

EMC TEST REPORT

Applicant	Zhejiang Lingzhu Technology Co., Ltd.
FCC ID	2BEWXS254
Product	Smart Hummingbird Feeder
Model	SF254-WBA3; SF254-WBB3; SF254-WBC3; SF254-WBD3; SF254-WBE3; SF254-WBF3; SF254-WBA3A; SF254-WBB3A; SF254-WBC3A; SF254-WBD3A; SF254-WBE3A; SF254-WBF3A; SF254-WBA2; SF254-WBB2; SF254-WBC2; SF254-WBD2; SF254-WBE2; SF254-WBF2; SF254-WBA4; SF254-WBB4; SF254-WBC4; SF254-WBD4; SF254-WBE4; SF254-WBF4
Report No.	R2409A1319-E1
Issue Date	December 19, 2024

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2023)/ ANSI C63.4-2014**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	FCC Part15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	FCC Part15.107, ANSI C63.4-2014	NA ^{Note 1}
Date of Testing: September 13, 2024 ~ November 5, 2024			
Date of Sample Received: September 11, 2024			
Note: 1. The equipment is not connected to the public network, so test items do not apply. 2. All indications of Pass/Fail in this report are opinions expressed by Eurofins TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **Eurofins TA Technology (Shanghai) Co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test Facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 3857.01)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3 Testing Location

Company:	Eurofins TA Technology (Shanghai) Co., Ltd.
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2 General Description of Equipment Under Test

2.1 Applicant and Manufacturer Information

Applicant	Zhejiang Lingzhu Technology Co., Ltd.
Applicant address	Room 302, No 1 Building Huace Center, Xihu District, Hangzhou City, Zhejiang Province, China
Manufacturer	Zhejiang Lingzhu Technology Co., Ltd.
Manufacturer address	Room 302, No 1 Building Huace Center, Xihu District, Hangzhou City, Zhejiang Province, China

2.2 General Information

EUT Description			
Device Type	Portable Device		
Model	SF254-WBA3; SF254-WBB3; SF254-WBC3; SF254-WBD3; SF254-WBE3; SF254-WBF3; SF254-WBA3A; SF254-WBB3A; SF254-WBC3A; SF254-WBD3A; SF254- WBE3A; SF254-WBF3A; SF254-WBA2; SF254-WBB2; SF254-WBC2; SF254-WBD2; SF254-WBE2; SF254-WBF2; SF254-WBA4; SF254-WBB4; SF254-WBC4; SF254-WBD4; SF254-WBE4; SF254-WBF4		
Lab internal SN	R2409A1319/S01		
HW Version	V1.0.2		
SW Version	V2.0.67		
Power Rating	DC 5V from Adapter.		
Connecting I/O Port(s)	Please refer to the User's Manual.		
Antenna Type	Integrated Antenna		
Frequency	Band	Tx (MHz)	Rx (MHz)
	Bluetooth LE	2400 ~ 2483.5	2400 ~ 2483.5
	Wi-Fi 2.4G	2400 ~ 2483.5	2400 ~ 2483.5
Auxiliary Test Equipment			
Phone	Manufacturer: HONOR Model: HW-050200E0		
Note: 1. The EUT is sent from the applicant to Eurofins TA and the information of the EUT is declared by the applicant. 2. The customer declares except for different model numbers, sensor, color and tiny enclosure difference, such as different chamfering. These differences are not related to the radio frequency function. 2, 3, 4 in model name for different sensor and A, B, C in model name for different color and			

tiny enclosure difference.

3. This report only tests SF254-WBA3.

2.3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards

FCC Code CFR47 Part15B (2023)

ANSI C63.4-2014

2.4 Test Mode

Test Mode	
Mode 1	Battery Powered + EUT +AP Link + Working

Test Type	Test Mode	Worst Mode
Radiated Emission	Mode 1	Mode 1
Conducted Emission	/	/
After technical evaluation or/and preliminary test, the test data of the worst-case condition was recorded in this report.		

3 Test Case Results

3.1 Radiated Emission

Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	30% ~ 60%

Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 10 meters below 1GHz; 3 meters for above 1GHz. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.

