# FCC Test Report

**Test Report**
**On Behalf of**
**Shenzhen Xiangdangwen Technology Co.,Ltd.**
**For**
**Lisen Pencil 2nd**
**Model No.: 2E536**

**FCC ID: 2AW73-2E536**

| | |
|---|---|
| **Prepared For:** | **Shenzhen Xiangdangwen Technology Co.,Ltd.**<br>**106, 1/F, No.313-4 Building, Huachang Road, Langkou Community, Dalang Street, Longhua District, Shenzhen, China** |
| **Prepared By:** | **Shenzhen HUAK Testing Technology Co., Ltd.**<br>**1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China** |
| **Date of Test:** | **Jul. 25, 2023 ~ Aug. 02, 2023** |
| **Date of Report:** | **Aug. 02, 2023** |
| **Report Number:** | **HK2307253250-1E** |

# Test Result Certification

| | | |
|---|---|---|
| **Applicant's Name** | : | Shenzhen Xiangdangwen Technology Co.,Ltd. |
| Address | : | 106, 1/F, No.313-4 Building, Huachang Road, Langkou Community, Dalang Street, Longhua District, Shenzhen, China |
| **Manufacture's Name** | : | Huizhou Yimai Electronics Technology Co., Ltd. |
| Address | : | 3rd Floor, Building B, Huakai High-tech Industrial Park, Electronic City Road, Longxi Street, Boluo Country, China |

**Product Description**

| | | |
|---|---|---|
| Trade Mark | : | LISEN, AINOPE, VEICO |
| Product Name | : | Lisen Pencil 2nd |
| Model and/or Type Reference: | | 2E536 |
| **Standards** | : | FCC CFR 47 PART 18 |



| | | |
|---|---|---|
| **Date of Test** | : | |
| Date (s) of Performance of Tests | : | **Jul. 25, 2023 ~ Aug. 02, 2023** |
| Date of Issue | : | **Aug. 02, 2023** |
| Test Result | : | **Pass** |

Testing Engineer : Gary Qian
(Gary Qian)

Technical Manager : Eden Hu
(Eden Hu)

Authorized Signatory : Jason Zhou
(Jason Zhou)

## Table of Contents

# ** Modified History **

| Revision | Description | Issued Data | Remark |
|---|---|---|---|
| Revision 1.0 | Initial Test Report Release | Aug. 02, 2023 | Jason Zhou |
| | | | |
| | | | |



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# 1. Test Summary

## 1.1. Test Procedures and Results

| Description of Test | Section Number | Result |
|---|---|---|
| Conducted Emissions Test | 18.307 | COMPLIANT |
| Radiated Emission Test | 18.305 | COMPLIANT |

***Note:***

*1. PASS: Test item meets the requirement.*

*2. Fail: Test item does not meet the requirement.*

*3. N/A: Test case does not apply to the test object.*

*4. The test result judgment is decided by the limit of test standard.*

## 1.2. Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：
A2LA Accreditation Code is 4781.01.
FCC Designation Number is CN1229.
Canada IC CAB identifier is CN0045.
CNAS Registration Number is L9589.

## 1.3. Measurement Uncertainty

Measurement Uncertainty

| | | |
|---|---|---|
| Conducted Emission Expanded Uncertainty | = | 2.71dB, k=2 |
| Radiated emission expanded uncertainty(9kHz-30MHz) | = | 3.90dB, k=2 |
| Radiated emission expanded uncertainty(30MHz-1000MHz) | = | 3.90dB, k=2 |
| Radiated emission expanded uncertainty(Above 1GHz) | = | 4.28dB, k=2 |

# 2. General Information

## 2.1. General Description of EUT

| | |
|---|---|
| Equipment: | Lisen Pencil 2nd |
| Model Name: | 2E536 |
| Series Models: | N/A |
| Model Difference: | N/A |
| Trade Mark: | LISEN, AINOPE, VEICO |
| FCC ID: | **2AW73-2E536** |
| Antenna Type: | Coil Antenna |
| Antenna Gain: | 0dBi |
| Operation Frequency: | 112KHz~205KHz |
| Test Frequency: | 128KHz |
| Number of Channels: | 1 |
| Modulation Type: | ASK |
| Power Source: | Input: DC 5V From Type-C<br>Wireless Output: 0.35W |
| Power Rating: | Input: DC 5V From Type-C<br>Wireless Output: 0.35W |
| | |

## 2.2. Carrier Frequency of Channels

| Operation Frequency each of channel | |
|---|---|
| Channel | Frequency |
| 1 | 128KHz |

## 2.3. Operation of EUT during Testing

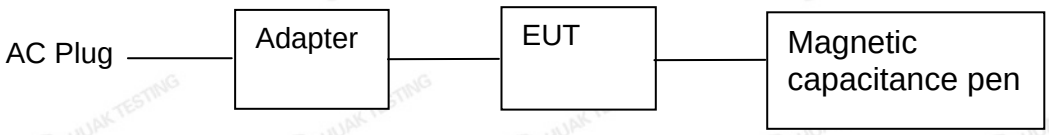
Operating Mode

The mode is used: Transmitting mode

| EUT Mode | Description |
|---|---|
| Working | Full Load |
| | Half Load |
| | No Load |

## 2.4. Description of Test Setup

Operation of EUT during Testing:




The sample was placed (0.8m (30MHz~1GHz), 0.8m (9KHz~30MHz)) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.



