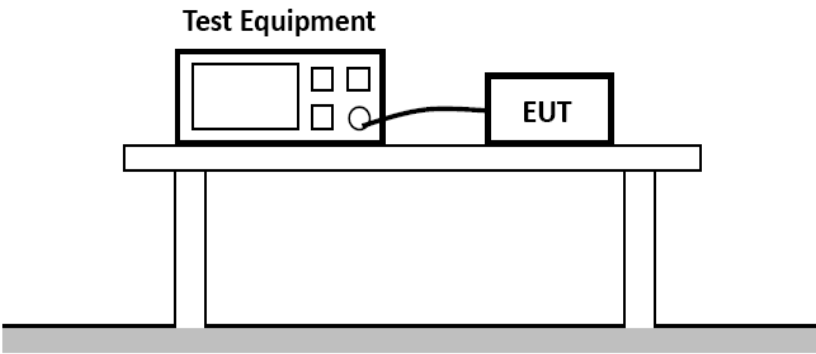
12.4. Test Data

| Surge Immunity Test Result |   |             |       |
|----------------------------|---|-------------|-------|
| Standard                   | <input type="checkbox"/> IEC 61000-4-5 <input checked="" type="checkbox"/> EN 61000-4-5 |             |       |
| Applicant                  | Dongguan Xing Yue Electronic co., Ltd   |             |       |
| EUT                        | Free Flow TWS earbuds in case   | Temperature | 24.8℃ |
| M/N                        | XO-9852-1   | Humidity    | 53.8% |
| Test Mode                  | TM1-TM3   | Criterion   | A     |
| Test Engineer              | Scout Wu  |             |       |

| TEST RESULT OF BULETOOTH |          |                     |                 |                    |             |                    |
|--------------------------|----------|---------------------|-----------------|--------------------|-------------|--------------------|
| Location                 | Polarity | Phase Angle         | Number of Pulse | Pulse Voltage (KV) | Observation | Result (Pass/Fail) |
| L-N                      | +        | 0°, 90°, 180°, 270° | 5               | 1.0                | CT, CR      | Pass               |
|                          | -        | 0°, 90°, 180°, 270° | 5               | 1.0                | CT, CR      | Pass               |
|                          |          |                     |                 |                    |             |                    |
|                          |          |                     |                 |                    |             |                    |
| TEST RESULT OF TM2-TM3   |          |                     |                 |                    |             |                    |
| Location                 | Polarity | Phase Angle         | Number of Pulse | Pulse Voltage (KV) |             | Result (Pass/Fail) |
| L-N                      | +        | 0°, 90°, 180°, 270° | 5               | 1.0                |             | Pass               |
|                          | -        | 0°, 90°, 180°, 270° | 5               | 1.0                |             | Pass               |
|                          |          |                     |                 |                    |             |                    |
|                          |          |                     |                 |                    |             |                    |
|                          |          |                     |                 |                    |             |                    |

13. VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

13.1. Test Configuration



13.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-11: 2004+A1:2017  
Test levels and Performance Criterion

| Test Level                            |                                  |                         |
|---------------------------------------|----------------------------------|-------------------------|
| Voltage Reduction<br>% U <sub>T</sub> | Voltage Dips<br>% U <sub>T</sub> | Duration<br>(in Period) |
| 100                                   | 0                                | 0.5                     |
| 100                                   | 0                                | 1                       |
| 30                                    | 70                               | 5                       |
| Voltage Reduction<br>% U <sub>T</sub> | Voltage Dips<br>% U <sub>T</sub> | Duration<br>(in Period) |
| 100                                   | 0                                | 250                     |
| Performance Criterion: B&C            |                                  |                         |

13.3. Test Procedure

- 13.3.1. The interruption is introduced at selected phase angles with specified duration.
- 13.3.2. Record any degradation of performance.

## 13.4. Test Data

| Voltage Dips And Interruptions Test Results |   |             |       |
|---|---|-------------|-------|
| Standard                                    | <input type="checkbox"/> IEC 61000-4-11 <input checked="" type="checkbox"/> EN 61000-4-11 |             |       |
| Applicant                                   | Dongguan Xing Yue Electronic co., Ltd   |             |       |
| EUT   | Free Flow TWS earbuds in case   | Temperature | 23.1℃ |
| M/N   | XO-9852-1   | Humidity    | 54.5% |
| Test Mode                                   | TM1-TM3   | Criterion   | A     |
| Test Engineer                               | Scout Wu  |             |       |

## TEST RESULT OF BULETOOTH

| Test Level<br>% U <sub>T</sub> | Voltage Dips & Short<br>Interruptions % U <sub>T</sub> | Duration<br>(in periods) | Observation | Result (Pass/Fail) |
|--------------------------------|--|--------------------------|-------------|--------------------|
| 0                              | 100  | 0.5P                     | CT, CR      | Pass               |
| 0                              | 100  | 1P                       | CT, CR      | Pass               |
| 70                             | 30   | 25P                      | CT, CR      | Pass               |
| 0                              | 100  | 250P                     | CT, CR      | Pass               |

## TEST RESULT OF TM2-TM3

| Test Level<br>% U <sub>T</sub> | Voltage Dips & Short<br>Interruptions % U <sub>T</sub> | Duration<br>(in periods) | Result (Pass/Fail) |
|--------------------------------|--|--------------------------|--------------------|
| 0                              | 100  | 0.5P                     | Pass               |
| 0                              | 100  | 1P                       | Pass               |
| 70                             | 30   | 25P                      | Pass               |
| 0                              | 100  | 250P                     | Pass               |

## 14. LIST OF MEASURING EQUIPMENT

### LINE CONDUCTED EMISSION

| Item | Equipment         | Manufacturer    | Model No.   | Serial No.      | Cal Date   | Due Date   |
|------|-------------------|-----------------|-------------|-----------------|------------|------------|
| 1    | EMI Test Software | AUDIX           | E3          | /               | N/A        | N/A        |
| 2    | EMI Test Receiver | R&S             | ESPI        | 101840          | 2019-06-11 | 2020-06-10 |
| 3    | Artificial Mains  | R&S             | ENV216      | 101288          | 2019-06-12 | 2020-06-11 |
| 4    | 10dB Attenuator   | SCHWARZBEC<br>K | MTS-IMP-136 | 261115-001-0032 | 2019-06-11 | 2020-06-10 |

