# EMC TEST REPORT

| | | |
|---|---|---|
| Prepared for | : | |
| Address | : | |

| | | |
|---|---|---|
| Prepared by | : | Shenzhen LCS Compliance Testing Laboratory Ltd. |
| Address | : | 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China |
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| Web | : | www.LCS-cert.com |
| Mail | : | webmaster@LCS-cert.com |

| | | |
|---|---|---|
| Date of receipt of test sample | : | November 21, 2018 |
| Number of tested samples | : | 1 |
| Serial number | : | Prototype |
| Date of Test | : | November 21, 2018 ~ November 30, 2018 |
| Date of Report | : | December 03, 2018 |

# EMC TEST REPORT

## ETSI EN 301 489-17 V3.1.1(2017-02)

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

| | | |
|---|---|---|
| **Report Reference No. .....** | : | **LCS181121010AEA** |
| Date Of Issue..... | : | December 03, 2018 |
| **Testing Laboratory Name .....** | : | **Shenzhen LCS Compliance Testing Laboratory Ltd.** |
| Address..... | : | 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China |
| Testing Location/ Procedure ..... | : | Full application of Harmonised standards ■<br>Partial application of Harmonised standards □<br>Other standard testing method □ |
| **Applicant's Name .....** | : | |
| Address..... | : | |
| **Test Specification** | | |
| Standard..... | : | ETSI EN 301 489-1 V2.1.1 (2017-02)<br>ETSI EN 301 489-17 V3.1.1(2017-02)<br>EN 55032: 2015 |
| Test Report Form No. ..... | : | LCSEMC-1.0 |
| TRF Originator..... | : | Shenzhen LCS Compliance Testing Laboratory Ltd. |
| Master TRF ..... | : | Dated 2017-06 |



| | | |
|---|---|---|
| **Test Item Description.....** | : | **Fabric Bluetooth Speaker** |
| Trade Mark..... | : | N/A |
| Test Model ..... | : | |
| Ratings ..... | : | Power Supply:3.7V by battery (1200mAh)<br>Recharge Voltage: 5V⎓,585mA Max |
| **Result .....** | : | **Positive** |

| **Compiled by:** | **Supervised by:** | **Approved by:** |
|---|---|---|
| Camille Li/ Administrators | Calvin Weng/ Technique principal | Gavin Liang/ Manager |

# EMC -- TEST REPORT

| | |
|---|---|
| **Test Report No. : LCS181121010AEA** | December 03, 2018<br>Date of issue |

| | |
|---|---|
| Test Model..... | : |
| EUT..... | : Fabric Bluetooth Speaker |
| **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

| Report Version | Issue Date | Revisions | Revised By |
|---|---|---|---|
| 000 | December 03, 2018 | Initial Issue | Gavin Liang |
| | | | |
| | | | |

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Test Report Description Page

# 1. GENERAL INFORMATION

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

| | | |
|---|---|---|
| EUT | : | Fabric Bluetooth Speaker |
| Test Model | : | XO-9567-1 |
| Power Supply | : | Power Supply:3.7V by battery (1200mAh)<br>Recharge Voltage: 5V⎓, 585mA Max |
| Hardware Version | : | V4.2 |
| Software Version | : | V1.1 |
| Bluetooth | : | |
| Frequency Range | : | 2.402-2.480GHz |
| Channel Number | : | 79 channels for Bluetooth V2.1 (BDR/EDR) |
| Channel Spacing | : | 1MHz for Bluetooth V2.1 (BDR/EDR) |
| Modulation Type | : | GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V2.1 (BDR/EDR) |
| Bluetooth Version | : | V2.1 |
| Antenna Description | : | PCB Antenna, -0.58 dBi |

## 1.2. Objective

| | |
|---|---|
| ETSI EN 301 489-1 | 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 |
| ETSI EN 301 489-17 | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; 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 |

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) and EN 55032:2015.

## 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) and EN 55032:2015.

## 1.5. Description of Test Facility

FCC Registration Number. is 254912.
Industry Canada Registration Number. is 9642A-1.
ESMD 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 Registration Code is 600167-0

## 1.6. Support Equipment List

| Manufacturer | Description | Model | Serial Number | Certificate |
|---|---|---|---|---|
| DELL | PC | Vostro 15-7570 | -- | CE |
| DELL | Power adapter | ADP-90DDB | -- | CE |

## 1.7. External I/O

| I/O Port Description | Quantity | Cable |
|---|---|---|
| AUX Port | 1 | N/A |
| USB Port | 1 | N/A |

## 1.8. List Of Measuring Equipment

LINE CONDUCTED EMISSION

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | EMI Test Software | AUDIX | E3 | / | 2018-06-16 | 2019-06-15 |
| 2 | EMI Test Receiver | R&S | ESPI | 101840 | 2018-06-16 | 2019-06-15 |
| 3 | Artificial Mains | R&S | ENV216 | 101288 | 2018-06-16 | 2019-06-15 |
| 4 | 10dB Attenuator | SCHWARZBECK | MTS-IMP-136 | 261115-001-0032 | 2018-06-16 | 2019-06-15 |

RADIATED DISTURBANCE

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | EMI Test Software | AUDIX | E3 | / | 2018-06-16 | 2019-06-15 |
| 2 | 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 2018-06-16 | 2019-06-15 |
| 3 | Positioning Controller | MF | MF-7082 | / | 2018-06-16 | 2019-06-15 |
| 4 | By-log Antenna | SCHWARZBECK | VULB9163 | 9163-470 | 2018-07-26 | 2019-07-25 |
| 5 | Horn Antenna | SCHWARZBECK | BBHA 9120D | 9120D-1925 | 2018-07-02 | 2019-07-01 |
| 6 | EMI Test Receiver | R&S | ESR 7 | 101181 | 2018-06-16 | 2019-06-15 |
| 7 | RS SPECTRUM ANALYZER | R&S | FSP40 | 100503 | 2018-11-15 | 2019-11-14 |
| 8 | AMPLIFIER | QuieTek | QTK | CHM/0809065 | 2018-11-15 | 2019-11-14 |
| 9 | RF Cable-R03m | Jye Bao | RG142 | CB021 | 2018-06-16 | 2019-06-15 |
| 10 | RF Cable-HIGH | SUHNER | SUCOFLEX 106 | 03CH03-HY | 2018-06-16 | 2019-06-15 |

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 | 2018-06-16 | 2019-06-15 |

RF ELECTROMAGNETIC FIELD

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | RS Test Software | Tonscend | / | / | 2018-06-16 | 2019-06-15 |
| 2 | ESG Vector Signal Generator | Agilent | E4438C | MY42081396 | 2018-11-15 | 2019-11-14 |
| 3 | 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 2018-06-16 | 2019-06-15 |
| 4 | RF POWER AMPLIFIER | OPHIR | 5225R | 1052 | NCR | NCR |
| 5 | RF POWER AMPLIFIER | OPHIR | 5273F | 1019 | NCR | NCR |
| 6 | Stacked Broadband Log Periodic Antenna | SCHWARZBECK | STLP 9128 | 9128ES-145 | NCR | NCR |
| 7 | Stacked Mikrowellen Log.-Per Antenna | SCHWARZBECK | STLP 9149 | 9149-484 | NCR | NCR |
| 8 | Electric field probe | Narda S.TS./PMM | EP601 | 611WX80208 | 2018-03-26 | 2019-03-25 |

ELECTROSTATIC DISCHARGE

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | ESD Simulator | SCHLODER | SESD 230 | 604035 | 2018-07-02 | 2019-07-01 |

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 | 2018-11-15 | 2019-11-14 |
| 2 | CAPACITANCE COUPLING CLAMP | 3CTEST | EFTC | EC0441098 | 2018-06-16 | 2019-06-15 |

RF COMMON MODE

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | Simulator | FRANKONIA | CIT-10/75 | A126A1195 | 2018-06-16 | 2019-06-15 |
| 2 | CDN | FRANKONIA | CDN-M2+M3 | A2210177 | 2018-06-16 | 2019-06-15 |
| 3 | 6dB Attenuator | FRANKONIA | DAM25W | 1172040 | 2018-06-16 | 2019-06-15 |

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 | 2018-11-15 | 2019-11-14 |

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 | 2018-06-16 | 2019-06-15 |

MAGNETIC FIELD SUSCEPTIBILITY TEST

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | Power frequency mag-field generator System | EVERFINE | EMS61000-8K | 906003 | 2018-06-16 | 2019-06-15 |

RADIATED ELECTROMAGNETIC DISTURBANCES (三环天线)

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | Large Loop Antenna | LAPLACE | LLA-2 | 9161 | 2018-06-16 | 2019-06-15 |
| 2 | 10dB Attenuator | Mini-circuits | HAT-10 | 15542 | 2018-06-16 | 2019-06-15 |
| 3 | EMI Test Software | AUDIX | E3 | / | 2018-06-16 | 2019-06-15 |
| 4 | EMI Test Receiver | R&S | ESPI | 101840 | 2018-06-16 | 2019-06-15 |

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

## 1.9. Measurement Uncertainty

| Item | MU | Remark |
|---|---|---|
| Uncertainty for Power point Conducted Emissions Test | 2.42dB | |
| Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz) | 3.54dB | Polarize: V |
| | 4.1dB | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber (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% | |

## 1.10. Description Of Test Modes

There was 2 test Modes. TM1 to TM2 were shown below:

**TM1 :** Operate in Bluetooth mode;

**TM2 :** Idle

***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 clause 8.4 of ETSI EN 301 489-1<br>Conducted Emission (AC mains input/output port) | Compliant |
| §7.1 | Reference to clause 8.3 of ETSI EN 301 489-1<br>Conducted Emission (DC power input/output port) | N/A* |
| §7.1 | Reference to clause 8.7 of ETSI EN 301 489-1<br>Conducted Emission (Wired network port) | N/A* |
| §7.1 | Reference to clause 8.2 of ETSI EN 301 489-1<br>Radiated Emission (Enclosure of ancillary equipment) | Compliant |
| §7.1 | Reference to clause 8.5 of ETSI EN 301 489-1<br>Harmonic current emissions (AC mains input port) | N/A |
| §7.1 | Reference to clause 8.6 of ETSI EN 301 489-1<br>Voltage fluctuations and flicker (AC mains input port) | N/A |
| §7.2 | Reference to clause 9.3 of ETSI EN 301 489-1<br>Electrostatic discharge (Enclosure port)<br>(EN 61000-4-2) | Compliant |
| §7.2 | Reference to clause 9.2 of ETSI EN 301 489-1<br>RF electromagnetic field (80MHz to 6000MHz) (Enclosure port)<br>(EN 61000-4-3) | Compliant |
| §7.2 | Reference to clause 9.4 of ETSI EN 301 489-1<br>Fast transients common mode (signal, wired network and control ports, DC and AC power ports)<br>(EN 61000-4-4) | N/A |
| §7.2 | Reference to clause 9.8 of ETSI EN 301 489-1<br>Surges, line to line and line to ground (AC mains power input ports, wired network ports)<br>(EN 61000-4-5) | N/A |
| §7.2 | Reference to clause 9.5 of ETSI EN 301 489-1<br>RF common mode 0.15MHz to 80MHz (signal, wired network and control ports, DC and AC power ports)<br>(EN 61000-4-6) | N/A |
| §7.2 | Reference to clause 9.6 of ETSI EN 301 489-1<br>Transients and surges in the vehicular environment<br>(ISO 7637-2) | N/A* |
| §7.2 | Reference to clause 9.7 of ETSI EN 301 489-1<br>Voltage dips and interruptions (AC mains power input ports)<br>(EN 61000-4-11) | N/A |

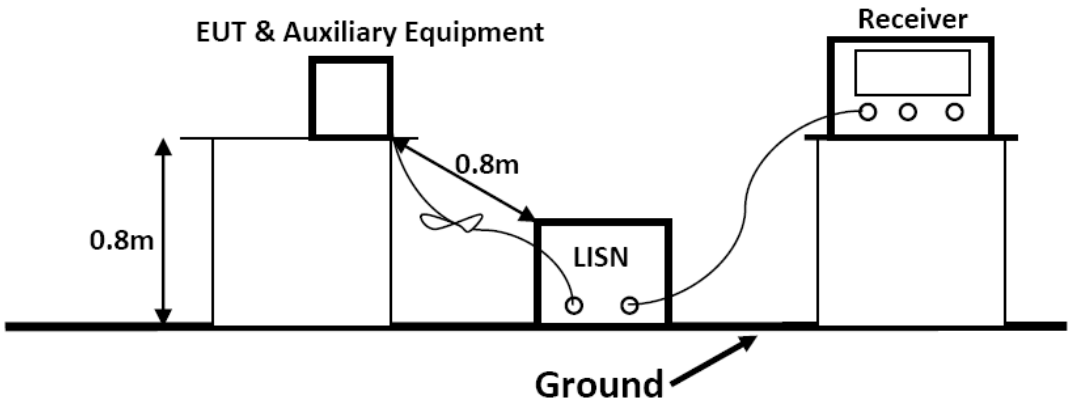
# 3. LINE CONDUCTED EMISSION

## 3.1. Conducted Emission Limit

**Relevant Standard(s):** ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 55032: 2015 Class B

| **Limits for Line Conducted Emission** | | |
|---|---|---|
| Frequency (MHz) | Limit (dBμV) | |
| | 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.<br>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 is connected to the power adapter(received power through a LISN supplying power of AC 230V/50Hz).

### 3.3. EMI Test Receiver Setup

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

| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 150KHz ~ 30MHz |
| (IF)RBW | 9kHz |

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

### 3.4. Test Procedure

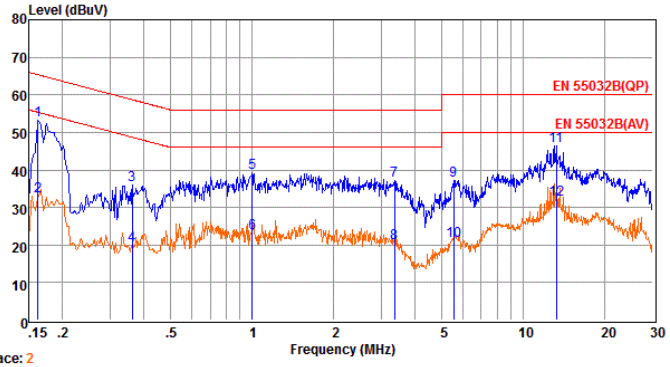
Power on the EUT, the EUT begins to work. Make sure the EUT operates normally during the test.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

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

## 3.5. Test Data

| Model No. | XO-9567-1 | Test Mode | TM1 |
|---|---|---|---|
| Environmental Conditions | 21.3℃, 51.6% RH | Test Engineer | Jerry Zeng |
| Pol. | Line | | |

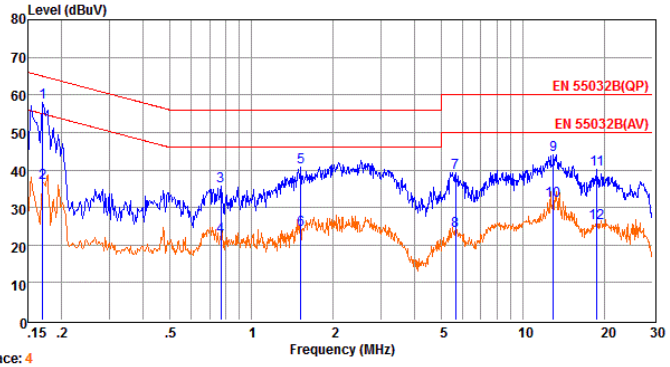



Trace: 2
Pol: LINE

| | Freq | Reading | LISNFac | CabLos | Aux2Fac | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB | dB | dBuV | dBuV | dB | |
| 1 | 0.16 | 33.48 | 9.59 | 0.02 | 10.00 | 53.09 | 65.34 | -12.25 | QP |
| 2 | 0.16 | 13.41 | 9.59 | 0.02 | 10.00 | 33.02 | 55.33 | -22.31 | Average |
| 3 | 0.36 | 16.48 | 9.62 | 0.03 | 10.00 | 36.13 | 58.69 | -22.56 | QP |
| 4 | 0.36 | 0.42 | 9.62 | 0.03 | 10.00 | 20.07 | 48.69 | -28.62 | Average |
| 5 | 1.00 | 19.66 | 9.63 | 0.05 | 10.00 | 39.34 | 56.00 | -16.66 | QP |
| 6 | 1.00 | 3.44 | 9.63 | 0.05 | 10.00 | 23.12 | 46.00 | -22.88 | Average |
| 7 | 3.35 | 17.55 | 9.65 | 0.06 | 10.00 | 37.26 | 56.00 | -18.74 | QP |
| 8 | 3.35 | 0.74 | 9.65 | 0.06 | 10.00 | 20.45 | 46.00 | -25.55 | Average |
| 9 | 5.53 | 17.50 | 9.66 | 0.06 | 10.00 | 37.22 | 60.00 | -22.78 | QP |
| 10 | 5.54 | 1.33 | 9.66 | 0.06 | 10.00 | 21.05 | 50.00 | -28.95 | Average |
| 11 | 13.27 | 26.67 | 9.70 | 0.10 | 10.00 | 46.47 | 60.00 | -13.53 | QP |
| 12 | 13.27 | 12.29 | 9.70 | 0.10 | 10.00 | 32.09 | 50.00 | -17.91 | Average |

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

| Model No. | XO-9567-1 | Test Mode | TM1 |
|---|---|---|---|
| Environmental Conditions | 21.3℃, 51.6% RH | Test Engineer | Jerry Zeng |
| Pol. | Neutral | | |




Trace: 4
Pol: NEUTRAL

| | Freq | Reading | LISNFac | CabLos | Aux2Fac | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB | dB | dBuV | dBuV | dB | |
| 1 | 0.17 | 38.46 | 9.65 | 0.02 | 10.00 | 58.13 | 64.94 | -6.81 | QP |
| 2 | 0.17 | 16.79 | 9.65 | 0.02 | 10.00 | 36.46 | 54.94 | -18.48 | Average |
| 3 | 0.77 | 16.15 | 9.63 | 0.04 | 10.00 | 35.82 | 56.00 | -20.18 | QP |
| 4 | 0.77 | 2.69 | 9.63 | 0.04 | 10.00 | 22.36 | 46.00 | -23.64 | Average |
| 5 | 1.52 | 20.93 | 9.63 | 0.05 | 10.00 | 40.61 | 56.00 | -15.39 | QP |
| 6 | 1.52 | 4.31 | 9.63 | 0.05 | 10.00 | 23.99 | 46.00 | -22.01 | Average |
| 7 | 5.65 | 19.64 | 9.67 | 0.06 | 10.00 | 39.37 | 60.00 | -20.63 | QP |
| 8 | 5.65 | 3.97 | 9.67 | 0.06 | 10.00 | 23.70 | 50.00 | -26.30 | Average |
| 9 | 12.92 | 24.23 | 9.73 | 0.09 | 10.00 | 44.05 | 60.00 | -15.95 | QP |
| 10 | 12.92 | 11.89 | 9.73 | 0.09 | 10.00 | 31.71 | 50.00 | -18.29 | Average |
| 11 | 18.72 | 20.17 | 9.84 | 0.11 | 10.00 | 40.12 | 60.00 | -19.88 | QP |
| 12 | 18.72 | 5.99 | 9.84 | 0.11 | 10.00 | 25.94 | 50.00 | -24.06 | Average |

