



# FCC TEST REPORT

## Client Information:

Applicant: Zhongying Optoelectronics (Shenzhen) Technology Co., LTD  
Applicant add.: 4th Floor, Building B, Jingchengda Science Park, Shiyan Street, Baoan District, Shenzhen  
Brand Name: N/A

## Product Information:

Product Name: Neck hung fan  
Model No.: Z3  
Derivative model No.: N/A

Test Date: May 13 May 18 2022

Issue Date: May 18 2022

Test Standard: FCC Part 15, Subpart B: 2016  
ANSI C63.4:2014

**Test Result: PASS**

**Shenzhen iTC Product Testing Co., Ltd.**

**Issued by:** Add. :Room 204, No.10, Phase 1, Xinhe Xinxing Third Industrial Area, FuhaiRoad, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

Tested by

Amanda Chen

*Amanda Chen*

Reviewed by

Apple Huang

*Apple Huang*

Approved by

John Liu

*John Liu*



This test report may be reproduced in full only  
Test result presented in this test report is applicable to the tested sample only



Report Revision History			
Report No.	Report Version	Description	Issue Date
22ITC0513062F	NONE	Original	May 18 2022

Customer information	
Applicant Name	Zhongying Optoelectronics (Shenzhen) Technology Co., LTD
Applicant Address	4th Floor, Building B, Jingchengda Science Park, Shiyan Street, Baoan District, Shenzhen
Manufacturer Name	Zhongying Optoelectronics (Shenzhen) Technology Co., LTD
Manufacturer Address	4th Floor, Building B, Jingchengda Science Park, Shiyan Street, Baoan District, Shenzhen

Test site information	
Lab performing tests	Shenzhen iTC Product Testing Co., Ltd.
Lab Address	Room 204, No.10, Phase 1, Xinhe Xinxing Third Industrial Area, Fuhai Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86)-0755-33138690
Fax:	(86)-0755-23071003
Abbreviations: OK/P=passed    fail/F=failed    n.a/N=not applicable    E.U.T=equipment under test	

## TABLE OF CONTENTS

	Page
Test Report Declaration	
1. GENERAL PRODUCT INFORMATION .....	4
1.1. Product Function .....	4
1.2. Description of Device (EUT) .....	4
1.3. Difference between Model Numbers .....	4
2. TEST SITES.....	5
2.1. Test Summary.....	5
2.2. List of Test and Measurement Instruments.....	6
3. TEST SET-UP AND OPERATION MODES.....	7
3.1. Principle of Configuration Selection .....	7
3.2. Block Diagram of Test Set-up .....	7
3.3. Test Operation Mode and Test Software .....	7
3.4. Special Accessories and Auxiliary Equipment .....	7
3.5. Countermeasures to Achieve EMC Compliance.....	7
4. TEST RESULTS.....	8
4.1. Conducted Emission at the Mains Terminals Test .....	8
4.2. Radiated Emission Test (below 1 GHz).....	11
4.3. Radiated Emission Test (above 1 GHz) .....	14
5. PHOTOGRAPHS OF THE EUT.....	15

## 1. GENERAL PRODUCT INFORMATION

### 1.1. Product Function

Refer to Technical Construction Form and User Manual.

### 1.2. Description of Device (EUT)

Description : Neck hung fan

M/N : Z3

Power supply : Input: DC 5V from adapter or DC 3.7V from battery

Testing voltage : AC 120V/60Hz

The basic operation mode is:

Pretest Mode	Description
Mode 1	Working Mode

### 1.3. Difference between Model Numbers

All are the same except the model name and appearance

## 2. TEST SITES

### 2.1. Test Summary

Test Item	Condition	Standard	Result
Conducted disturbance at mains terminals	150kHz to 30MHz	FCC Part 15, Subpart B: 2016 ANSI C63.4:2014	Pass
Radiated Emission (below 1 GHz)	30MHz to 1GHz	FCC Part 15, Subpart B: 2016 ANSI C63.4:2014	Pass
Radiated Emission (above 1 GHz)	Above 1GHz	FCC Part 15, Subpart B: 2016 ANSI C63.4:2014	N/A

Remark: 1. The symbol "N/A" in above table means Not Applicable.  
2. When determining the test results, measurement uncertainty of tests has been considered.

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber	3.60dB
Uncertainty for Conducted Emission.	2.60dB

## 2.2. List of Test and Measurement Instruments

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<b>For conducted emission at the mains terminals and load port test</b>					<input checked="" type="checkbox"/>
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr 9,22	Apr 9,23
Artificial Mains Network	Rohde&Schwarz	ENV216	101315	Apr 9,22	Apr 9,23
Artificial Mains Network (AUX)	Rohde&Schwarz	ENV216	101314	Apr 9,22	Apr 9,23
RF Cable	FUJIKURA	3D-2W	944 Cable	Apr 9,22	Apr 9,23
Voltage Probe	CHWARZBECK	A130302	KWE-053	Apr 12, 22	Apr 12, 23
<b>For radiated emission test (Below 1GHz)</b>					<input checked="" type="checkbox"/>
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr 9,22	Apr 9,23
Bilog Antenna	ETS-LINDGREN	3142D	00135452	Apr 2, 22	Apr 2, 23
Spectrum Analyzer	Agilent	8593E	3911A0427 1	Apr 9,22	Apr 9,23
3m Semi-anechoic Chamber	ETS-LINDGREN	966	170326	Apr 2, 22	Apr 2, 23
Signal Amplifier	SONOMA	310	186956	Apr 9,22	Apr 9,23
RF Cable	IMRO	IMRO-400	966 Cable 1#	Apr 9,22	Apr 9,23
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A
<b>For radiated emission test (Above 1GHz)</b>					<input type="checkbox"/>
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr 9,22	Apr 9,23
Horn Antenna	DAZE	ZN30701	11003	Apr 13, 22	Apr 13, 23
Spectrum Analyzer	Agilent	8593E	3911A0427 1	Apr 9,22	Apr 9,23
3m Semi-anechoic Chamber	ETS-LINDGREN	966	170326	Apr 2, 22	Apr 2, 23
Signal Amplifier	ZHINAN	ZN3380C	11001	Apr 9,22	Apr 9,23
RF Cable	IMRO	IMRO-400	966 Cable 1#	Apr 9,22	Apr 9,23
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A
Note: <input checked="" type="checkbox"/> Used <input type="checkbox"/> Not Used					