### RADIATED DISTURBANCE

| Item | Equipment                | Manufacturer    | Model No.       | Serial No. | Cal Date   | Due Date   |
|------|--------------------------|-----------------|-----------------|------------|------------|------------|
| 1    | EMI Test Software        | AUDIX           | E3              | /          | N/A        | N/A        |
| 2    | 3m Full Anechoic Chamber | MRDIANZI        | FAC-3M          | MR009      | 2019-09-27 | 2020-09-26 |
| 3    | Positioning Controller   | MF              | MF-7082         | /          | 2019-06-12 | 2020-06-11 |
| 4    | By-log Antenna           | SCHWARZBEC<br>K | VULB9163        | 9163-470   | 2018-07-26 | 2021-07-25 |
| 5    | Horn Antenna             | SCHWARZBEC<br>K | BBHA 9120D      | 9120D-1925 | 2018-07-02 | 2021-07-01 |
| 6    | EMI Test Receiver        | R&S             | ESR 7           | 101181     | 2019-06-12 | 2020-06-11 |
| 7    | RS SPECTRUM ANALYZER     | R&S             | FSP40           | 100503     | 2019-11-22 | 2020-11-21 |
| 8    | Broadband Preamplifier   | /               | BP-01M18G       | P190501    | 2019-07-01 | 2020-06-30 |
| 9    | RF Cable-R03m            | Jye Bao         | RG142           | CB021      | 2019-06-12 | 2020-06-11 |
| 10   | RF Cable-HIGH            | SUHNER          | SUCOFLEX<br>106 | 03CH03-HY  | 2019-06-12 | 2020-06-11 |

### VOLTAGE FLUCTUATION AND FLICKER/HARMONIC CURRENT EMISSIONS

| Item | Equipment                  | Manufacturer | Model No. | Serial No.   | Cal Date   | Due Date   |
|------|----------------------------|--------------|-----------|--------------|------------|------------|
| 1    | Power Analyzer Test System | Voltech      | PM6000    | 200006700523 | 2019-06-12 | 2020-06-11 |

### RF ELECTROMAGNETIC FIELD

| Item | Equipment                                 | Manufacturer    | Model No.         | Serial No. | Cal Date   | Due Date   |
|------|---|-----------------|-------------------|------------|------------|------------|
| 1    | RS Test Software                          | Tonscend        | /                 | /          | N/A        | N/A        |
| 2    | ESG Vector Signal Generator               | Agilent         | E4438C            | MY42081396 | 2019-11-22 | 2020-11-23 |
| 3    | 3m Full Anechoic Chamber                  | MRDIANZI        | FAC-3M            | MR009      | 2019-09-27 | 2020-09-26 |
| 4    | RF POWER AMPLIFIER                        | OPHIR           | 5225R             | 1052       | NCR        | NCR        |
| 5    | RF POWER AMPLIFIER                        | OPHIR           | 5273F             | 1019       | NCR        | NCR        |
| 6    | RF POWER AMPLIFIER                        | SKET            | HAP_0306G-50<br>W | /          | NCR        | NCR        |
| 7    | Stacked Broadband Log Periodic<br>Antenna | SCHWARZBEC<br>K | STLP 9128         | 9128ES-145 | NCR        | NCR        |
| 8    | Stacked Mikrowellen Log.-Per<br>Antenna   | SCHWARZBEC<br>K | STLP 9149         | 9149-484   | NCR        | NCR        |

**ELECTROSTATIC DISCHARGE**

| Item | Equipment     | Manufacturer | Model No. | Serial No. | Cal Date   | Due Date   |
|------|---------------|--------------|-----------|------------|------------|------------|
| 1    | ESD Simulator | SCHLODER     | SESD 230  | 604035     | 2019-06-13 | 2020-06-12 |

**ELECTRICAL FAST TRANSIENT IMMUNITY**

| Item | Equipment                     | Manufacturer | Model No. | Serial No. | Cal Date   | Due Date   |
|------|-------------------------------|--------------|-----------|------------|------------|------------|
| 1    | Immunity Simulative Generator | EM TEST      | UCS500 M4 | 0101-34    | 2019-06-11 | 2020-06-10 |

**RF COMMON MODE**

| Item | Equipment      | Manufacturer | Model No. | Serial No. | Cal Date   | Due Date   |
|------|----------------|--------------|-----------|------------|------------|------------|
| 1    | Simulator      | FRANKONIA    | CIT-10/75 | A126A1195  | 2019-06-11 | 2020-06-10 |
| 2    | CDN            | FRANKONIA    | CDN-M2+M3 | A2210177   | 2019-06-11 | 2020-06-10 |
| 3    | 6dB Attenuator | FRANKONIA    | DAM25W    | 1172040    | 2019-06-11 | 2020-06-10 |

**SURGES, LINE TO LINE AND LINE TO GROUND**

| Item | Equipment                     | Manufacturer | Model No. | Serial No. | Cal Date   | Due Date   |
|------|-------------------------------|--------------|-----------|------------|------------|------------|
| 1    | Immunity Simulative Generator | EM TEST      | UCS500 M4 | 0101-34    | 2019-06-11 | 2020-06-10 |

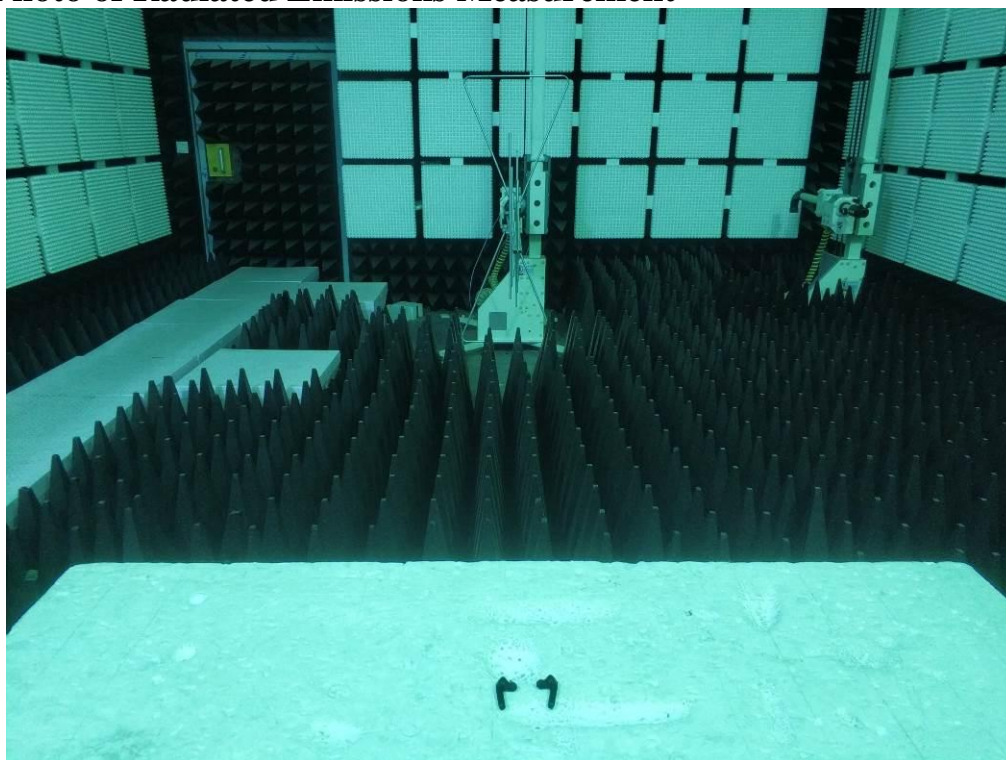
**VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST**

| Item | Equipment                     | Manufacturer | Model No. | Serial No. | Cal Date   | Due Date   |
|------|-------------------------------|--------------|-----------|------------|------------|------------|
| 1    | Voltage dips and up generator | 3CTEST       | VDG-1105G | EC0171014  | 2019-06-11 | 2020-06-10 |