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

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

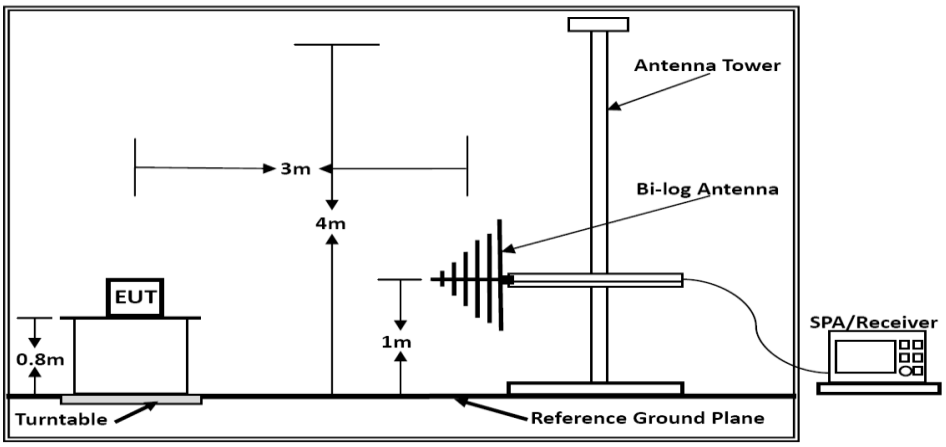
## 4.1. Radiated Emission Limit

**Relevant Standard(s):** ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 55032: 2015 Class B

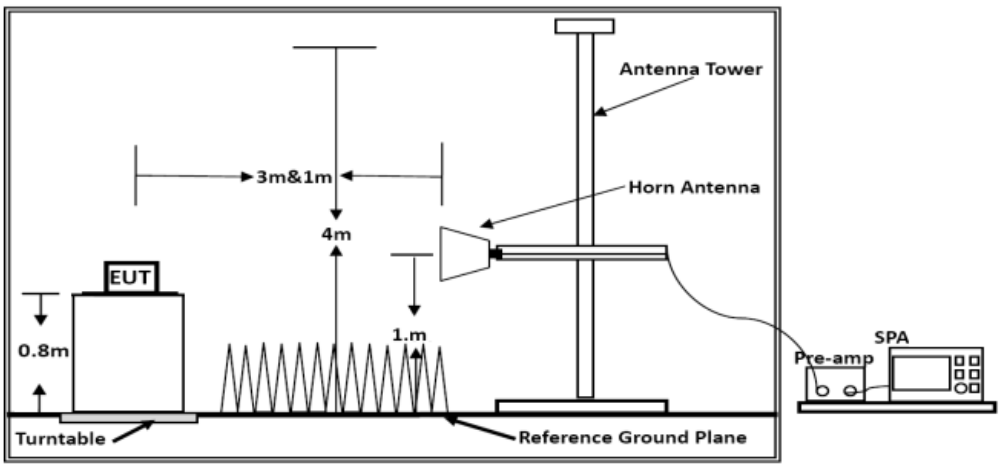
| Limits for Radiated Disturbance Below 1GHz | | |
|---|---|---|
| Frequency (MHz) | Distance (Meters) | Field Strengths Limit (dBμV/m) |
| 30 ~ 230 | 3 | 40 |
| 230 ~ 1000 | 3 | 47 |
| ***Note:<br>(1) The smaller limit shall apply at the combination point between two frequency bands.<br>(2) Distance 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 (MHz) | Distance (Meters) | Peak Limit (dBμV/m) | Average Limit (dBμV/m) |
| 1000 ~ 3000 | 3 | 70 | 50 |
| 3000 ~ 6000 | 3 | 74 | 54 |
| ***Note: The lower limit applies at the transition frequency. | | | |

## 4.2. Test Configuration




Below 1GHz




Above 1GHz

## 4.3. Test Procedure

**1) Sequence of testing 30 MHz to 1 GHz**

**Setup:**

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.

**Pre-measurement:**

--- The turntable rotates from 0 °to 315 °using 45 °steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height changes from 1 to 4 meter.
--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (±45 °) and antenna movement between 1 and 4 meter.
--- The final measurement will be done with QP detector with an EMI receiver.
--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre-measurement with marked maximum final measurements and the limit will be stored.

**2) Sequence of testing 1 GHz to 6 GHz**

**Setup:**

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.

**Pre-measurement:**

--- The turntable rotates from 0 °to 315 °using 45 °steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height scan range is 1 meter to 4 meter.
--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

**Final measurement:**

--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of pre-measurement the software maximize the peaks by changing turntable position (±45 °) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre-measurement with marked maximum final measurements and the limit will be stored.

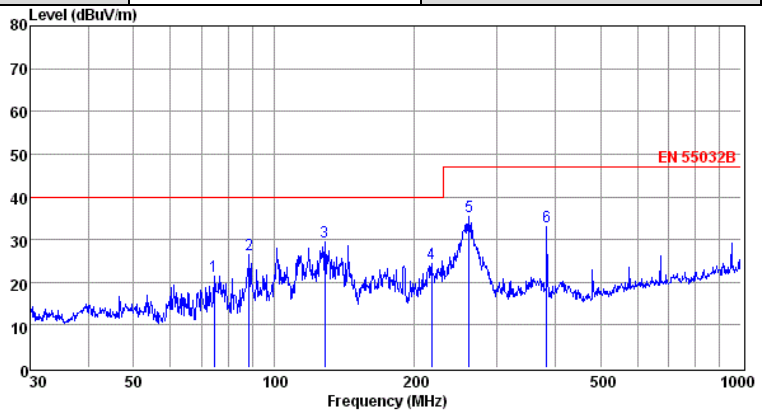
| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 30MHz~1000MHz / RBW 100kHz for QP |

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 6000 MHz |
| RBW / VBW | 1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average |

## 4.4. Test Data

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

| Model No. | XO-9567-1 | Test Mode | TM1 |
|---|---|---|---|
| Environmental Conditions | 22.3℃, 52.6% RH | Test Engineer | Jerry Zeng |
| Pol. | Vertical | Detector Function | Quasi-peak |
| Distance | 3m | | |

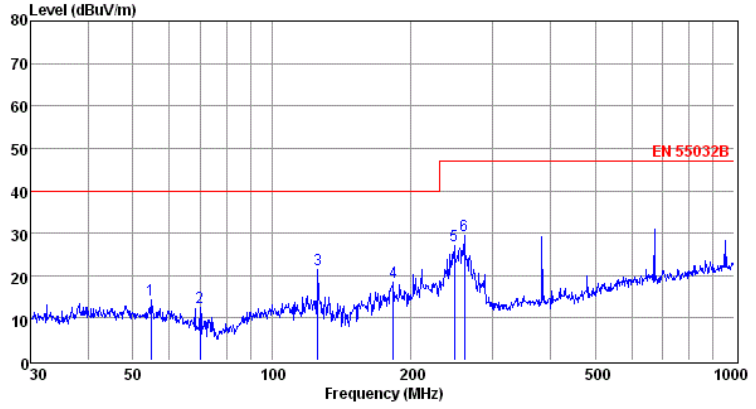



pol: VERTICAL

| | Freq | Reading | CabLos | Antfac | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 74.40 | 12.88 | 0.54 | 7.90 | 21.32 | 40.00 | -18.68 | QP |
| 2 | 88.34 | 14.31 | 0.68 | 11.37 | 26.36 | 40.00 | -13.64 | QP |
| 3 | 128.56 | 19.51 | 0.67 | 9.15 | 29.33 | 40.00 | -10.67 | QP |
| 4 | 217.54 | 12.26 | 0.88 | 11.12 | 24.26 | 40.00 | -15.74 | QP |
| 5 | 261.98 | 22.30 | 0.96 | 12.11 | 35.37 | 47.00 | -11.63 | QP |
| 6 | 383.93 | 17.30 | 1.13 | 14.68 | 33.11 | 47.00 | -13.89 | QP |

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

| Model No. | XO-9567-1 | Test Mode | TM1 |
|---|---|---|---|
| Environmental Conditions | 22.3℃, 52.6% RH | Test Engineer | Jerry Zeng |
| Pol. | Horizontal | Detector Function | Quasi-peak |
| Distance | 3m | | |




pol: HORIZONTAL

| | Freq | Reading | CabLos | Antfac | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 54.64 | 0.84 | 0.46 | 13.04 | 14.34 | 40.00 | -25.66 | QP |
| 2 | 69.84 | 3.38 | 0.51 | 8.71 | 12.60 | 40.00 | -27.40 | QP |
| 3 | 125.45 | 11.05 | 0.71 | 9.64 | 21.40 | 40.00 | -18.60 | QP |
| 4 | 183.20 | 7.86 | 0.70 | 9.96 | 18.52 | 40.00 | -21.48 | QP |
| 5 | 247.68 | 14.06 | 0.97 | 12.07 | 27.10 | 47.00 | -19.90 | QP |
| 6 | 261.06 | 16.45 | 0.96 | 12.08 | 29.49 | 47.00 | -17.51 | QP |

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

| **Test Mode:** TM1 (Above 1GHz) | | | | **Tested by:** Jerry Zeng | | | |
|---|---|---|---|---|---|---|---|
| **Test Voltage:** DC 3.7V | | | | **Test Distance:** 3m | | | |
| **Detector Function**: Peak + AV | | | | **Test Results:** Passed | | | |
| Polarization | Frequency (MHz) | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | |
| Horizontal | 1202.79 | 54.23 | 36.89 | 70.00 | 50.00 | -15.77 | -13.11 |
| | 1886.82 | 51.31 | 34.08 | 70.00 | 50.00 | -18.69 | -15.92 |
| | 2104.93 | 54.72 | 36.90 | 70.00 | 50.00 | -15.28 | -13.10 |
| | 3232.08 | 53.94 | 34.04 | 74.00 | 54.00 | -20.06 | -19.96 |
| | 4351.46 | 53.23 | 35.85 | 74.00 | 54.00 | -20.77 | -18.15 |
| | 5883.95 | 57.71 | 33.95 | 74.00 | 54.00 | -16.29 | -20.05 |
| Vertical | 1201.80 | 53.75 | 36.99 | 70.00 | 50.00 | -16.25 | -13.01 |
| | 1885.91 | 51.70 | 33.28 | 70.00 | 50.00 | -18.30 | -16.72 |
| | 2105.21 | 54.34 | 37.64 | 70.00 | 50.00 | -15.66 | -12.36 |
| | 3232.94 | 54.80 | 33.34 | 74.00 | 54.00 | -19.20 | -20.66 |
| | 4351.26 | 54.03 | 35.92 | 74.00 | 54.00 | -19.97 | -18.08 |
| | 5884.69 | 58.16 | 33.27 | 74.00 | 54.00 | -15.84 | -20.73 |

1. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
2. Measurements above show only up to 6 maximum emissions noted.
3. Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