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## 2.5. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Trade Mark | Model/Type No. | Specification | Note |
|---|---|---|---|---|---|
| 1 | Lisen Pencil 2nd | LISEN, AINOPE, VEICO | 2E536 | N/A | EUT |
| 2 | Magnetic capacitance pen | N/A | K3 | Wireless input:0.35W | Accessory |
| 3 | Adapter | N/A | CD289 | Input: AC100-240V, 50/60Hz, 2A Max<br>USB-C1 Output: DC5V/3A, 9V3A, 12V/3A, 15V/3A, 20V/5A, 28V/5A 140W MAX<br>USB-C2 Output: DC5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/5A 100W MAX<br>USB-A Output: DC5V/4.5A, 4.5V/5A, 5V/3A, 9V/2A, 12V/1.5A 22.5W MAX<br>Total Output: 140W Max | Peripheral |
| 4 | USB Cable | N/A | N/A | Length: 1.0m | Peripheral |
| | | | | | |
| | | | | | |

***Note:***

*1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*

*2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

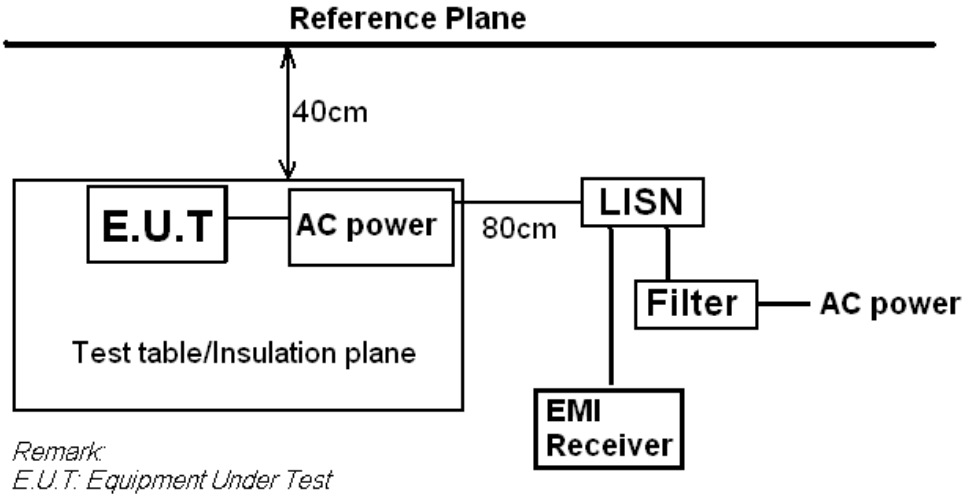
*3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.*

## 2.6. Measurement Instruments List

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | L.I.S.N. Artificial Mains Network | R&S | ENV216 | HKE-002 | Feb. 17, 2023 | 1 Year |
| 2. | Receiver | R&S | ESR-7 | HKE-005 | Feb. 17, 2023 | 1 Year |
| 3. | RF automatic control unit | Tonscend | JS0806-2 | HKE-060 | Feb. 17, 2023 | 1 Year |
| 4. | Spectrum analyzer | R&S | FSP40 | HKE-025 | Feb. 17, 2023 | 1 Year |
| 5. | Spectrum analyzer | Agilent | N9020A | HKE-048 | Feb. 17, 2023 | 1 Year |
| 6. | Preamplifier | Schwarzbeck | BBV 9743 | HKE-006 | Feb. 17, 2023 | 1 Year |
| 7. | EMI Test Receiver | Rohde & Schwarz | ESR-7 | HKE-010 | Feb. 17, 2023 | 1 Year |
| 8. | Bilog Broadband Antenna | Schwarzbeck | VULB9163 | HKE-012 | Feb. 17, 2023 | 1 Year |
| 9. | Loop Antenna | Schwarzbeck | FMZB 1519 B | HKE-014 | Feb. 17, 2023 | 1 Year |
| 10. | Horn Antenna | Schwarzbeck | 9120D | HKE-013 | Feb. 17, 2023 | 1 Year |
| 11. | Pre-amplifier | EMCI | EMC051845 SE | HKE-015 | Feb. 17, 2023 | 1 Year |
| 12. | Pre-amplifier | Agilent | 83051A | HKE-016 | Feb. 17, 2023 | 1 Year |
| 13. | EMI Test Software EZ-EMC | Tonscend | JS1120-B Version | HKE-083 | N/A | N/A |
| 14. | Power Sensor | Agilent | E9300A | HKE-086 | Feb. 17, 2023 | 1 Year |
| 15. | Spectrum analyzer | Agilent | N9020A | HKE-048 | Feb. 17, 2023 | 1 Year |
| 16. | Signal generator | Agilent | N5182A | HKE-029 | Feb. 17, 2023 | 1 Year |
| 17. | Signal Generator | Agilent | 83630A | HKE-028 | Feb. 17, 2023 | 1 Year |
| 18. | Shielded room | Shiel Hong | 4*3*3 | HKE-039 | Dec. 09, 2021 | 3 Year |
| 19. | 10dB Attenuator | Schwarzbeck | VTSD9561F | HKE-153 | Feb. 17, 2023 | 1 Year |