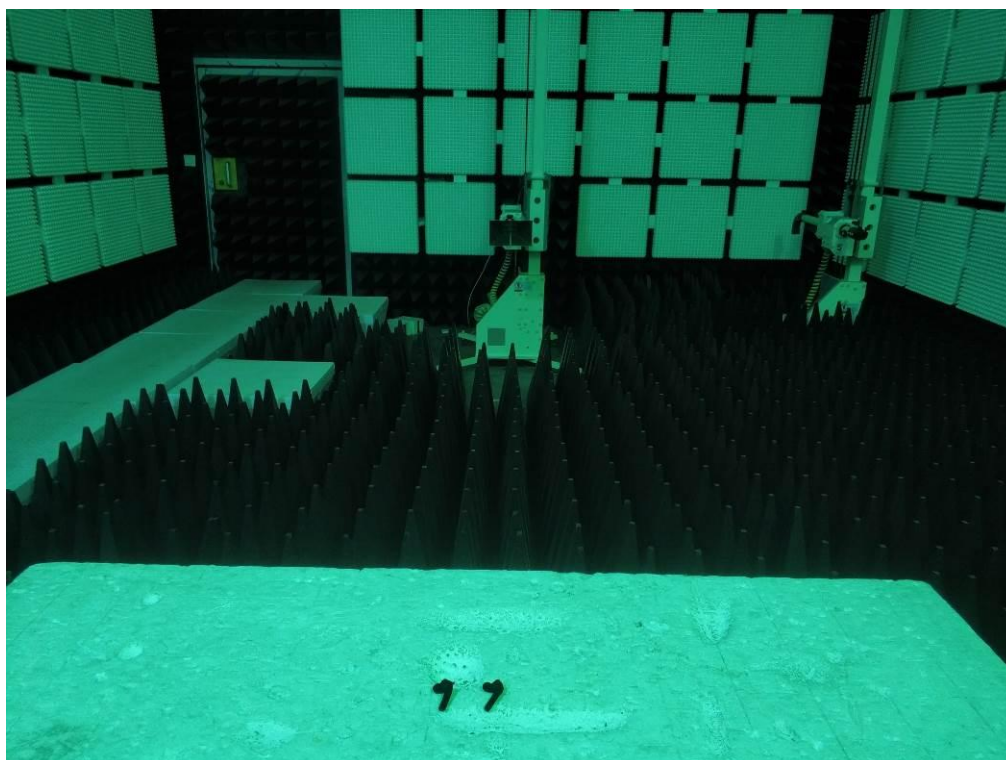
Note: All equipment is calibrated through CHINA CEPREI LABORATORY and GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.

## 15. TEST SETUP PHOTOGRAPHS

### 15.1. Photo of Radiated Emissions Measurement



Below 1G





## 15.2. Photo of Power Line Conducted Emissions Measurement



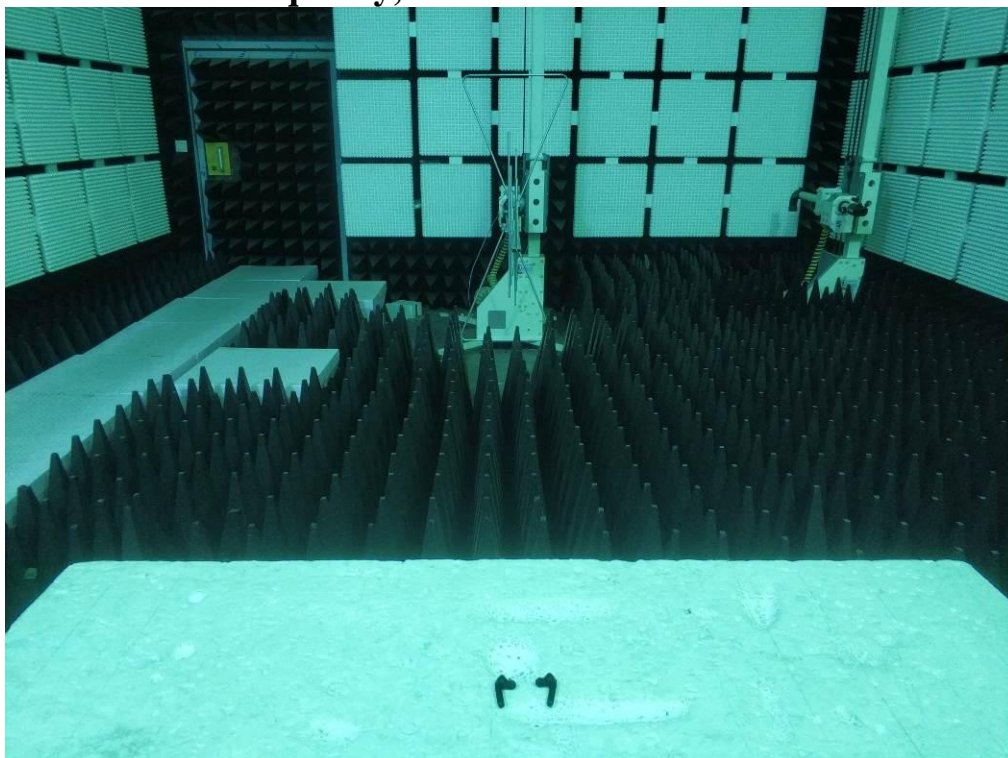
## 15.3. Photo of Harmonic & Flicker Measurement