# 5. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

## 5.1. 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.

## 5.2. 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.

## 5.3. 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.

## 5.4. 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). |

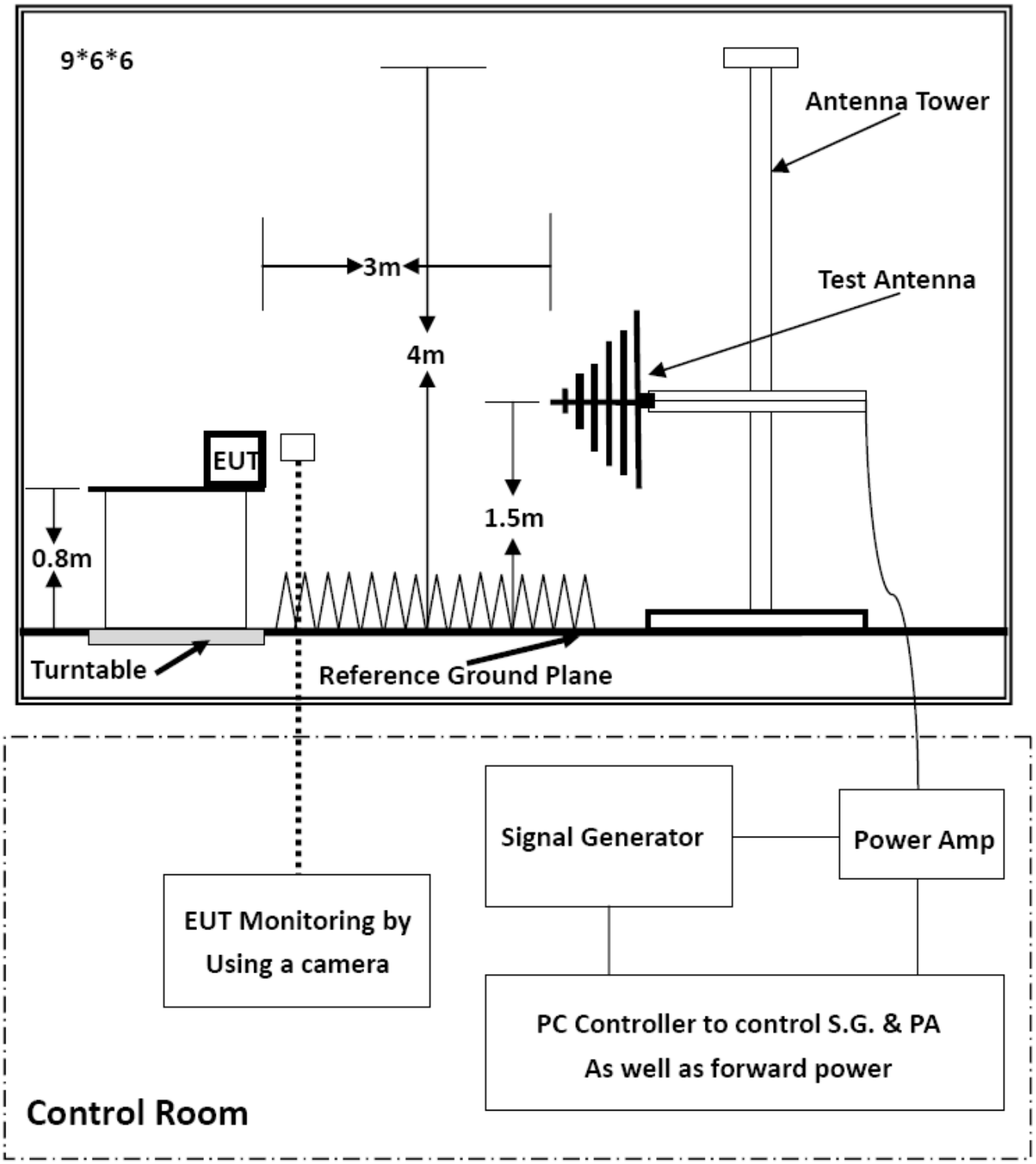
NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If 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.

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

## 6.1. Test Configuration



## 6.2. 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.

## 6.3. Severity Level

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

## 6.4. 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. |

## 6.5. Test Result

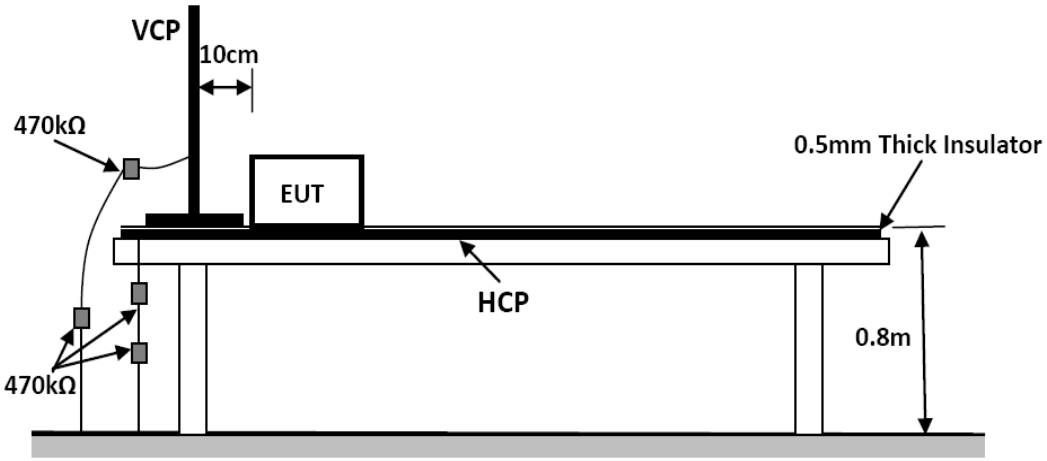
**Bluetooth Test Result:**

| 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 |

# 7. ELECTROSTATIC DISCHARGE

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

## 7.1. 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.

## 7.2. Test Procedure

ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 61000-4-2: 2009
Test level 3 for Air Discharge at ±8 kV
Test level 2 for Contact Discharge at ±4 kV

7.2.1. 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.

7.2.2. Contact Discharge

All the procedure shall be same as Section 7.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.2.3. 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.

7.2.4. 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.

## 7.3. Test Data

**PASS.**

# Electrostatic Discharge Test Results

| | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-2 ☑ EN 61000-4-2 | | |
| **Applicant** | Dongguan Xing Yue Electronic co., Ltd | | |
| **EUT** | Fabric Bluetooth Speaker | **Temperature** | 22.6℃ |
| **M/N** | XO-9567-1 | **Humidity** | 51.3% |
| **Criterion** | B | **Pressure** | 1021mbar |
| **Test Mode** | TM1-TM2 | **Test Engineer** | Jerry Zeng |

**TEST RESULT OF BLUETOOTH**

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

# 8. PHOTOGRAPHS OF TEST SETUP

Please refer to separated files **Appendix A** for Photographs of Test Setup.

# 9. PHOTOGRAPHS OF THE EUT

Please refer to separated files **Appendix B** for Photographs of The EUT.