# 3. Conducted Emission Test

## 3.1. Block Diagram of Test Setup




*Remark:*
*E.U.T: Equipment Under Test*
*LISN: Line Impedence Stabilization Network*
*Test table height=0.8m*

## 3.2. Conducted Power Line Emission Limit

According to FCC Part 18.307(b)

| Frequency (MHz) | Maximum RF Line Voltage (dBμV) | | | |
|---|---|---|---|---|
| | CLASS A | | CLASS B | |
| | Q.P. | Ave. | Q.P. | Ave. |
| 0.15 - 0.50 | 79 | 66 | 66-56* | 56-46* |
| 0.50 - 5.00 | 73 | 60 | 56 | 46 |
| 5.00 - 30.0 | 73 | 60 | 60 | 50 |

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §18.307 Line Conducted Emission Limit is same as above table.

## 3.3. Test Procedure

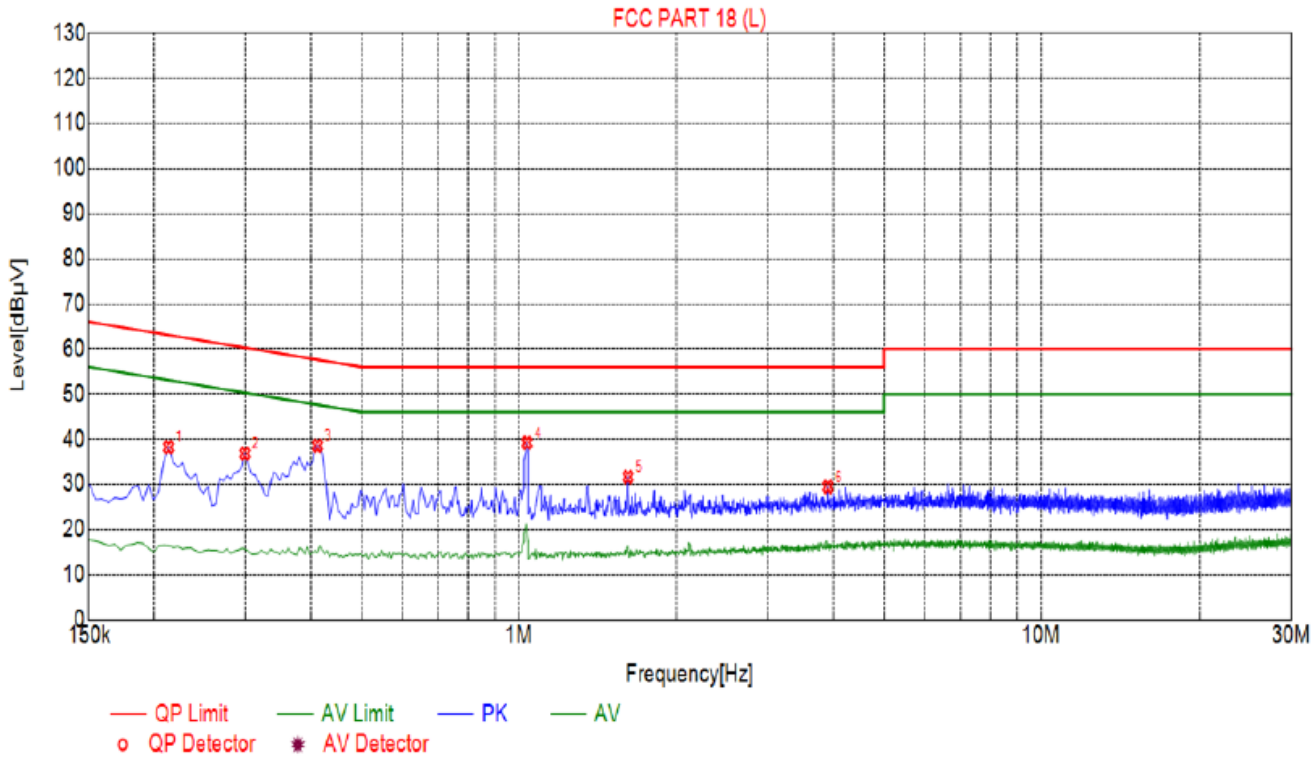
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

## 3.4. Test Result

PASS

All the test modes completed for test. Only the worst result was reported as below:

Test Specification: Line



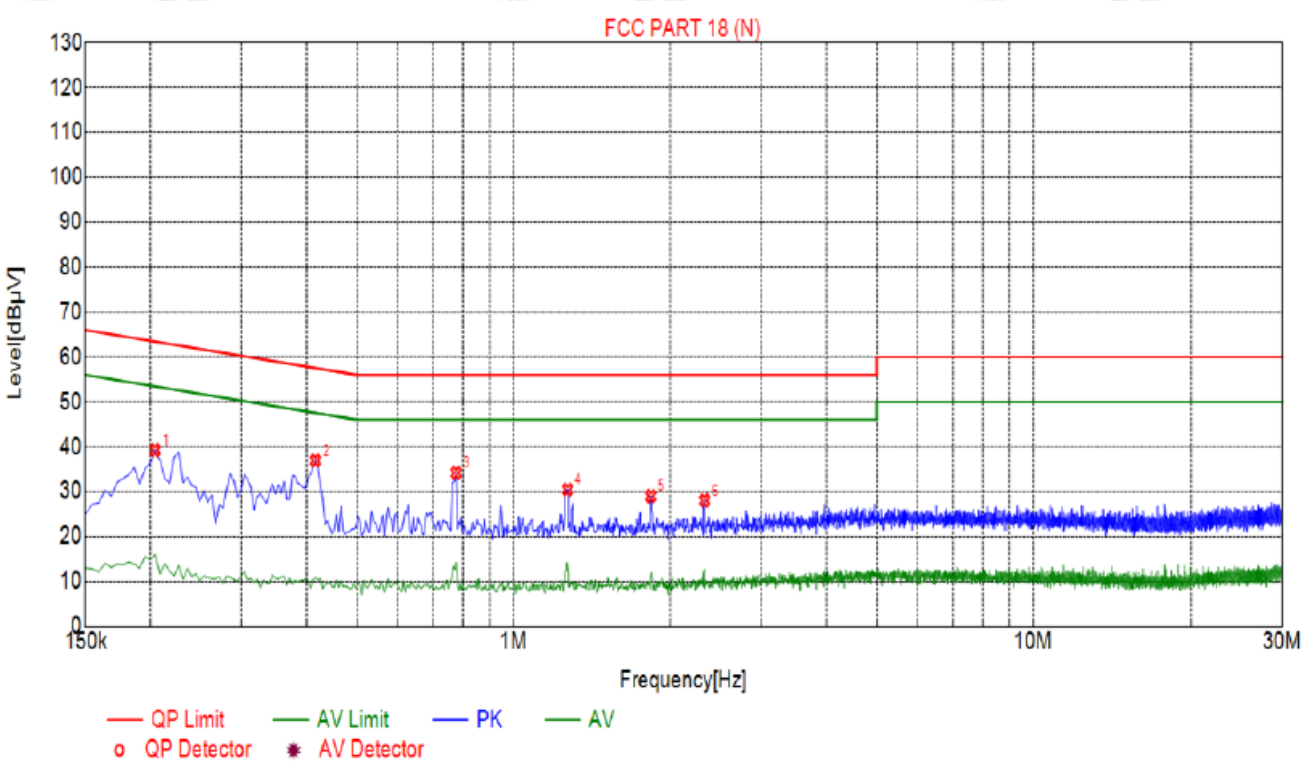

| Suspected List | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Level [dBµV] | Factor [dB] | Limit [dBµV] | Margin [dB] | Reading [dBµV] | Detector | Type |
| 1 | 0.2130 | 38.23 | 20.05 | 63.23 | 25.00 | 18.18 | PK | L |
| 2 | 0.2985 | 36.81 | 20.04 | 60.33 | 23.52 | 16.77 | PK | L |
| 3 | 0.4110 | 38.56 | 20.03 | 57.67 | 19.11 | 18.53 | PK | L |
| 4 | 1.0365 | 39.20 | 20.07 | 56.00 | 16.80 | 19.13 | PK | L |
| 5 | 1.6170 | 31.63 | 20.11 | 56.00 | 24.37 | 11.52 | PK | L |
| 6 | 3.9075 | 29.50 | 20.25 | 56.00 | 26.50 | 9.25 | PK | L |

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

Test Specification: Neutral




| Suspected List | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Level [dBµV] | Factor [dB] | Limit [dBµV] | Margin [dB] | Reading [dBµV] | Detector | Type |
| 1 | 0.2040 | 39.23 | 20.04 | 63.51 | 24.28 | 19.19 | PK | N |
| 2 | 0.4155 | 36.93 | 20.03 | 57.60 | 20.67 | 16.90 | PK | N |
| 3 | 0.7755 | 34.17 | 20.05 | 56.00 | 21.83 | 14.12 | PK | N |
| 4 | 1.2705 | 30.42 | 20.09 | 56.00 | 25.58 | 10.33 | PK | N |
| 5 | 1.8375 | 28.97 | 20.14 | 56.00 | 27.03 | 8.83 | PK | N |
| 6 | 2.3325 | 28.01 | 20.18 | 56.00 | 27.99 | 7.83 | PK | N |