Set the spectrum analyzer in the following:

Below 1GHz:

RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz:

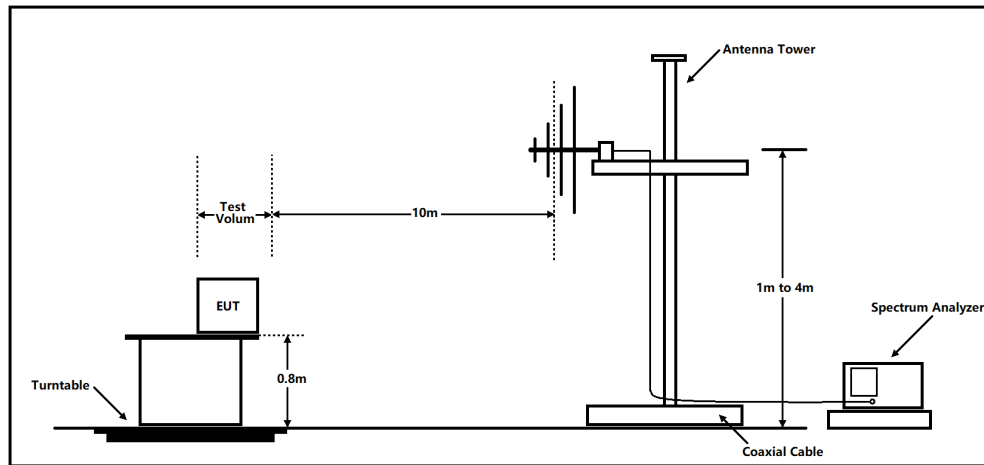
(a) PEAK Detector: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

(b) AVERAGE Detector: RBW=1MHz / VBW=3MHz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

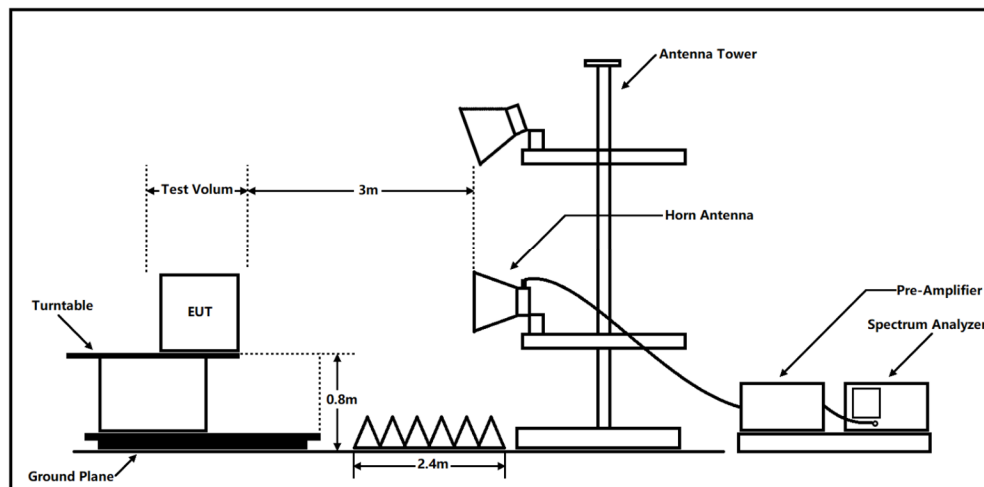
Test Setup

Below 1GHz



Note: Area side: 21m x 12m

Above 1GHz



Note: Area side: 2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

Limits

Class B

Frequency (MHz)	Field Strength (dB μ V/m)	Detector
30 -88	30.0	Quasi-peak
88-216	33.5	Quasi-peak
216 – 960	36.0	Quasi-peak
960-1000	44.0	Quasi-peak
1000-5 th harmonic of the highest frequency or 40GHz, which is lower	54 74	Average Peak