----------THE END OF REPORT----------

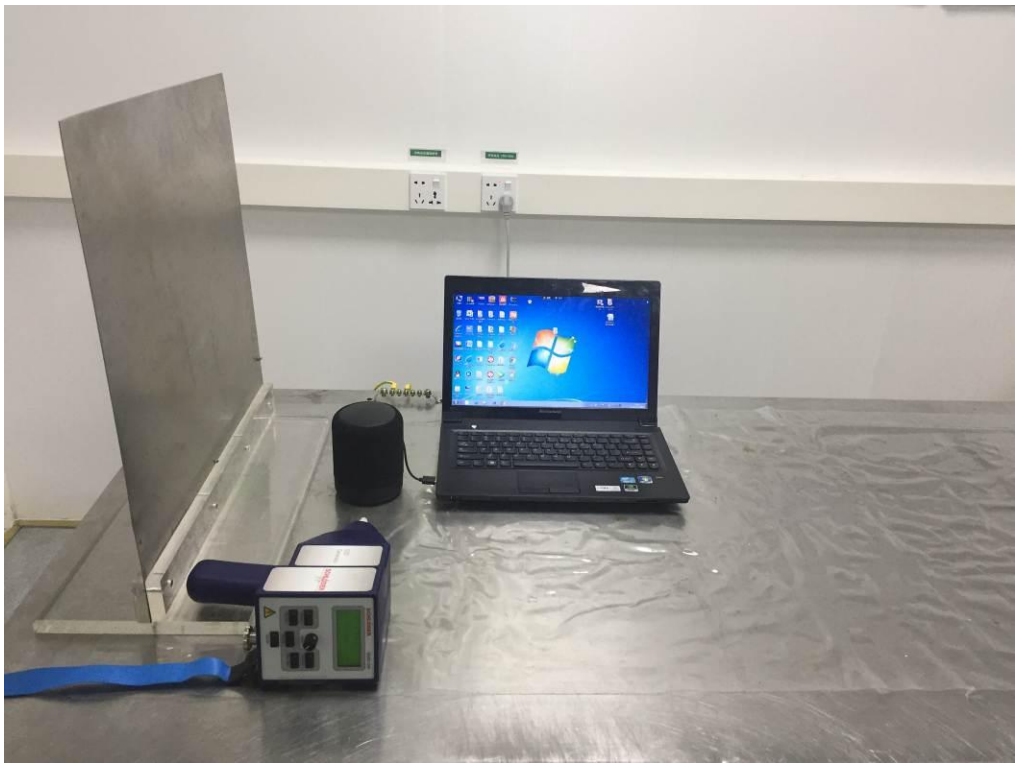
# Appendix A

# Photographs of Test Setup

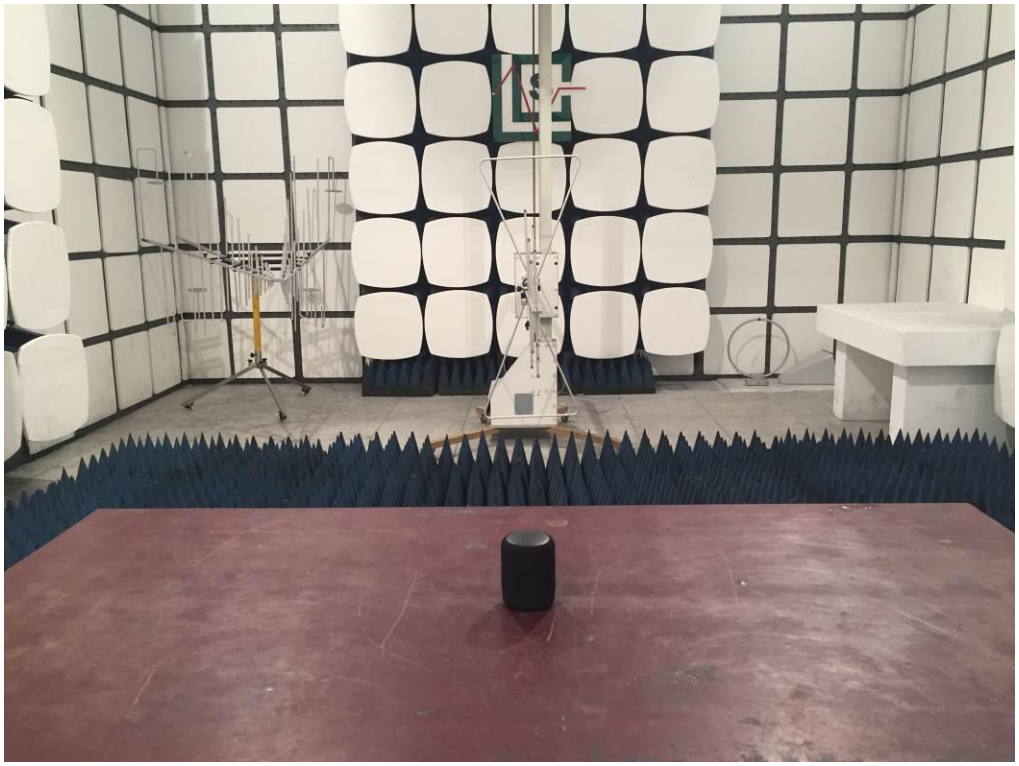
Power Line Conducted Emission

Radiated Emission Below 1 GHz

Radiated Emission Above 1 GHz



Electrostatic Discharge



RF Electromagnetic Field (80MHz to 6 000MHz )