### 3. TEST SET-UP AND OPERATION MODES

#### 3.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

#### 3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: Neck hung fan)

#### 3.3. Test Operation Mode and Test Software

Refer to Test Setup in clause 4 & 5.

#### 3.4. Special Accessories and Auxiliary Equipment

None.

#### 3.5. Countermeasures to Achieve EMC Compliance

None.

## 4. TEST RESULTS

### 4.1. Conducted Emission at the Mains Terminals Test

**Result** : **PASS**  
**Test Site** : 944 Shielded Room  
**Limits** : FCC Part 15B

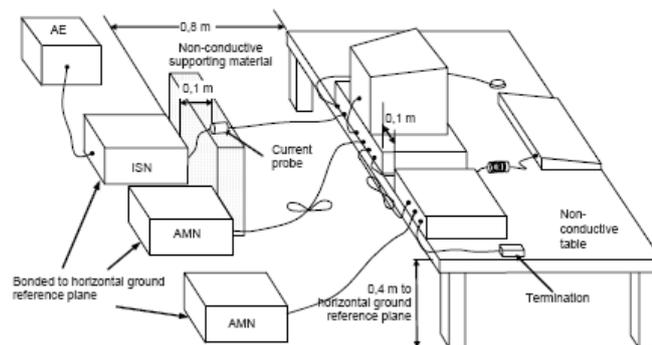
Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE: 1.The lower limit shall apply at the transition frequencies.  
 2.The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

#### Test

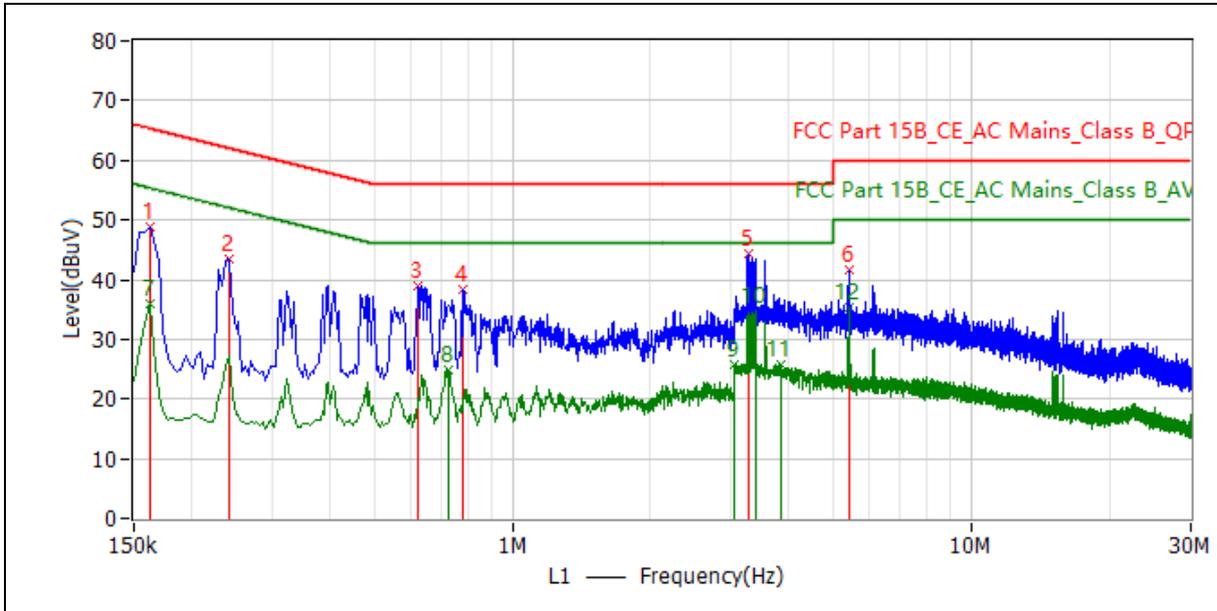
- 1.The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 1 m, the excess was folded back and forth parallel to the cable at the centre so as to form a bundle no longer than 0.4 m.
- 2.The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.
- 3.The bandwidth of the test receiver was set at 9 kHz.
- 4.The worst test data was reported on the following page.