#### 15.4. Photo of Electrostatic Discharge Test



#### 15.5. Photo of Radio-frequency, Continuous radiated disturbance





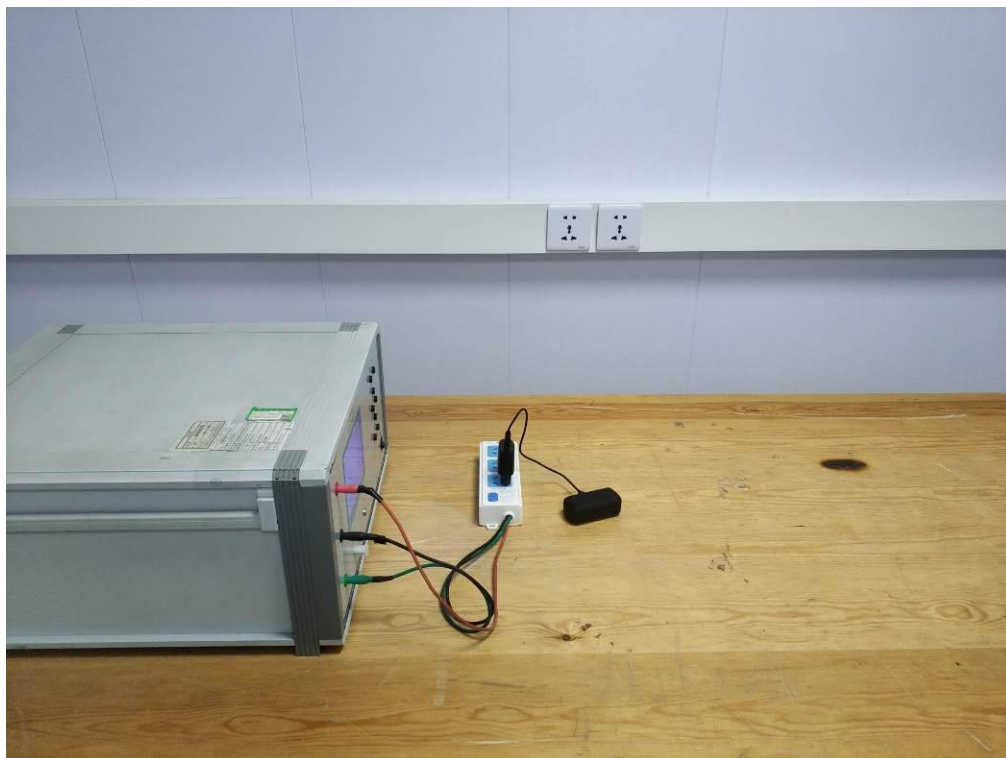
### 15.6. Photo of Electrical Fast Transient/Burst& Surge Immunity Test