# Appendix B

# Photographs of The EUT

Fig.1

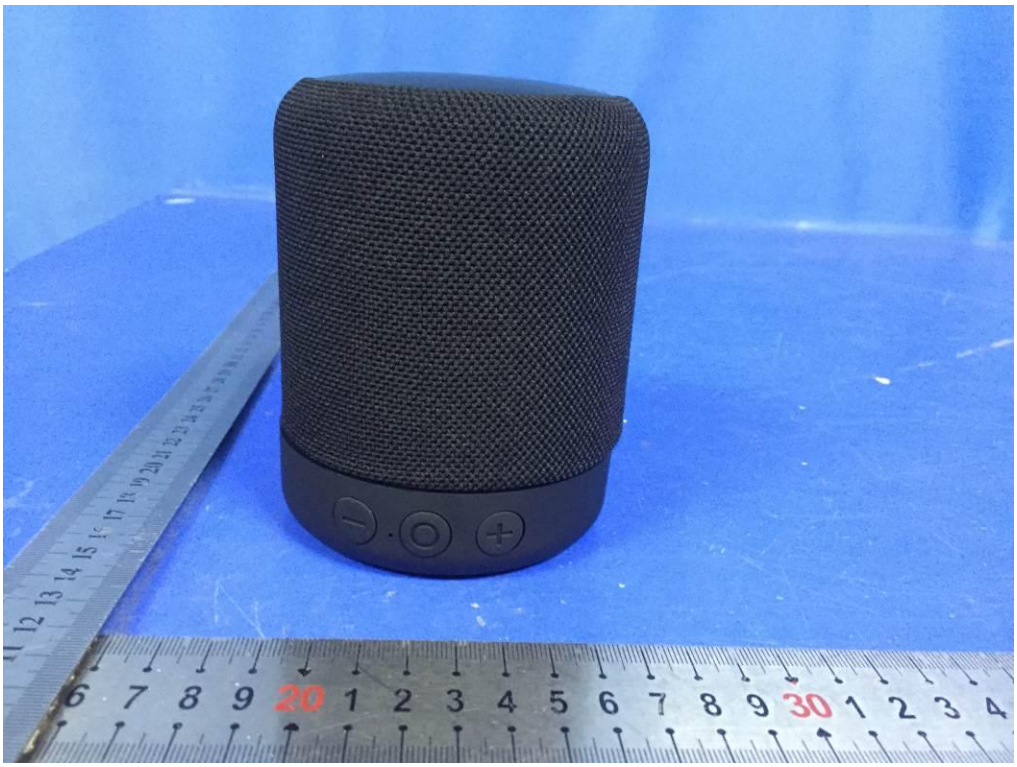


Fig.2

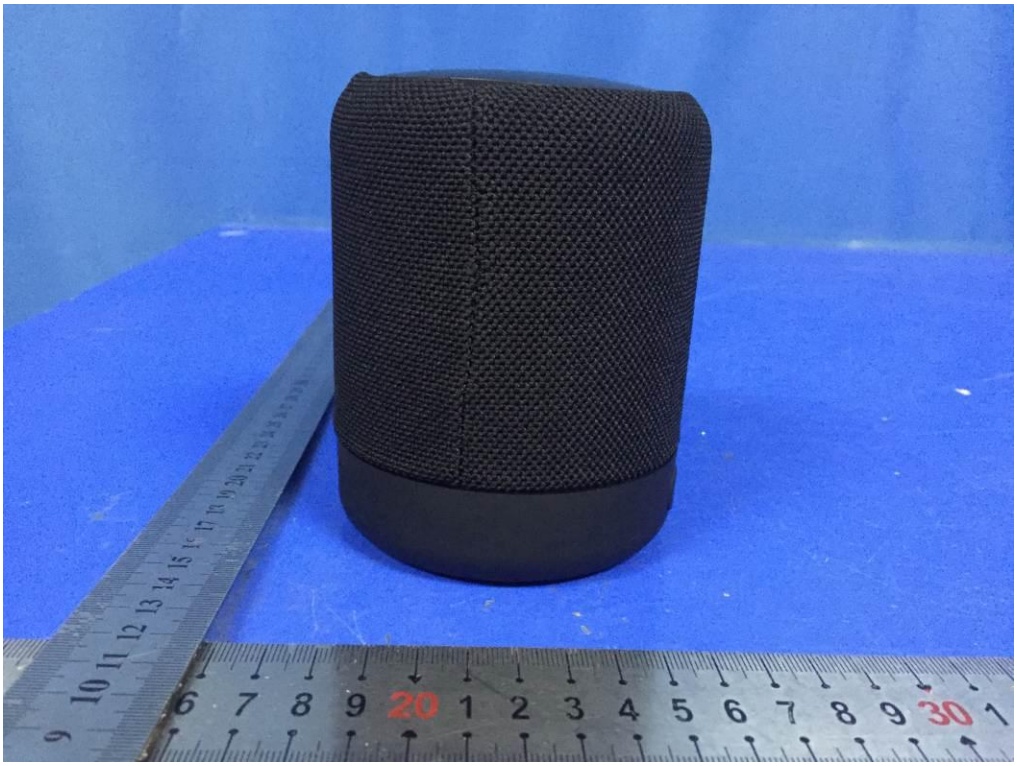


Fig.3

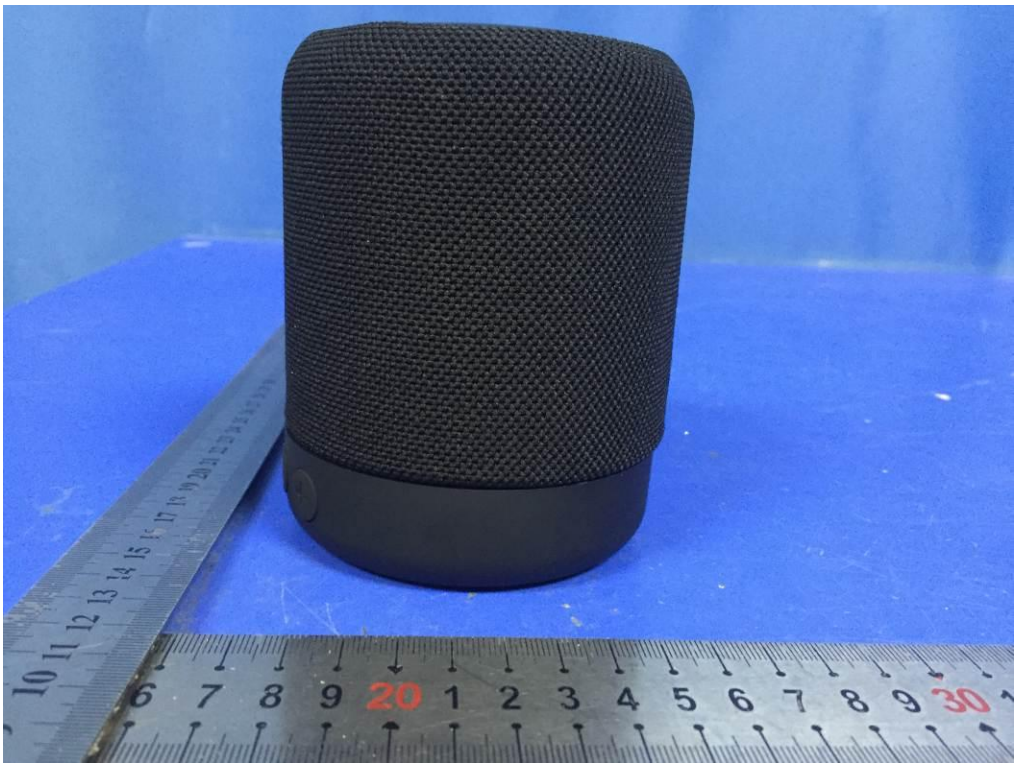


Fig.4

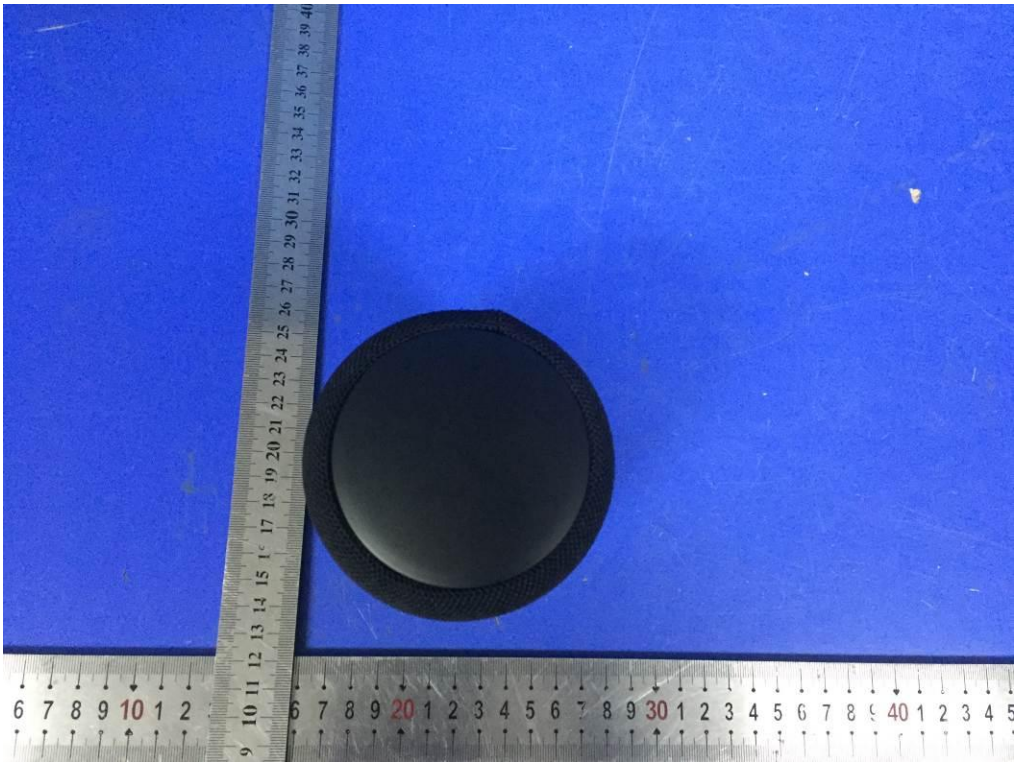


Fig.5