#### Test Set-up



EUT :	Neck hung fan	Model Name. :	Z3
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode :	Working Mode

S

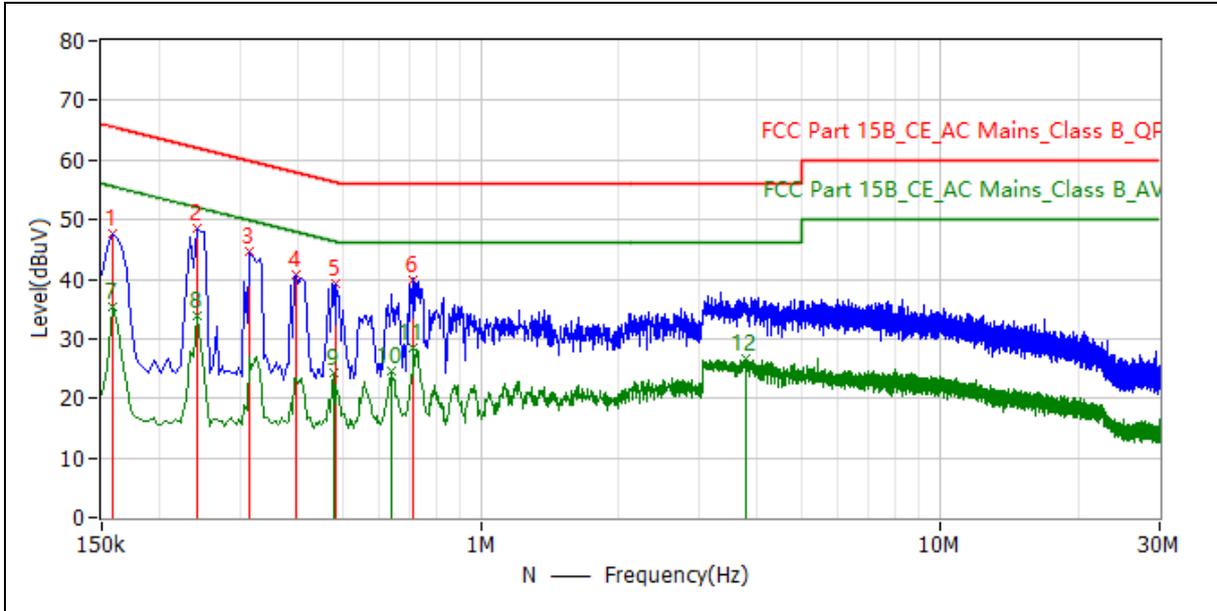


Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit

No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Factor dB	Detector	Polar
1*	162.000 kHz	65.4	48.9	-16.5	9.7	PK	L1
2*	242.000 kHz	62.0	43.5	-18.5	9.7	PK	L1
3*	622.000 kHz	56.0	39.0	-17.0	9.8	PK	L1
4*	778.000 kHz	56.0	38.5	-17.5	9.8	PK	L1
5*	3.258 MHz	56.0	44.3	-11.7	9.9	PK	L1
6*	5.410 MHz	60.0	41.6	-18.4	10.0	PK	L1
7*	162.000 kHz	55.4	35.9	-19.4	9.7	AV	L1
8*	726.000 kHz	46.0	25.0	-21.0	9.8	AV	L1
9*	3.050 MHz	46.0	25.7	-20.3	9.9	AV	L1
10*	3.374 MHz	46.0	34.9	-11.1	9.9	AV	L1
11*	3.862 MHz	46.0	25.9	-20.1	9.9	AV	L1
12*	5.414 MHz	50.0	35.3	-14.7	10.0	AV	L1

EUT :	Neck hung fan	Model Name. :	Z3
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode :	Working Mode



Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit

No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Factor dB	Detector	Polar
1*	158.000 kHz	65.6	47.7	-17.8	9.7	PK	N
2*	242.000 kHz	62.0	48.5	-13.5	9.7	PK	N
3*	314.000 kHz	59.9	44.6	-15.2	9.7	PK	N
4*	398.000 kHz	57.9	40.7	-17.2	9.7	PK	N
5*	486.000 kHz	56.2	39.3	-16.9	9.7	PK	N
6*	714.000 kHz	56.0	40.0	-16.0	9.7	PK	N
7*	158.000 kHz	55.6	35.4	-20.1	9.7	AV	N
8*	242.000 kHz	52.0	34.0	-18.1	9.7	AV	N
9*	478.000 kHz	46.4	24.3	-22.1	9.7	AV	N
10*	638.000 kHz	46.0	24.5	-21.5	9.7	AV	N
11*	714.000 kHz	46.0	28.6	-17.4	9.7	AV	N
12*	3.782 MHz	46.0	26.6	-19.4	9.9	AV	N

## 4.2. Radiated Emission Test (below 1 GHz)

**Result** : **PASS**  
**Test Site** : 966 Chamber  
**Limits** : FCC Part 15B

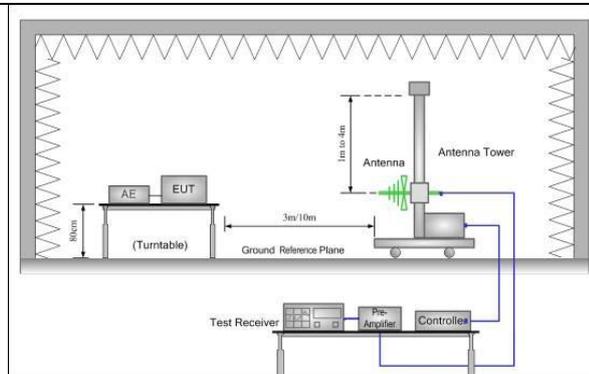
Frequency range MHz	Quasi-peak limits 3m dB( $\mu$ V/m)
30-88	40
88-216	43.5
216-960	46
960-1000	54

Note: 1.The lower limit shall apply at the transition frequency.  
2.Additional provisions may be required for cases where interference occurs.