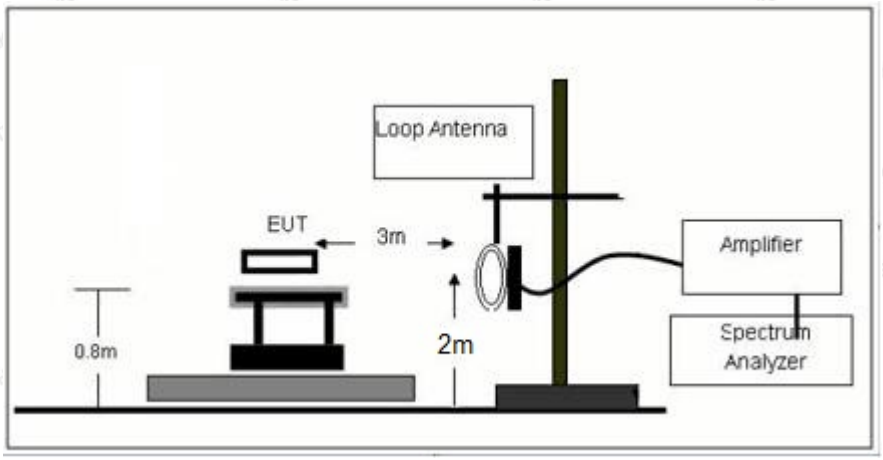
Remark: Margin = Limit – Level

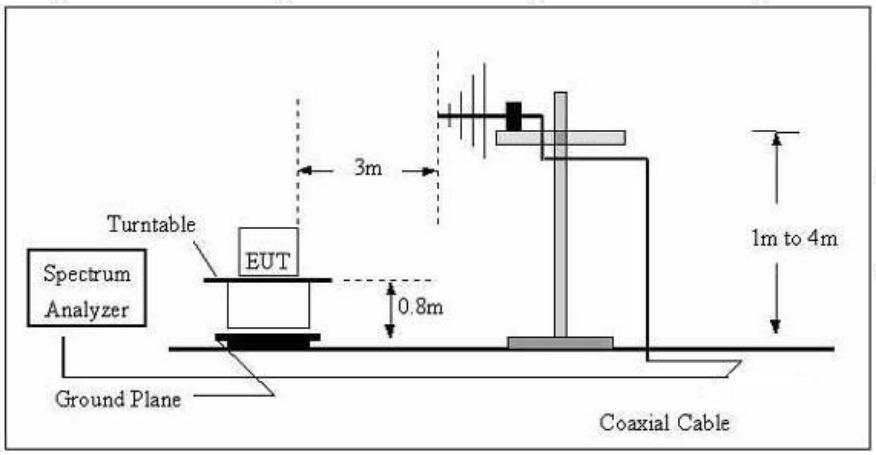
Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

# 4. Radiated Emissions

## 4.1. Block Diagram of Test Setup



## 4.2. Rules and Specifications

Except as provided elsewhere in this Subpart 18.305 (b), the field strength levels of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following table:

| Equipment | Operating frequency | RF Power generated by equipment (watts) | Field strength limit (uV/m) | Distance (meters) |
|---|---|---|---|---|
| (miscellaneous) | | | | |
| | Any non-ISM frequency | Below 500<br>500 or more | 15<br>15 × SQRT(power/500) | 300<br>[1]300 |

Remark:

(1) Emission level dBuV/m for 0.009~30MHz = 20log (15) + 40log (300/3) dBuV/m;

(2) Calculated according FCC 18.305.

(3) The smaller limit shall apply at the cross point between two frequency bands.

(4) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

## 4.3. Test Procedure

Measurement distance 3m
For the measurement range up to 30MHz in the following plots the field strength result from 3m
Distance measurements are extrapolated to 300m and 30m distance respectively, by 40dB/decade, Per antenna factor scaling.
Measurements below 1000MHz are performed with a peak detector and compared to average limits,
Measurements with an average detector are not required.

Note:

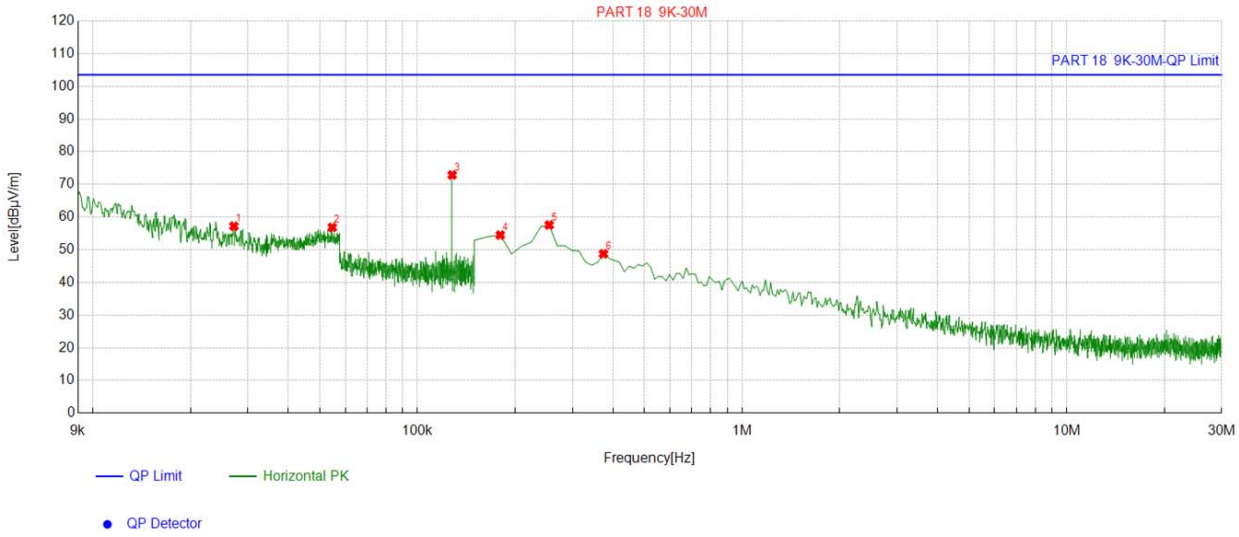
For battery operated equipment, the equipment tests shall be performed using a new battery.