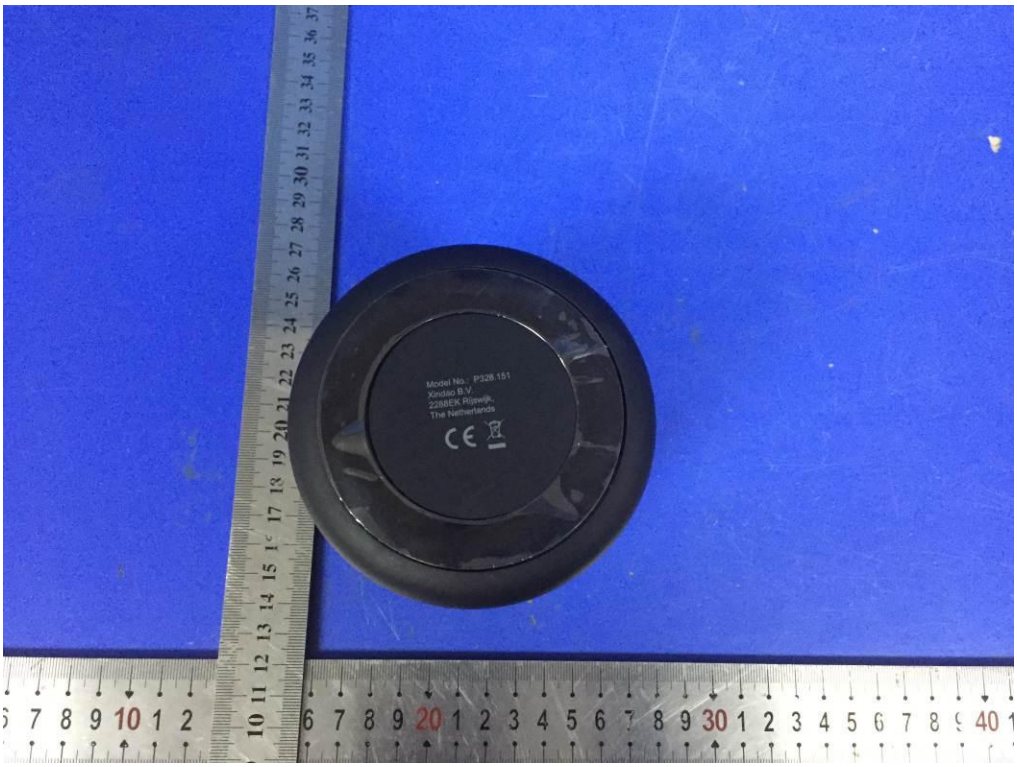



Fig.6

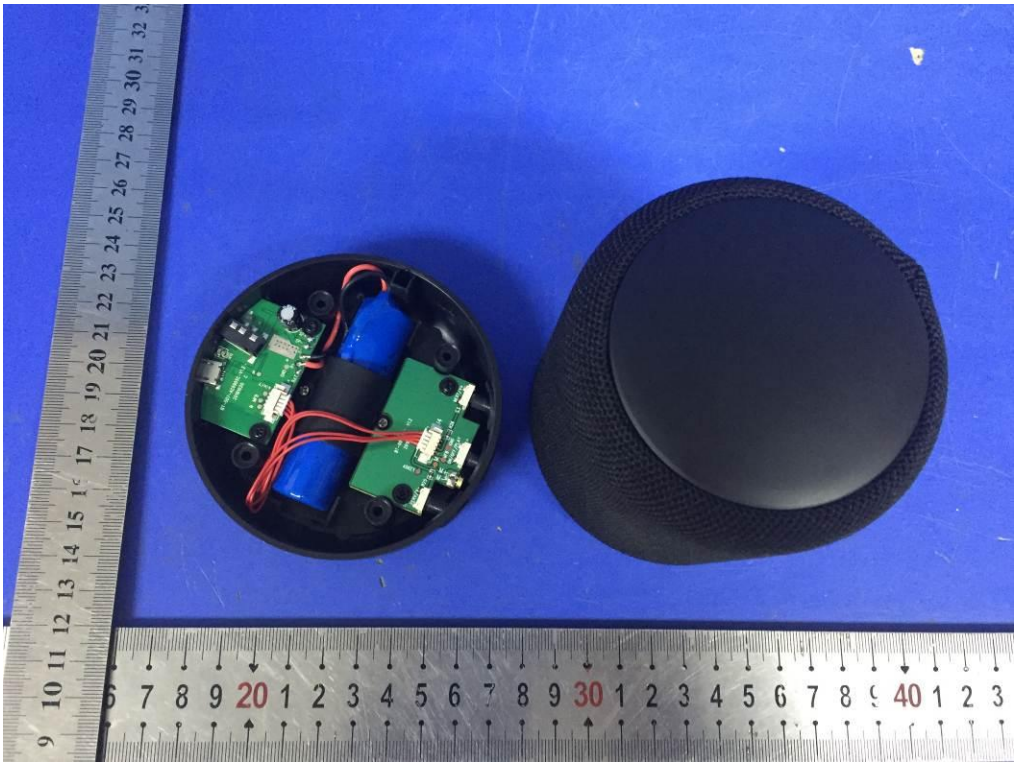


Fig.7

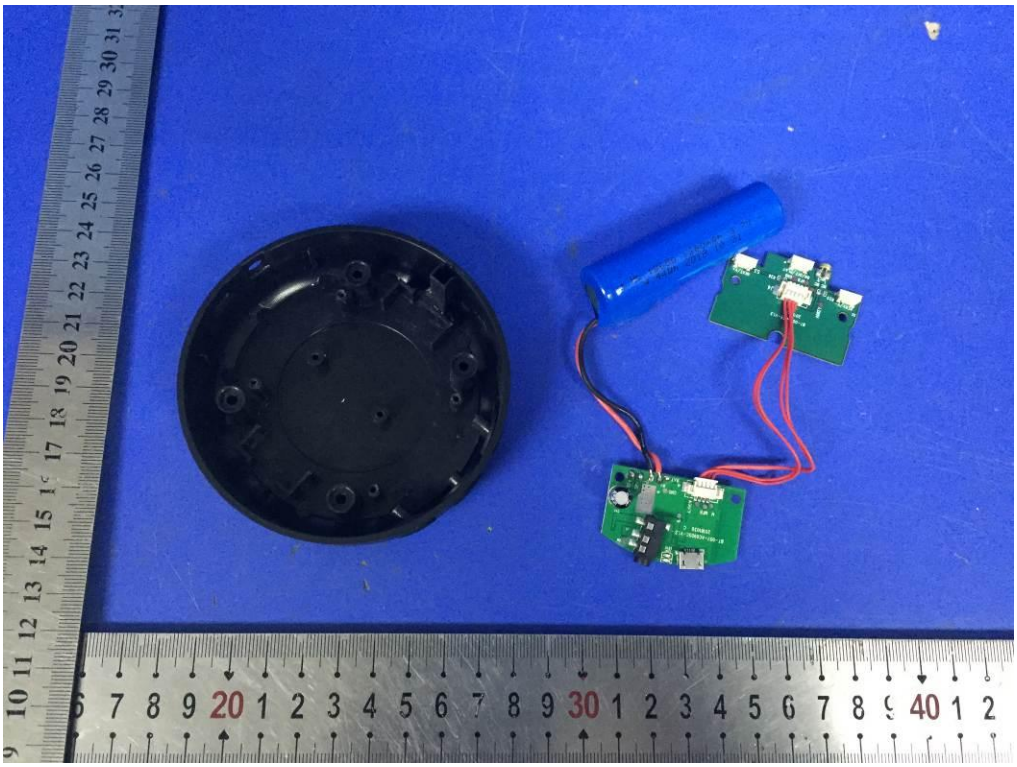


Fig.8

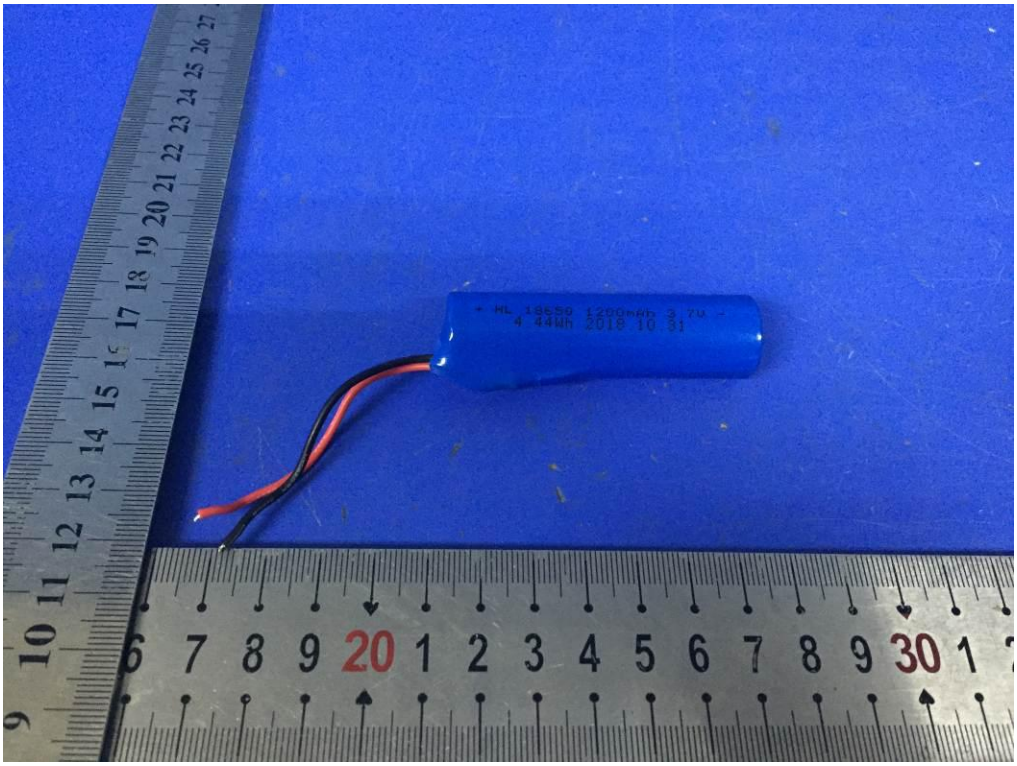


Fig.9

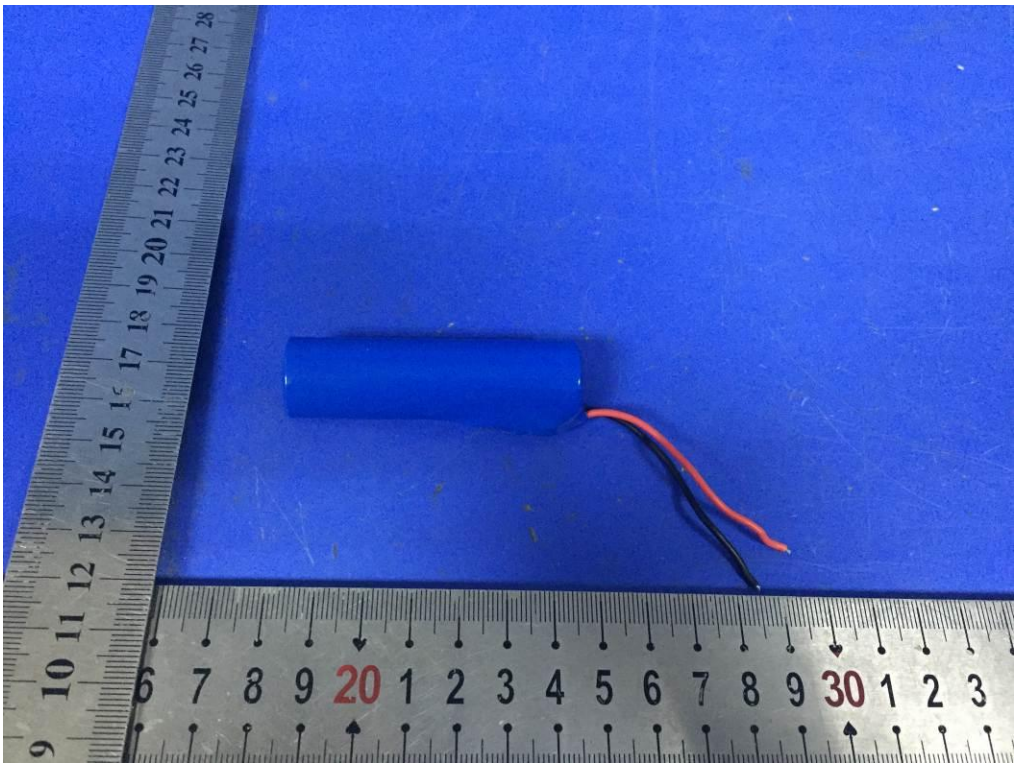


Fig.10

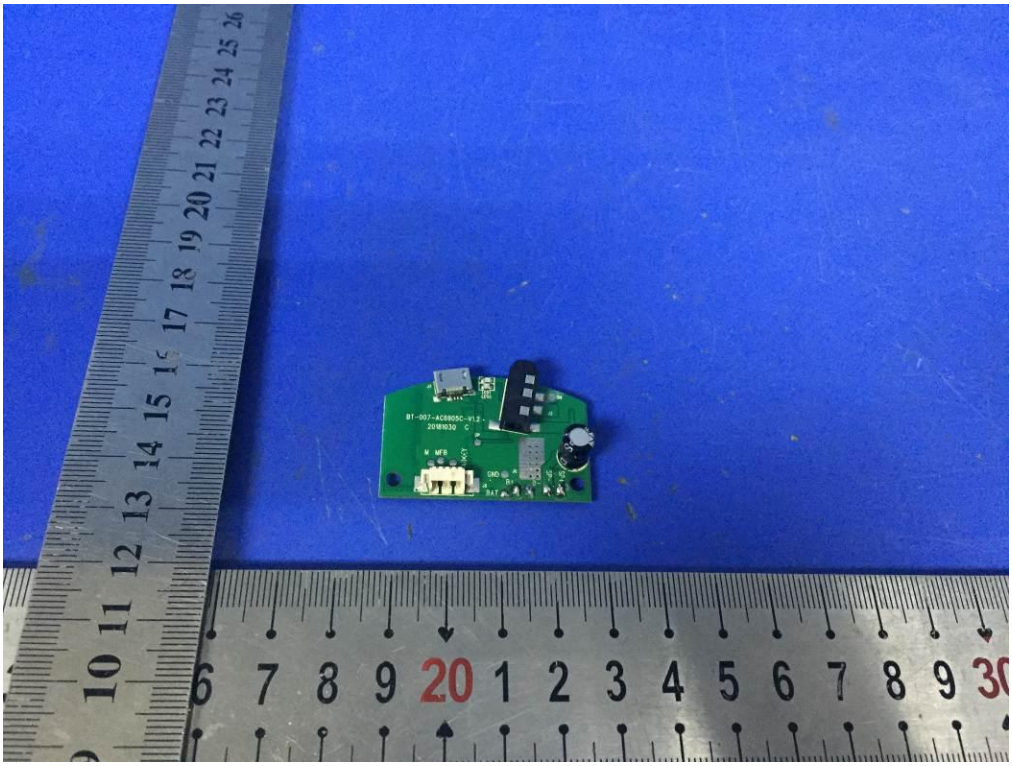