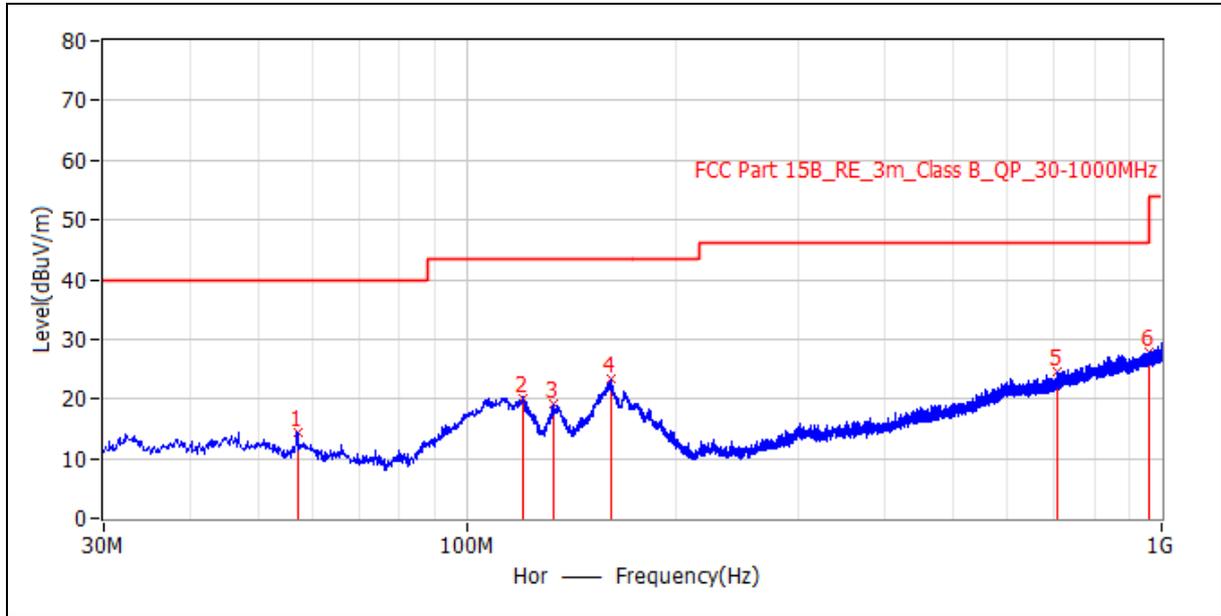
### Conditional testing procedure

- 1.The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.
- 2.The highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.
- 2.The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.
- 3.The bandwidth setting on the test receiver was 120 kHz.
- 4.The worst test data was reported on the following page.
- 5.Emission Level = Antenna Factor + Cable Loss + Meter Reading - Preamp Factor.

### Test Set-up



EUT :	Neck hung fan	Model Name :	Z3
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	AC 120V/60Hz	Test Mode :	Working Mode

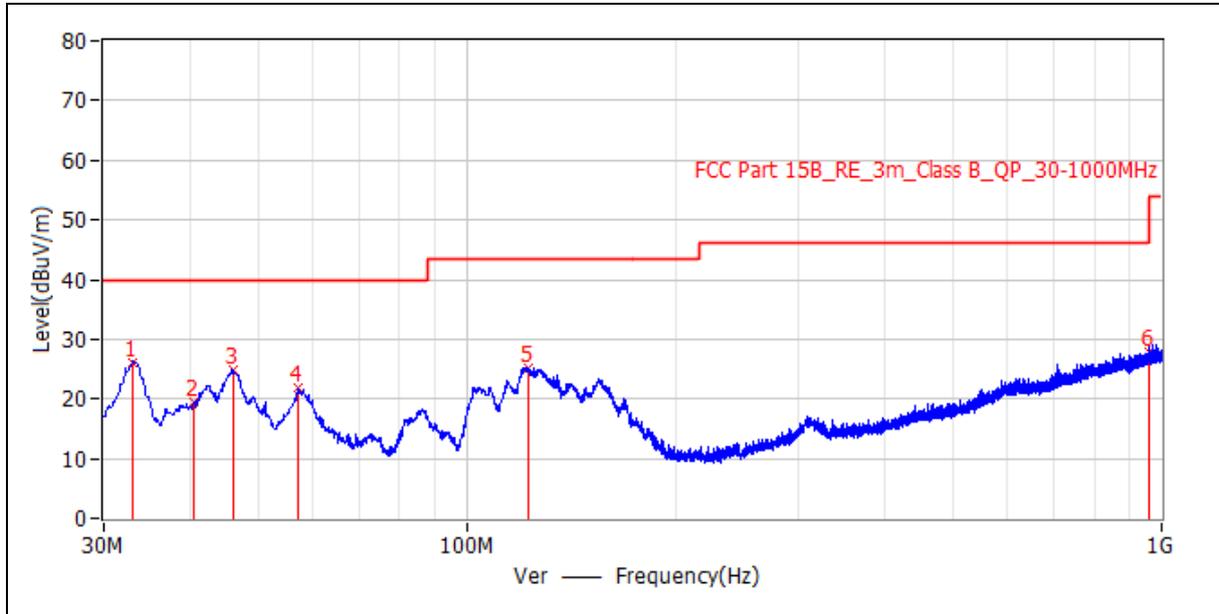


Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor )–Limit

No.	Frequency	Level dBuV/m	Factor dB/m	Limit dBuV/m	Margin dB	Detector	Polar	Height cm	Angle deg
1*	57.039 MHz	14.5	12.9	40.0	-25.5	PK	Hor	200.0	175.0
2*	120.453 MHz	20.2	11.7	43.5	-23.3	PK	Hor	200.0	222.0
3*	132.941 MHz	19.2	12.5	43.5	-24.3	PK	Hor	200.0	4.0
4*	160.950 MHz	23.4	13.6	43.5	-20.1	PK	Hor	200.0	175.0
5*	708.515 MHz	24.6	22.5	46.0	-21.4	PK	Hor	200.0	351.0
6*	956.835 MHz	27.8	26.3	46.0	-18.2	PK	Hor	200.0	209.0