## 4.4. Test Result

PASS

Note: All the test modes completed for test. Only the worst result was reported as below:

For 9KHz - 30MHz

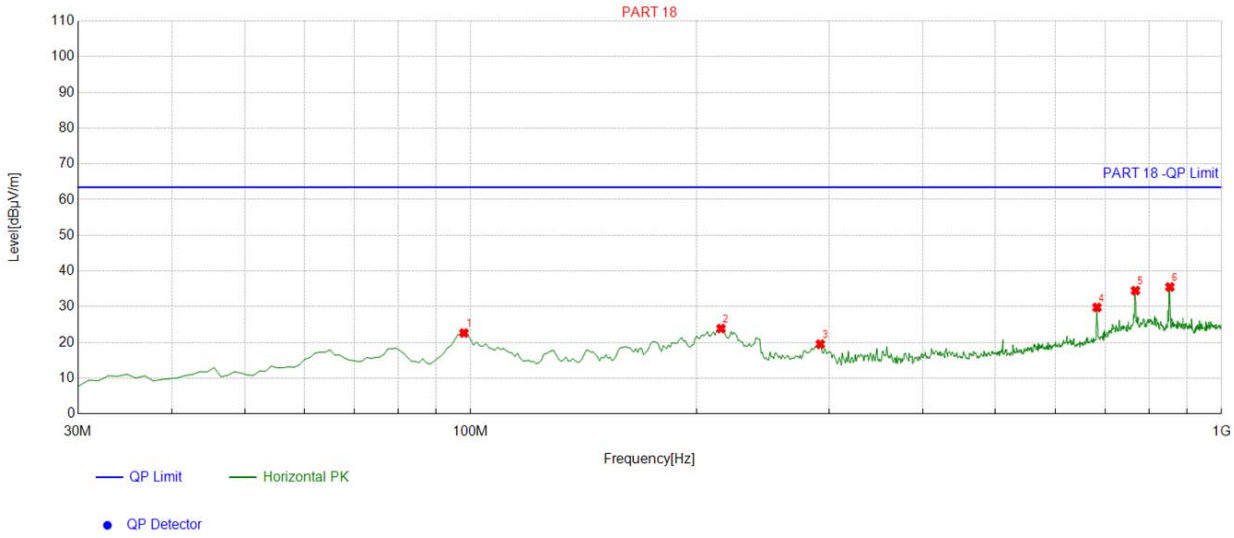



| Suspected List | | | | | | |
|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Factor [dB] | Reading [dBµV/m] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
| 1 | 0.027198 | 14.69 | 42.52 | 57.21 | 103.50 | 46.29 |
| 2 | 0.054636 | 13.94 | 42.90 | 56.84 | 103.50 | 46.66 |
| 3 | 0.127922 | 13.78 | 59.11 | 72.89 | 103.50 | 30.61 |
| 4 | 0.179865 | 13.70 | 40.80 | 54.50 | 103.50 | 49.00 |
| 5 | 0.254527 | 13.68 | 43.90 | 57.58 | 103.50 | 45.92 |
| 6 | 0.373987 | 13.76 | 35.00 | 48.76 | 103.50 | 54.74 |