### 15.7. Photo of Injected Currents Susceptibility Test



## 15.8 Photo of Voltage Dips and Short Interruptions Immunity Test



## 16. EXTERNAL AND INTERNAL PHOTOS OF THE EUT



Fig. 1



Fig. 2





Fig. 3



Fig. 4



Fig. 5



Fig. 6





Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11

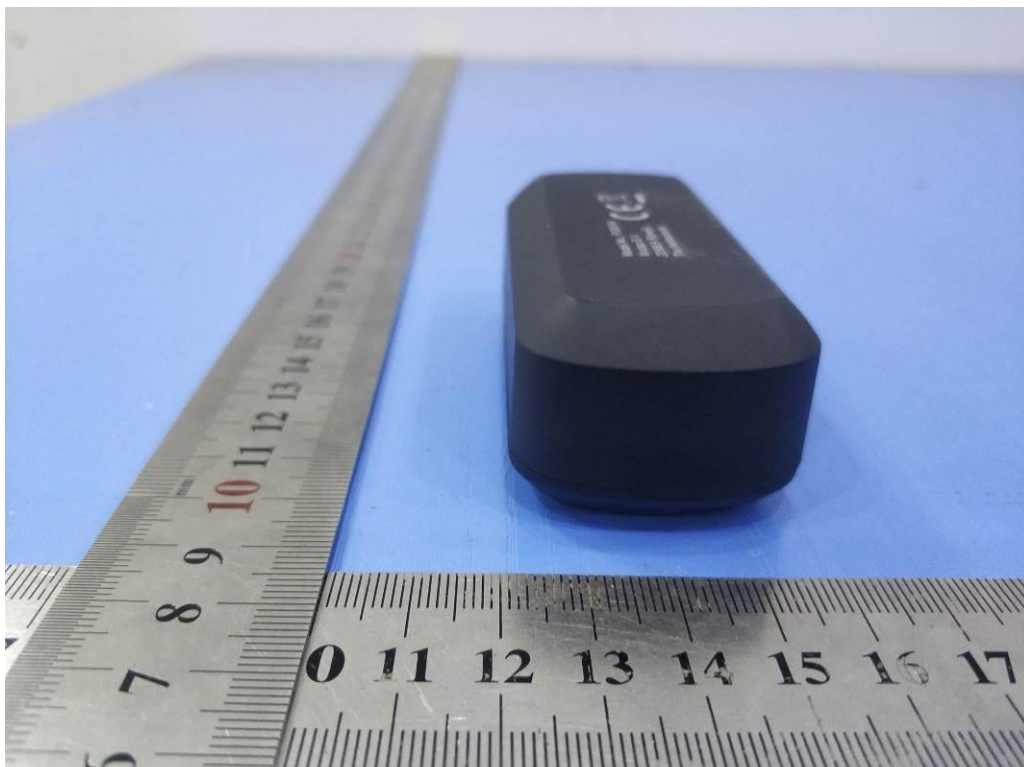


Fig. 12





Fig. 13



Fig. 14

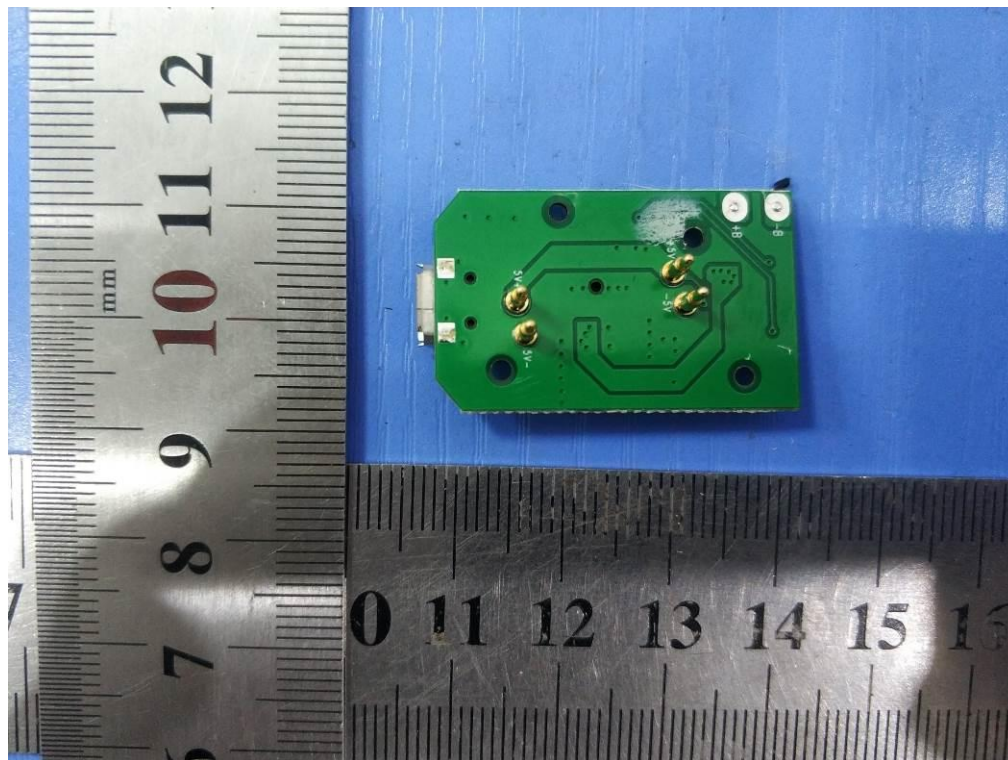


Fig. 15

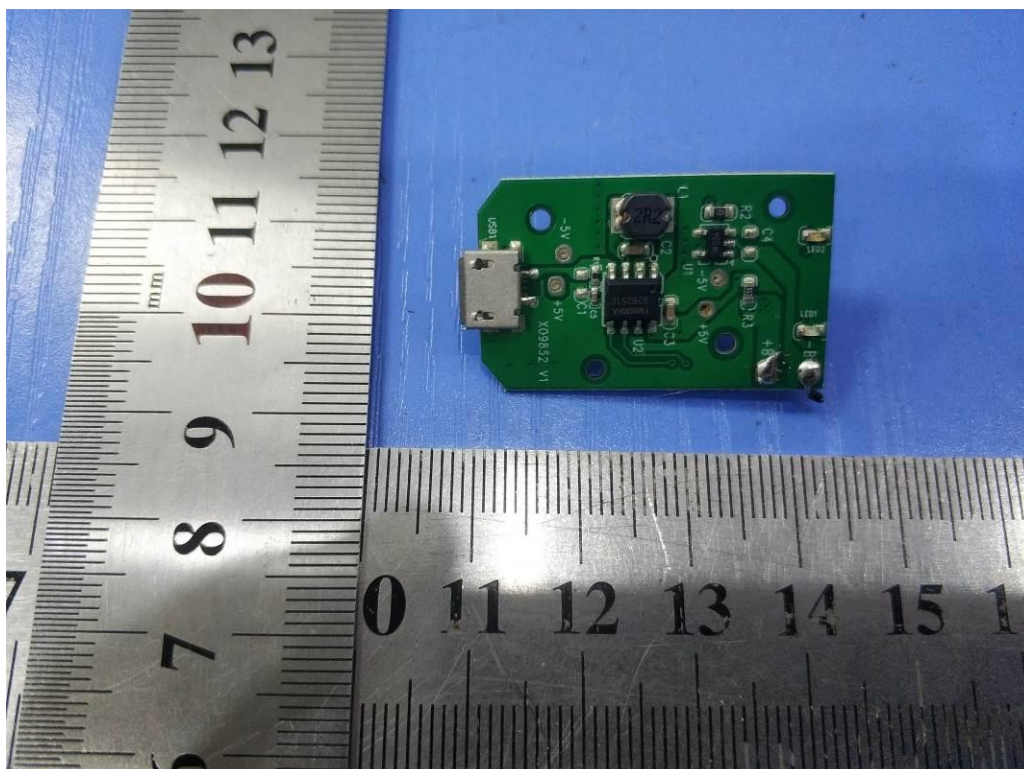


Fig. 16



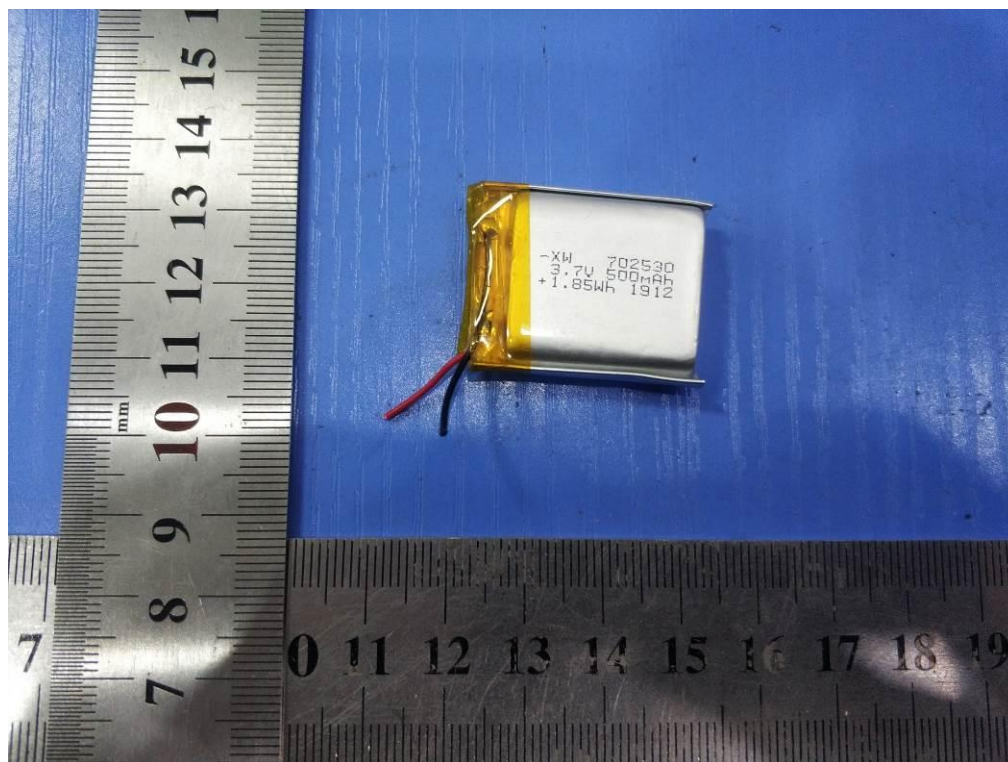


Fig. 17

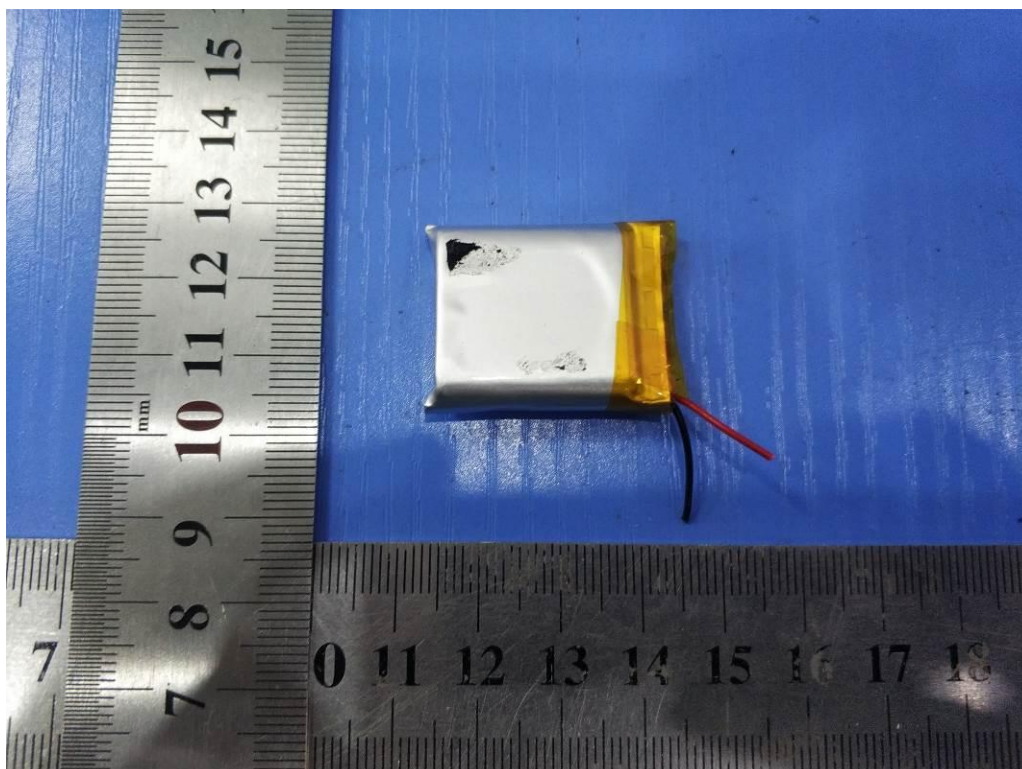