Fig.11

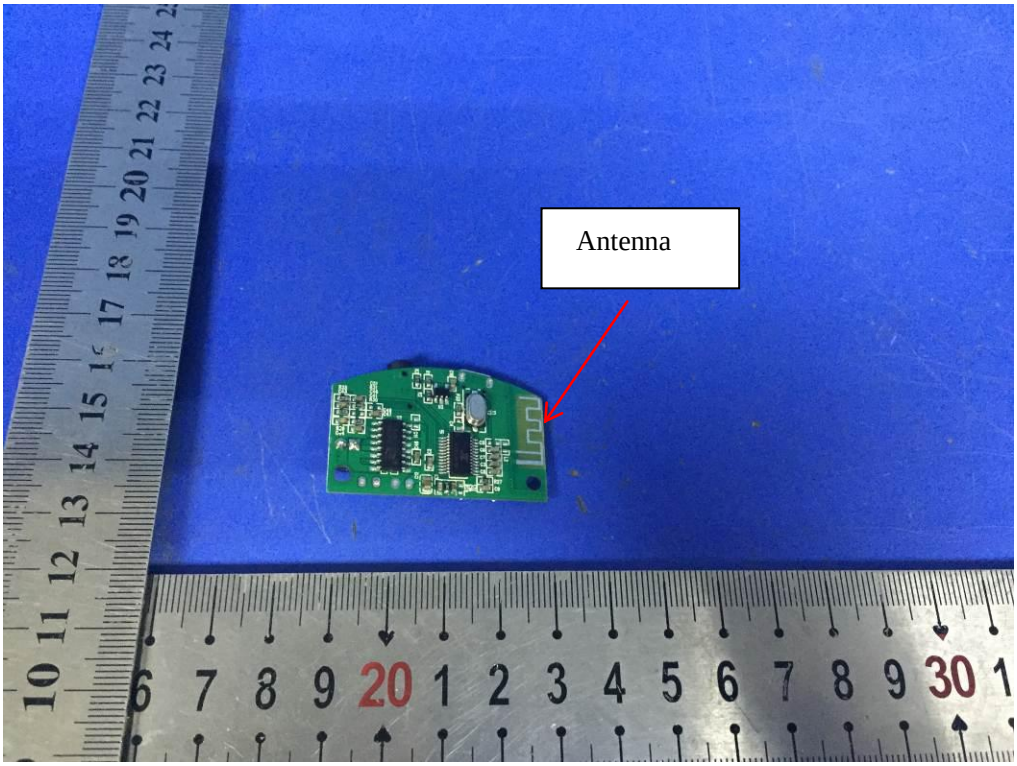



Fig.12

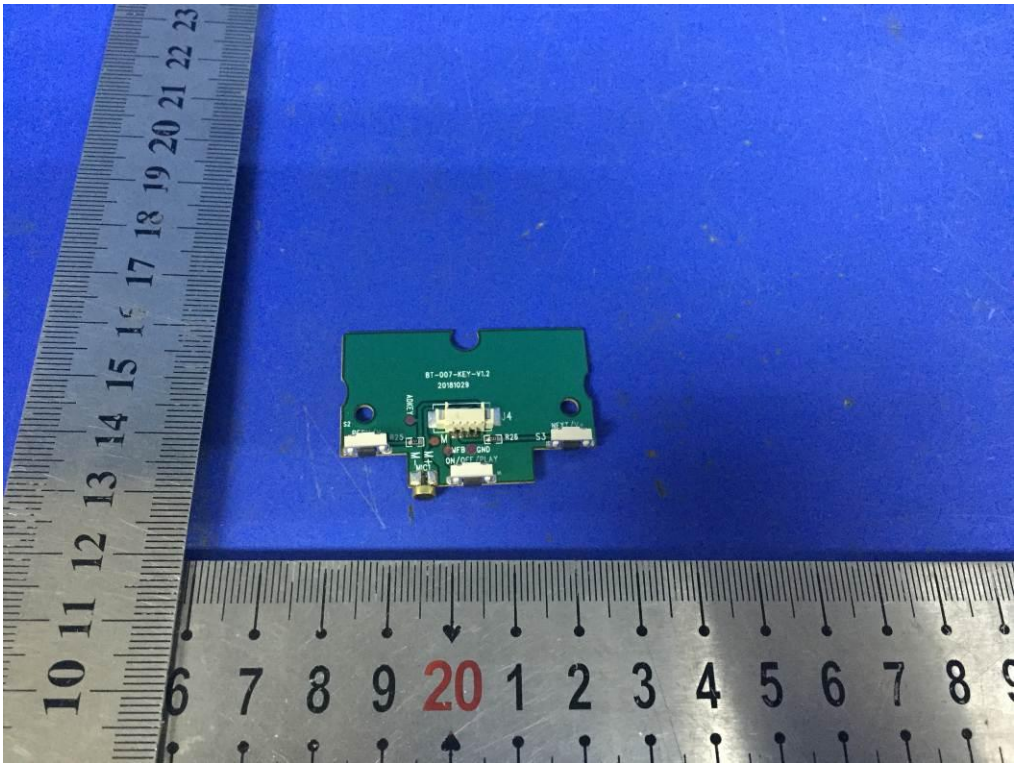


Fig.13

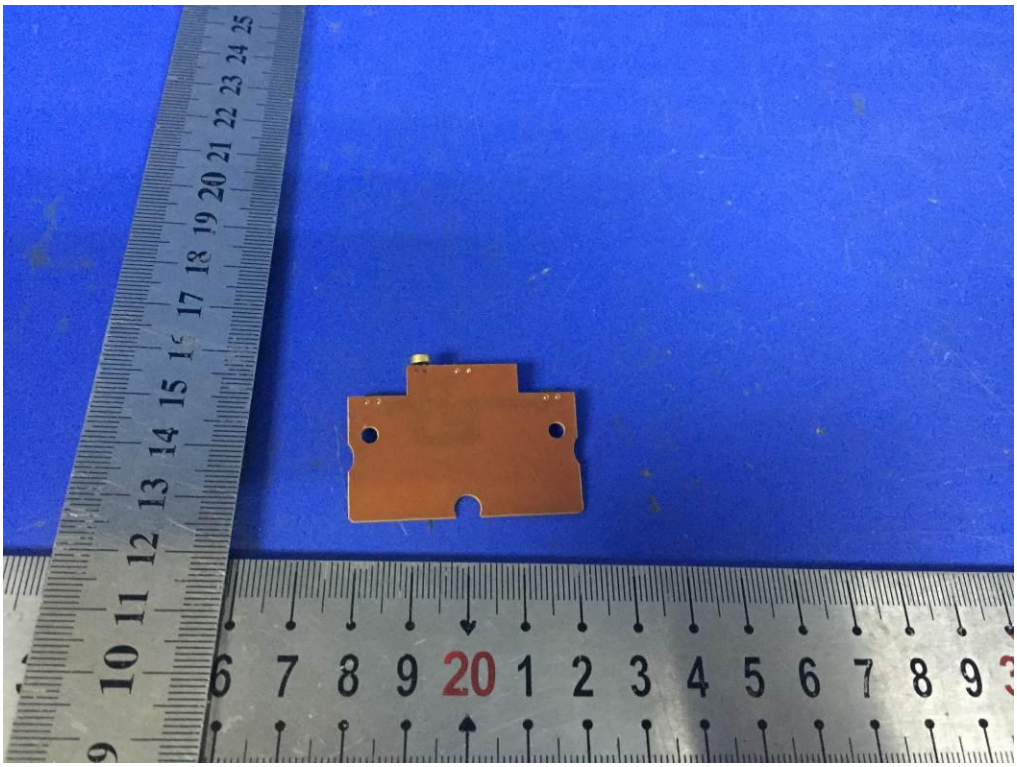


Fig.14

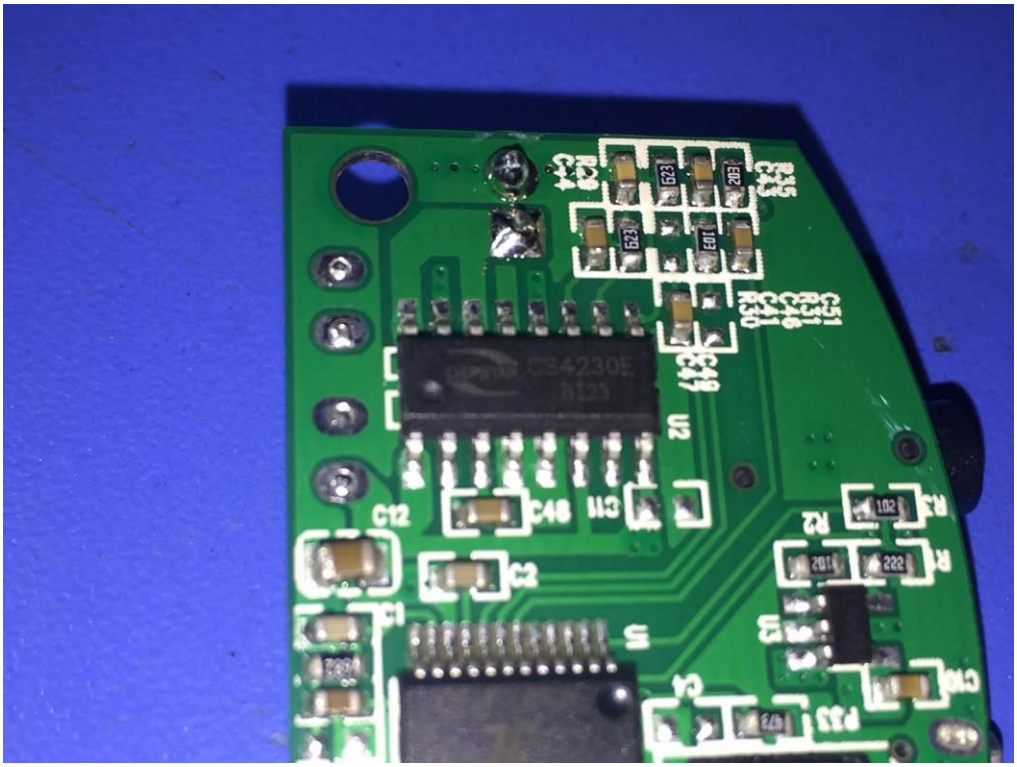



Fig.15

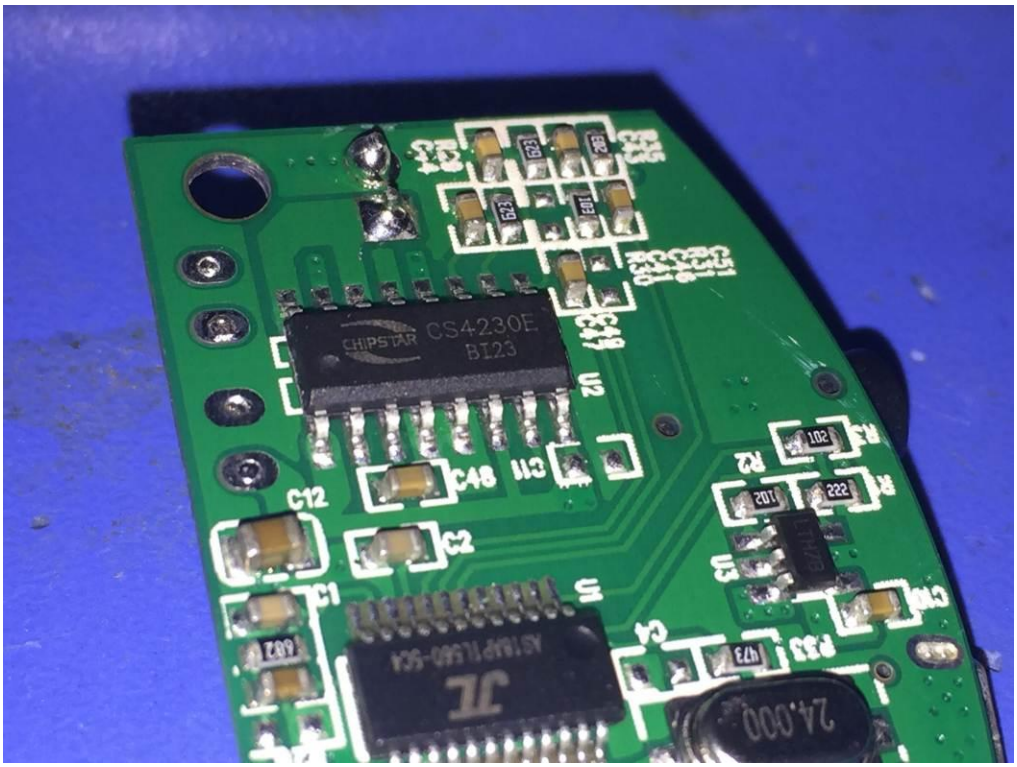



Fig.16