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

For 30MHz-1GHz

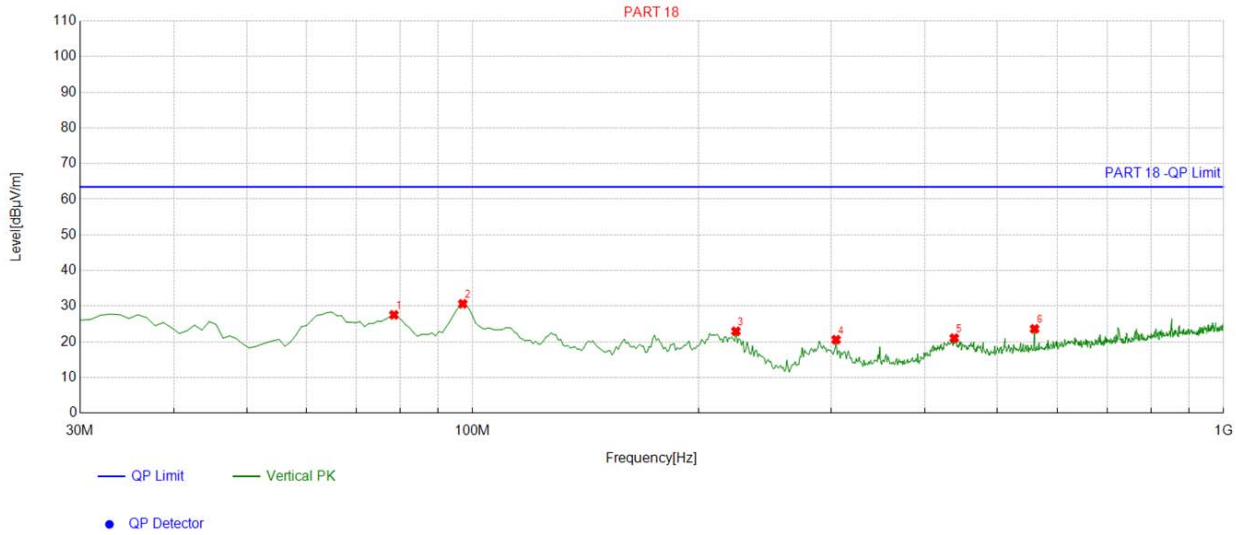
Antenna polarity: H




| Suspected List | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Factor [dB] | Reading [dBµV/m] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1 | 97.967968 | -15.83 | 38.48 | 22.65 | 63.50 | 40.85 | 100 | 150 | Horizontal |
| 2 | 215.45545 | -14.42 | 38.32 | 23.90 | 63.50 | 39.60 | 100 | 226 | Horizontal |
| 3 | 292.16216 | -12.24 | 31.79 | 19.55 | 63.50 | 43.95 | 100 | 288 | Horizontal |
| 4 | 682.49249 | -4.01 | 33.83 | 29.82 | 63.50 | 33.68 | 100 | 355 | Horizontal |
| 5 | 767.93793 | -2.44 | 36.97 | 34.53 | 63.50 | 28.97 | 100 | 350 | Horizontal |
| 6 | 853.38338 | -1.20 | 36.74 | 35.54 | 63.50 | 27.96 | 100 | 192 | Horizontal |

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;

Antenna polarity: V




| Suspected List | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Factor [dB] | Reading [dBµV/m] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1 | 78.548549 | -17.29 | 44.86 | 27.57 | 63.50 | 35.93 | 100 | 125 | Vertical |
| 2 | 96.996997 | -15.95 | 46.62 | 30.67 | 63.50 | 32.83 | 100 | 178 | Vertical |
| 3 | 224.19419 | -14.05 | 37.02 | 22.97 | 63.50 | 40.53 | 100 | 158 | Vertical |
| 4 | 304.78478 | -11.92 | 32.53 | 20.61 | 63.50 | 42.89 | 100 | 216 | Vertical |
| 5 | 437.80780 | -8.33 | 29.37 | 21.04 | 63.50 | 42.46 | 100 | 246 | Vertical |
| 6 | 560.15015 | -6.00 | 29.64 | 23.64 | 63.50 | 39.86 | 100 | 144 | Vertical |

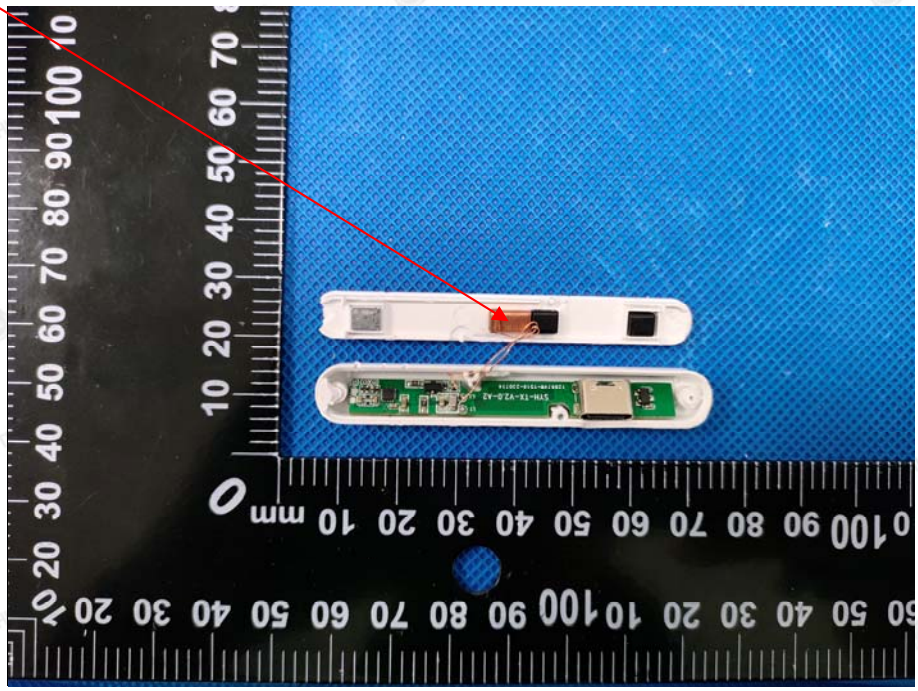
Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;