Fig. 18



Fig. 19



Fig. 20



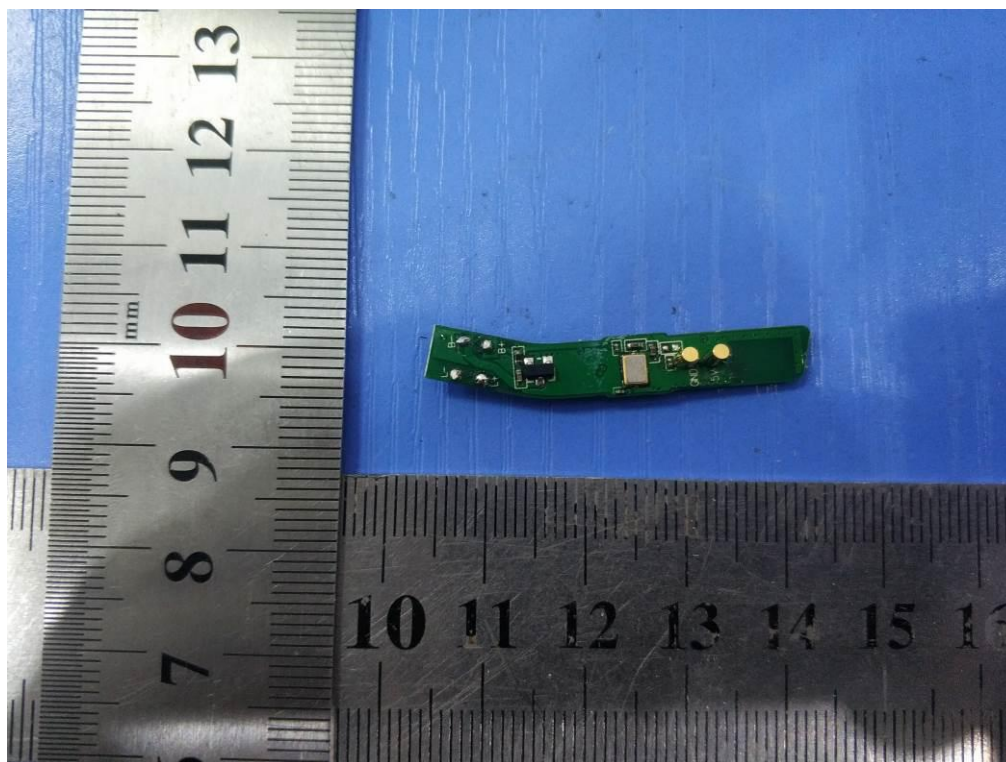


Fig. 21

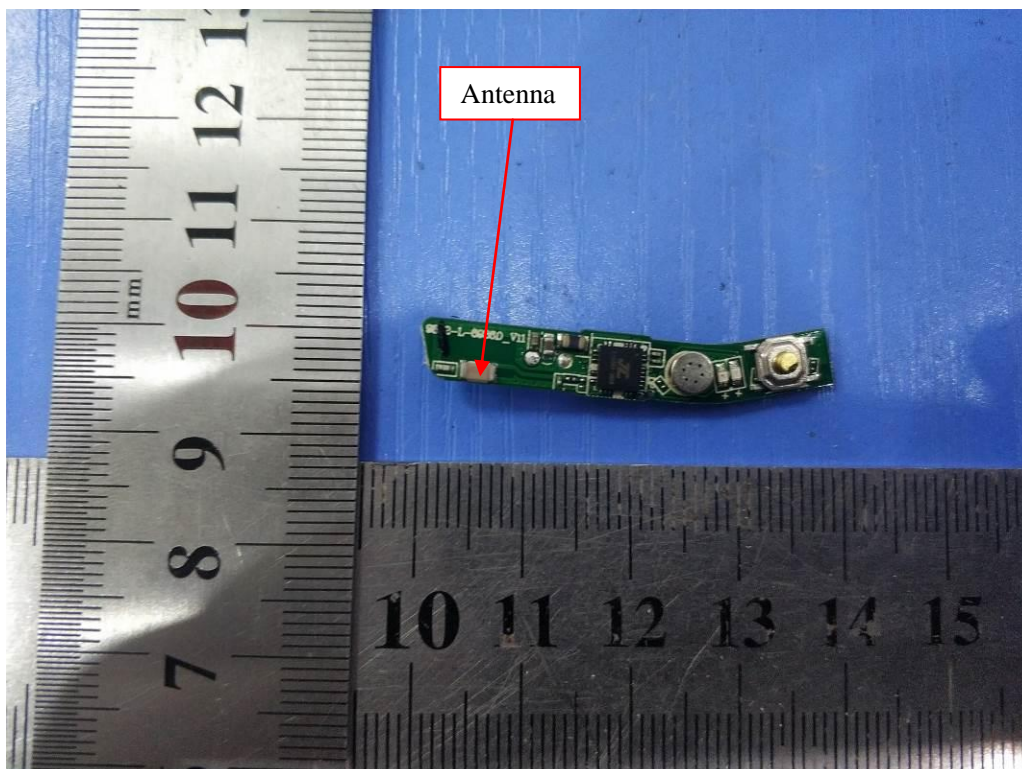


Fig. 22

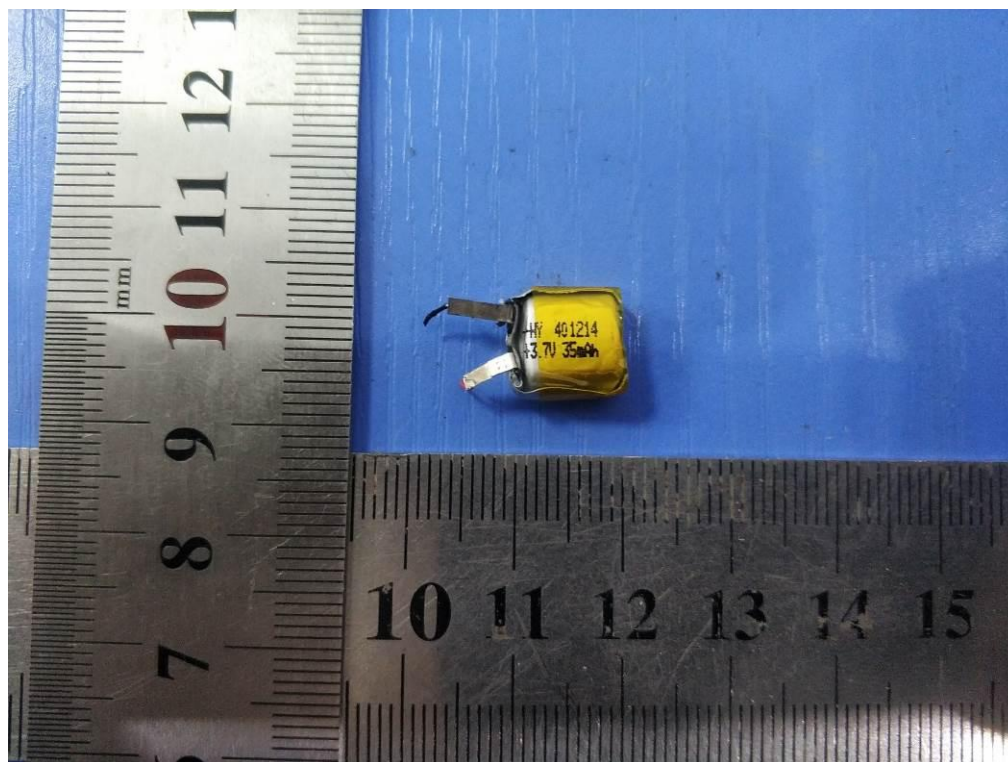


Fig. 23

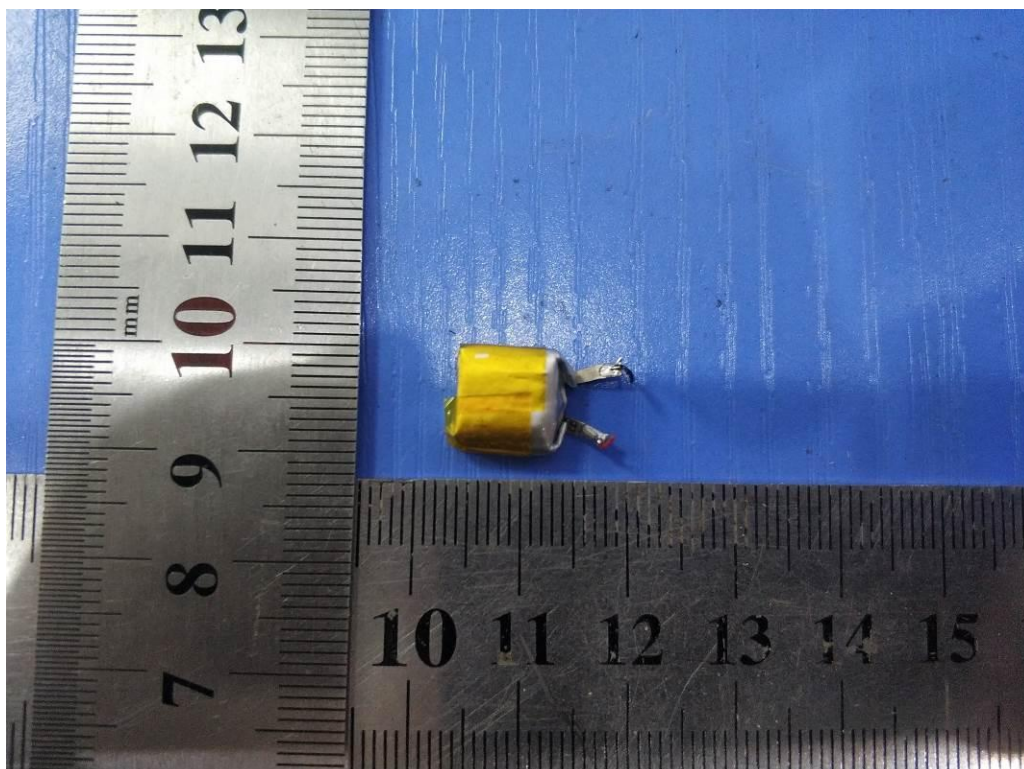


Fig. 24





Fig. 25