EUT :	Neck hung fan	Model Name :	Z3
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	AC 120V/60Hz	Test Mode :	Working Mode



Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor )–Limit

No.	Frequency	Level dBuV/m	Factor dB/m	Limit dBuV/m	Margin dB	Detector	Polar	Height cm	Angle deg
1*	32.910 MHz	26.2	12.8	40.0	-13.8	PK	Ver	100.0	146.0
2*	40.428 MHz	19.5	13.6	40.0	-20.5	PK	Ver	100.0	160.0
3*	46.126 MHz	24.9	13.4	40.0	-15.1	PK	Ver	100.0	160.0
4*	57.039 MHz	21.8	12.9	40.0	-18.2	PK	Ver	100.0	213.0
5*	122.514 MHz	25.3	11.8	43.5	-18.2	PK	Ver	100.0	241.0
6*	956.350 MHz	27.9	26.3	46.0	-18.1	PK	Ver	128.0	0.0

### 4.3. Radiated Emission Test (above 1 GHz)

**Result** : N/A  
**Test Site** : 966 Chamber  
**Limits** : FCC Part 15B

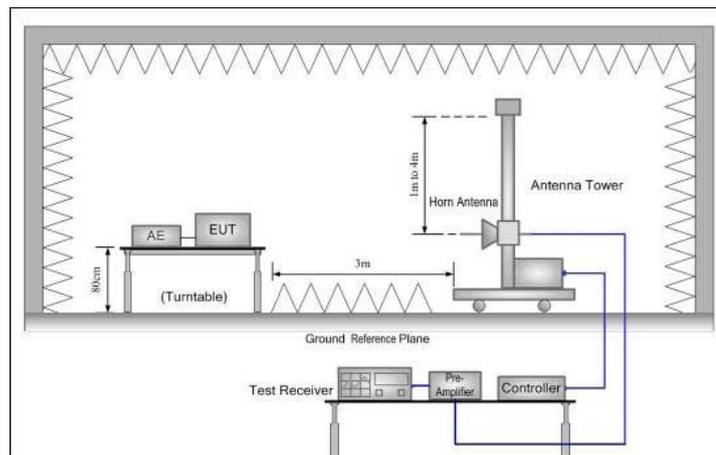
Frequency range GHz	Average limit dB(μV/m)	Peak limit dB(μV/m)
1-3	50	70
3-6	54	74

Note: The lower limit applies at the transition frequency

#### Conditional testing procedure

- The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.
- The EUT was tested in the 3m Chamber Site. It was pre-scanned with a Peak detector from the spectrum.
- The bandwidth setting on the test receiver was 1 MHz.
- The worst test data was reported on the following page.
- Emission Level = Antenna Factor + Cable Loss + Meter Reading - Preamp Factor.
  - the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
  - the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the the measurement shall only be made up to 5 GHz.
  - the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, whichever is lower.