# 5. Antenna Requirement

**Refer to statement below for compliance.**
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

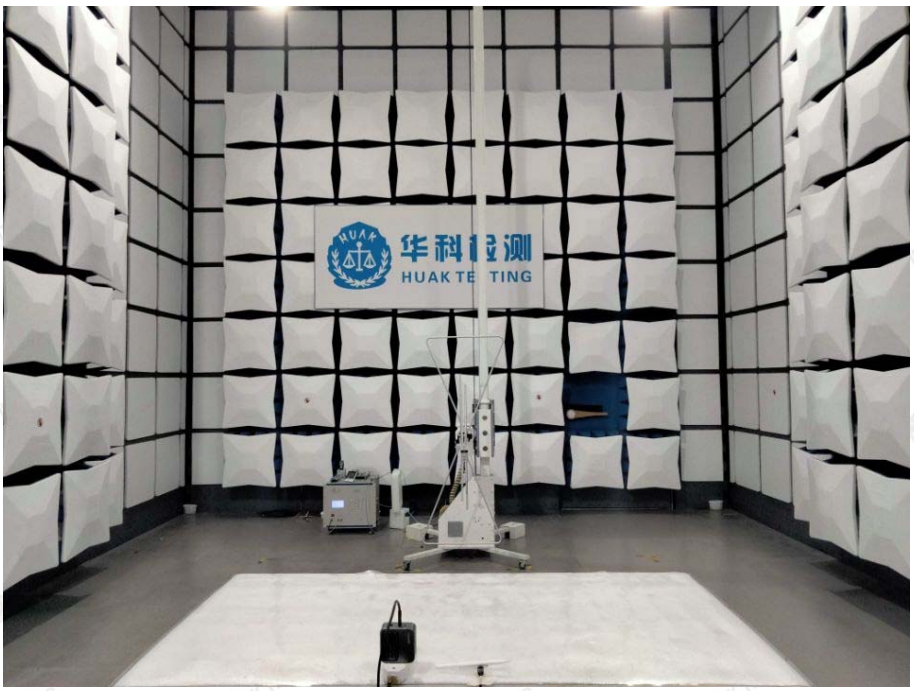
**Antenna Connected Construction**
The antenna used in this product is a Coil Antenna, which permanently attached. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 0dBi.

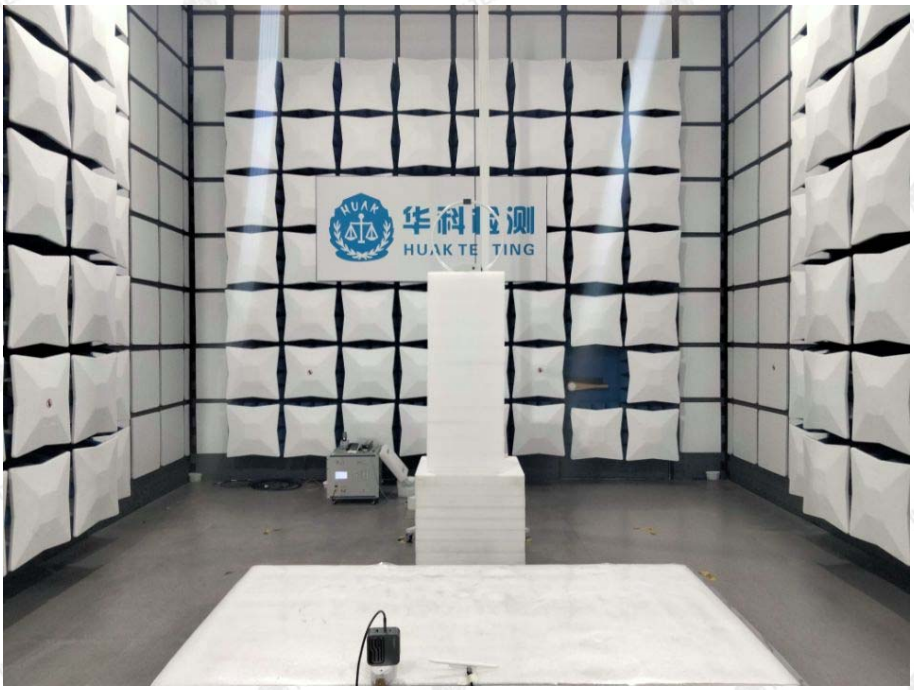
Antenna



## 6. Photograph of Test

Radiated Emission



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Conducted Emission



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## 7. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos.

---------End of test report---------



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