Fig. 26

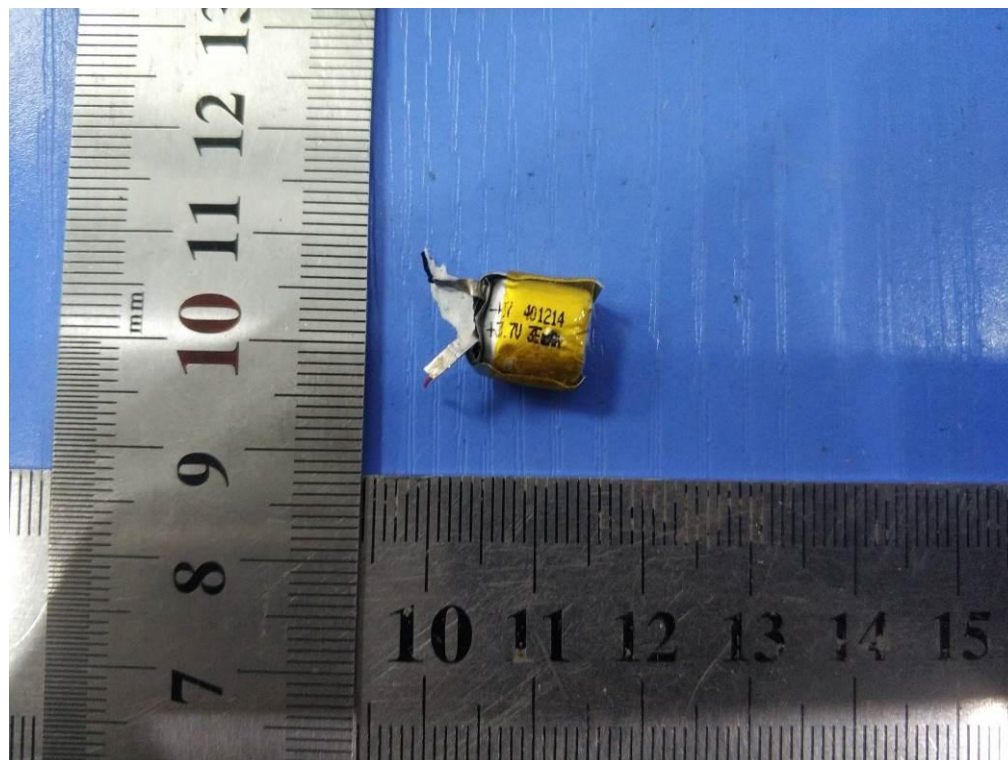


Fig. 27

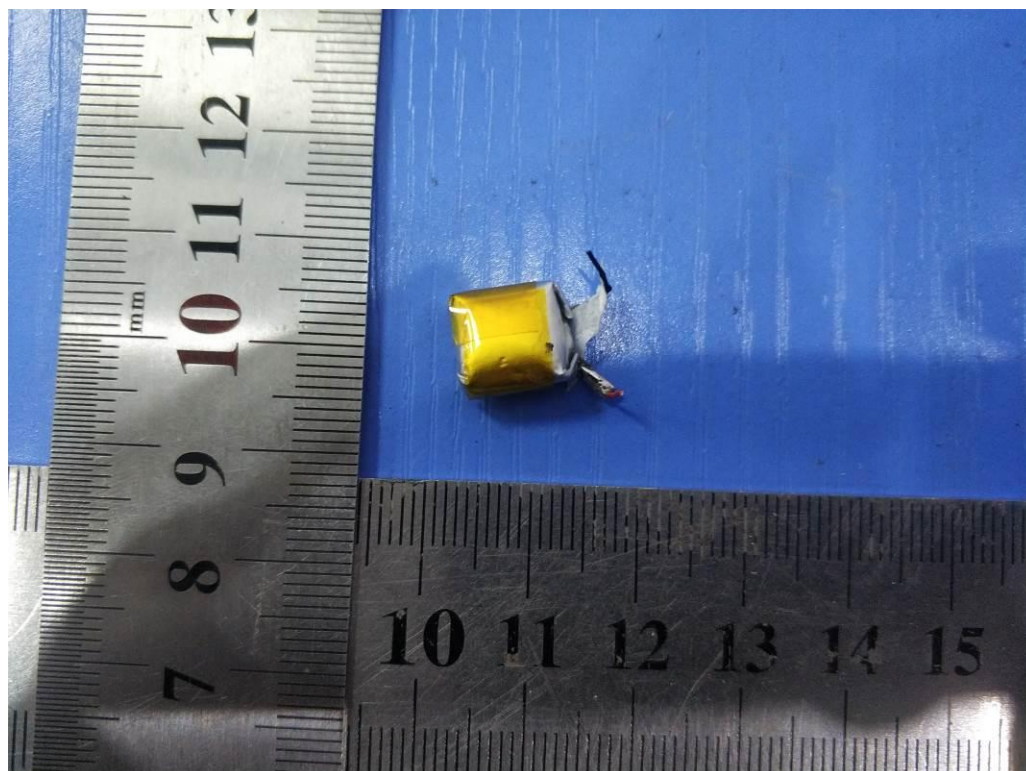


Fig. 28



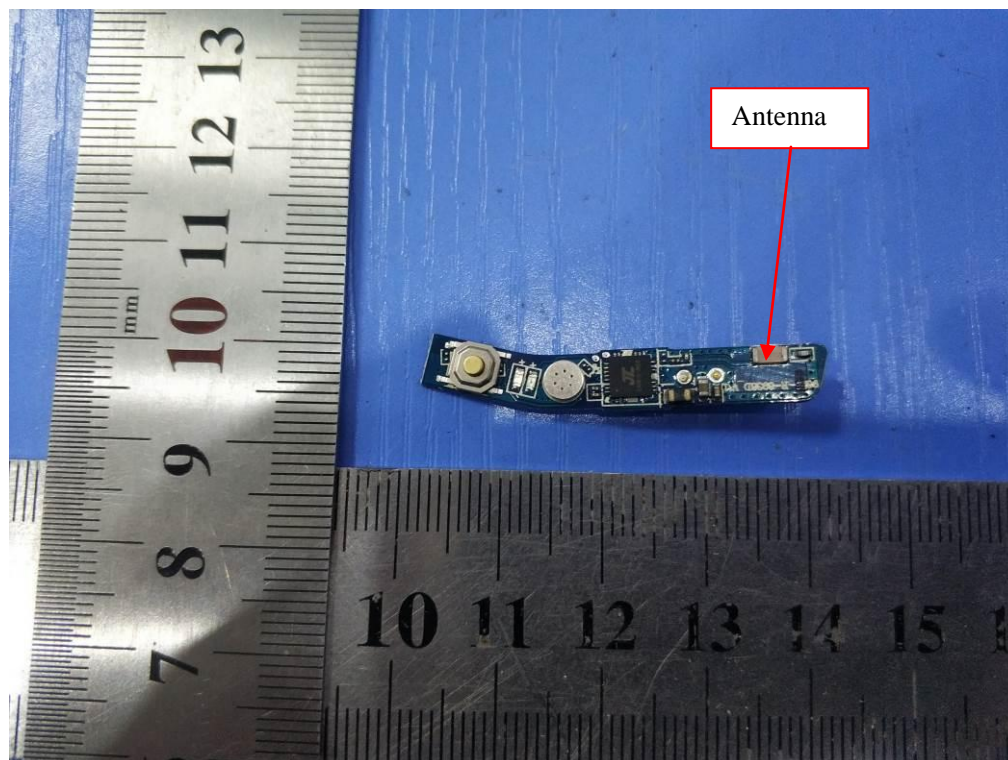


Fig. 29

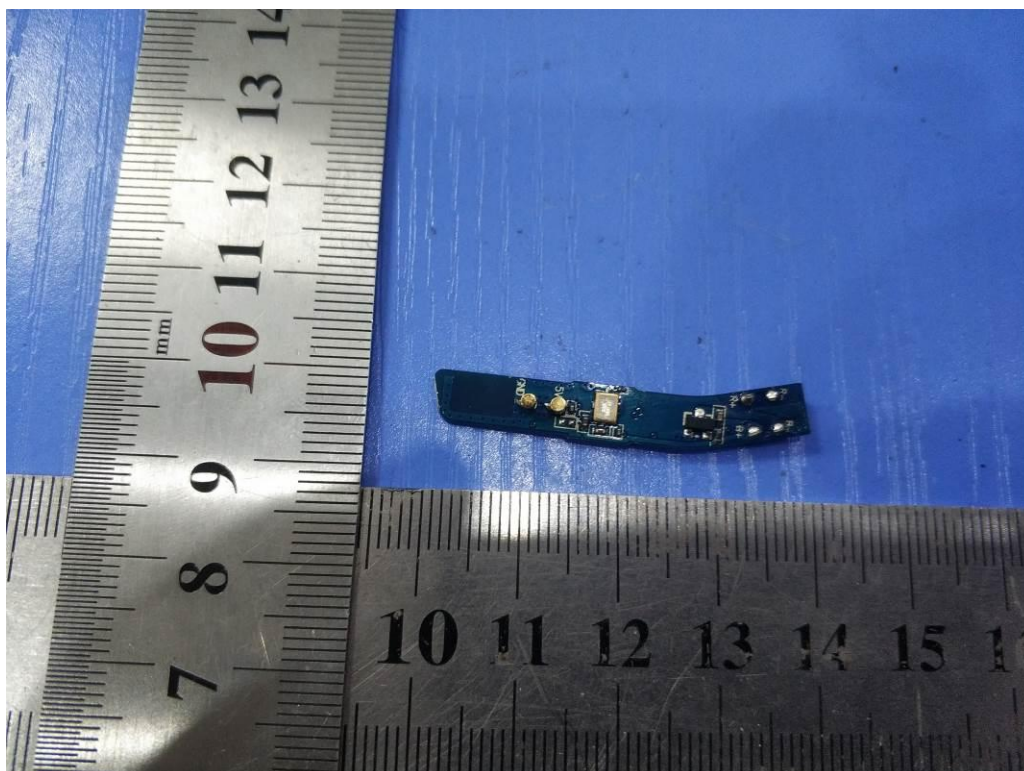


Fig. 30



Fig. 31

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