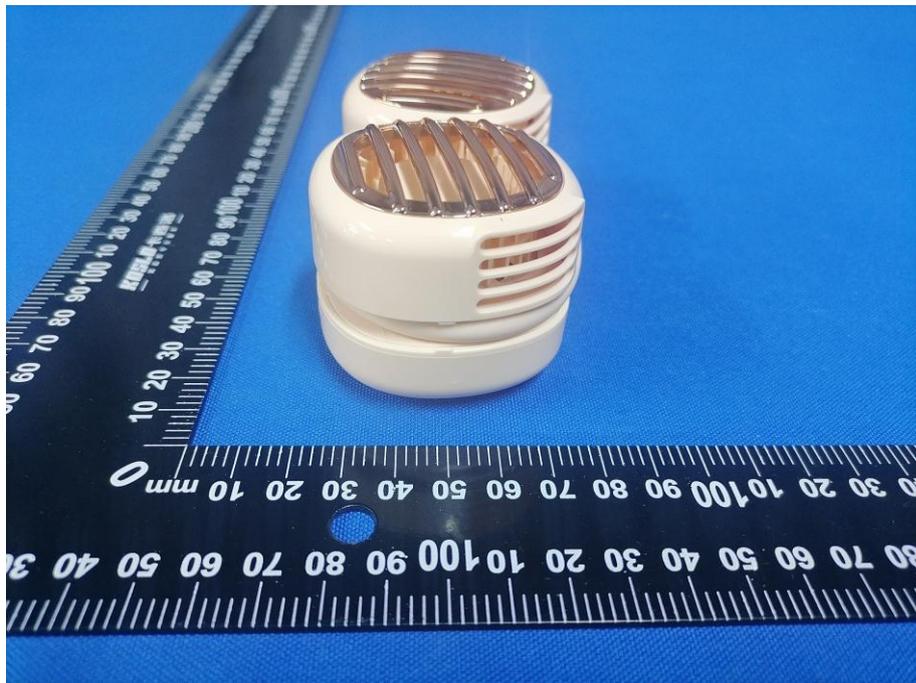
#### Test Set-up

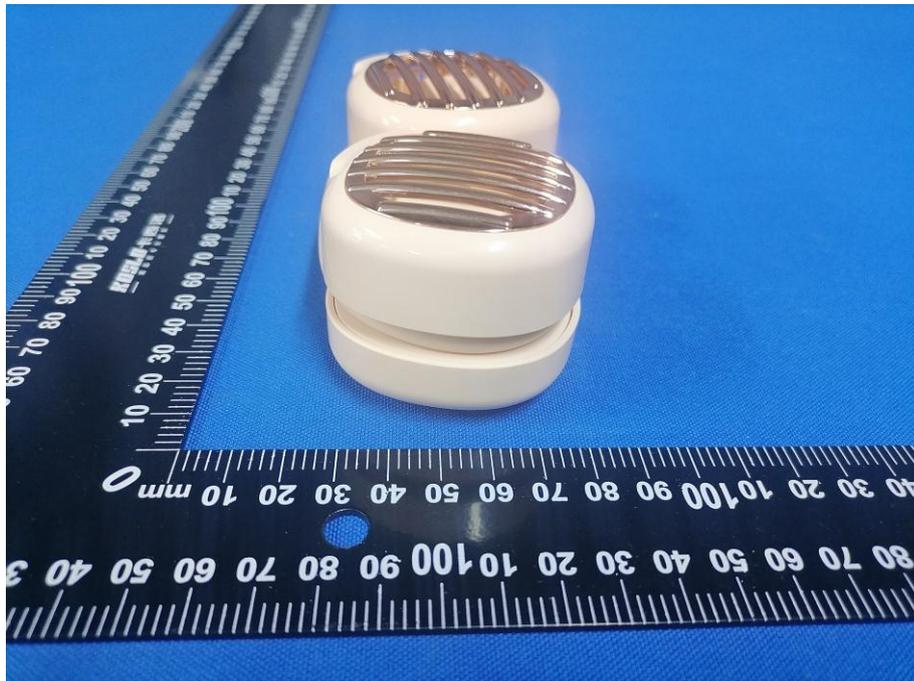
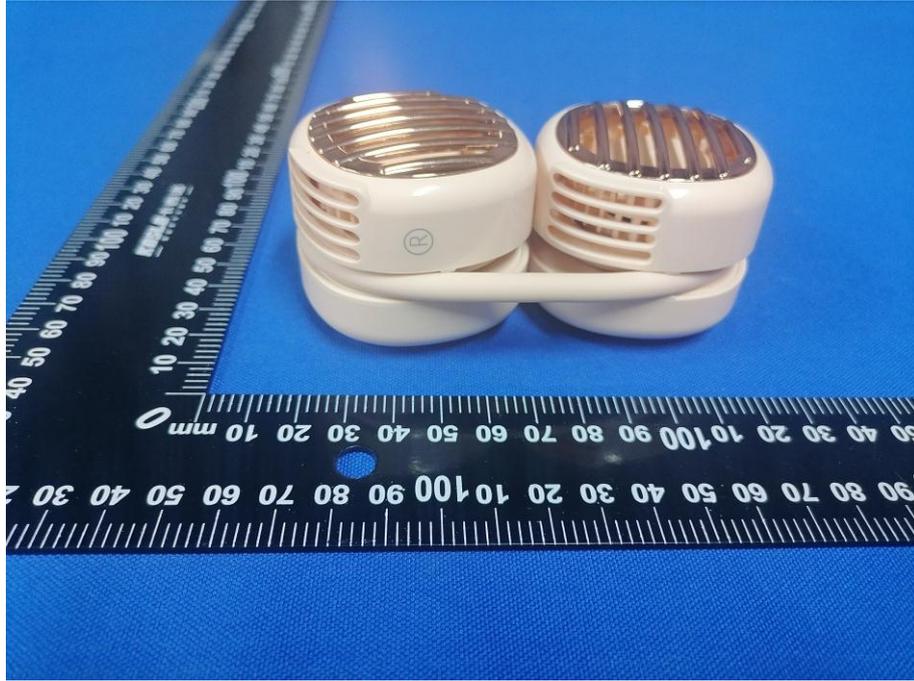


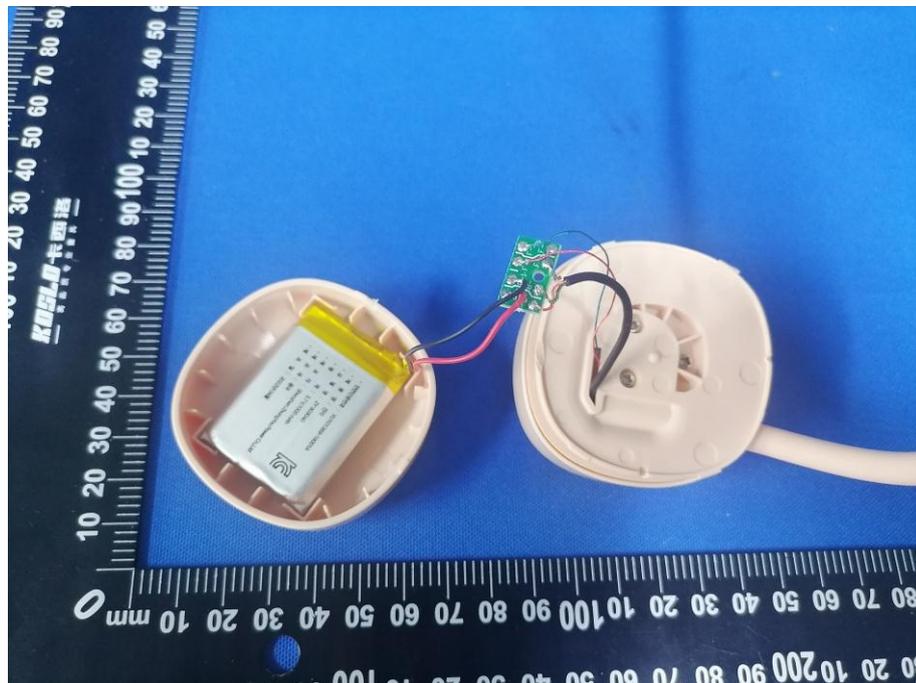
## 5. PHOTOGRAPHS OF THE EUT

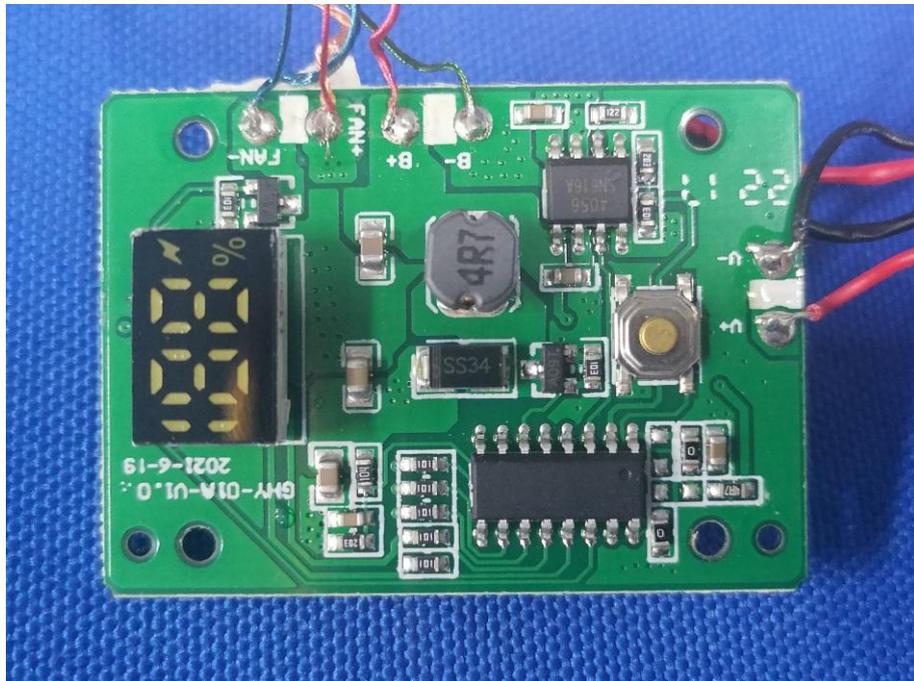
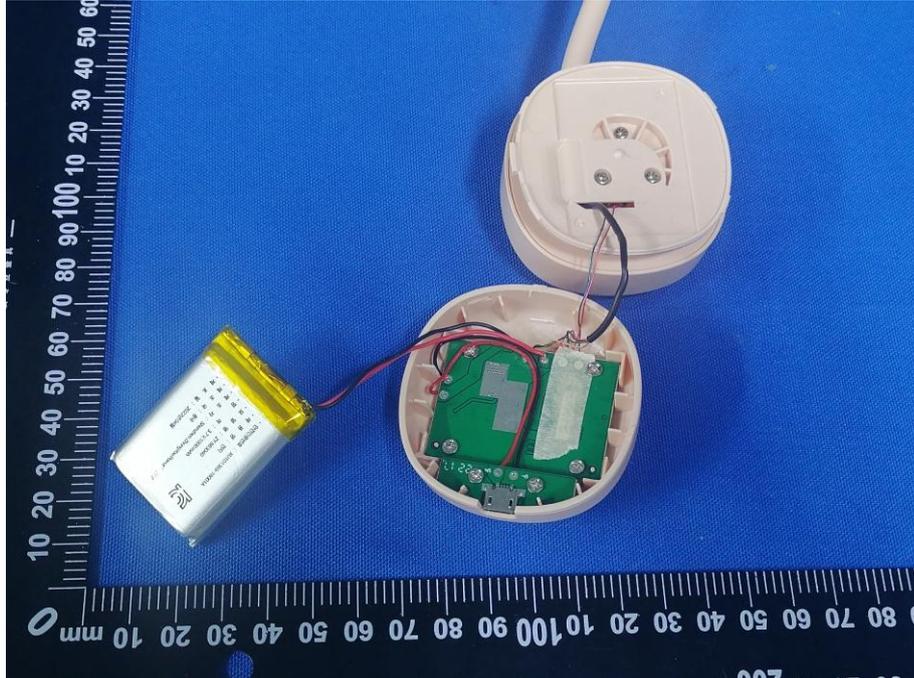


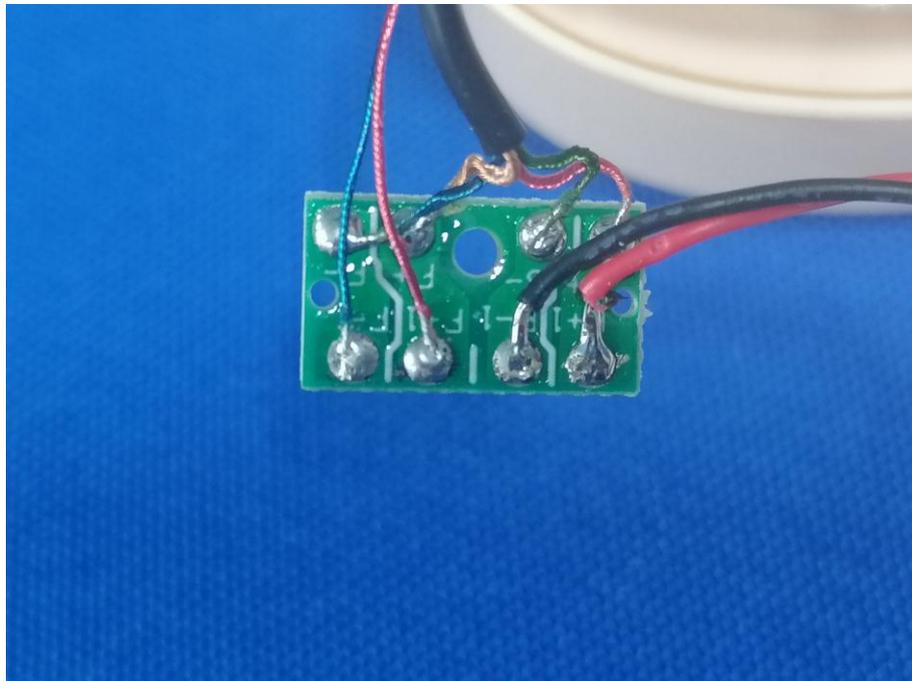
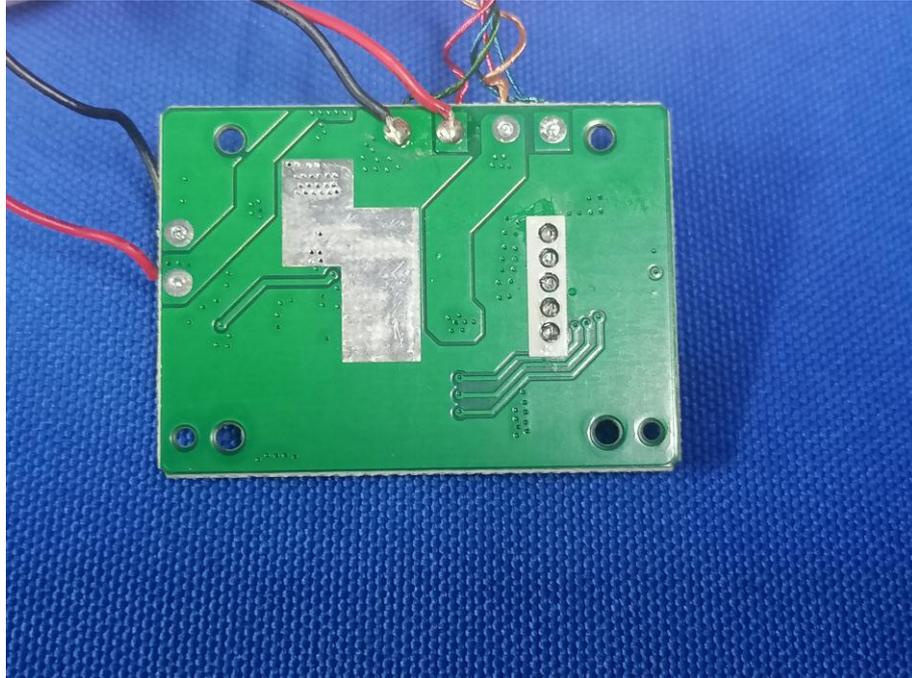


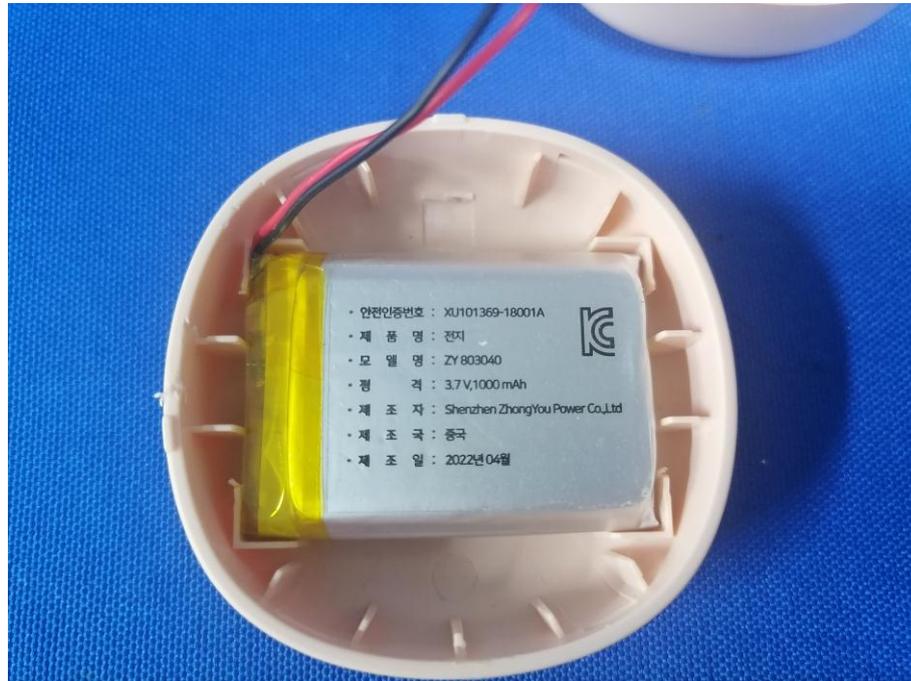












\*\*\*the end of report\*\*\*