Frequency range of radiated measurements

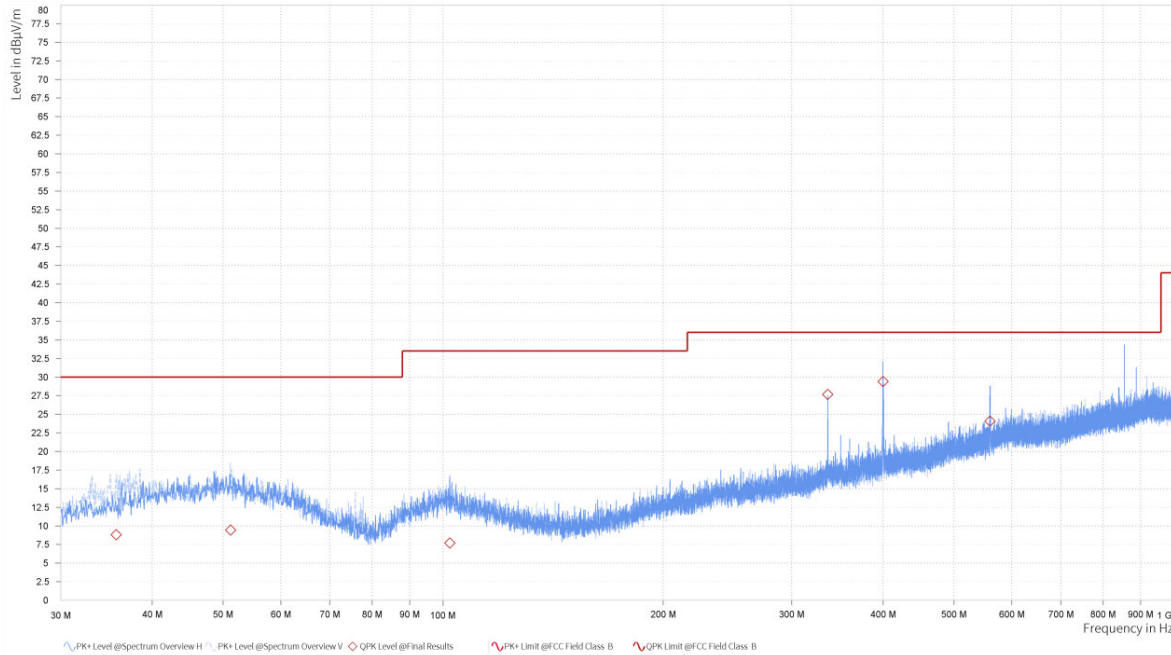
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Test Results

Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier.

The following graphs display the maximum values of horizontal and vertical by software.

For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

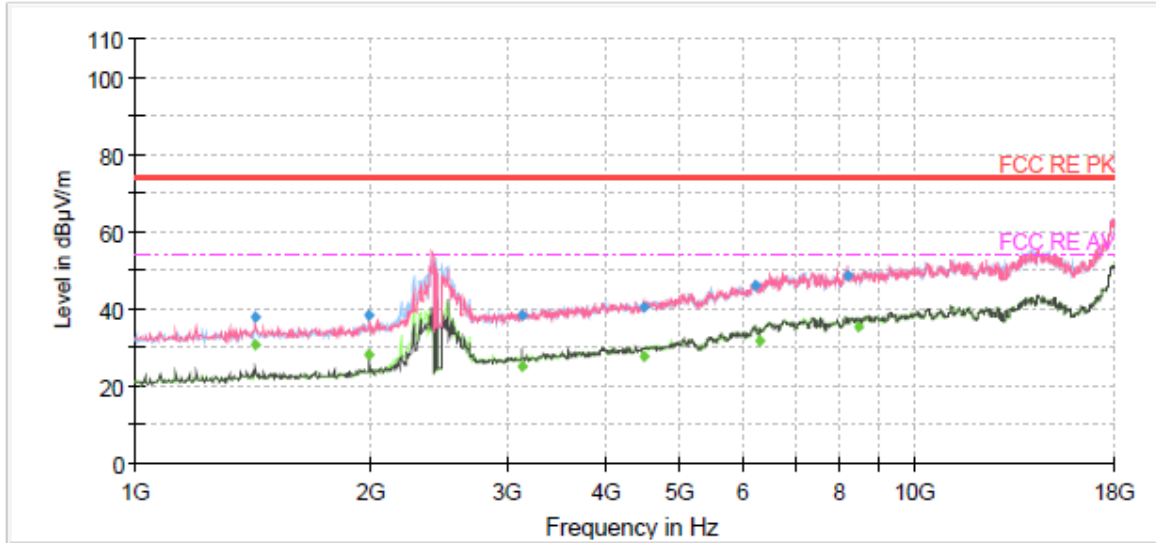


Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (m)	Polarization	Azimuth (deg)	Correct Factor (dB)
35.723	8.80	30.00	21.20	1.00	V	250.2	-10.30
51.214	9.44	30.00	20.56	1.25	V	198.9	-8.16
102.145	7.70	33.50	25.80	2.22	H	95.8	-10.06
336.005	27.66	36.00	8.34	1.78	H	239.4	-6.72
399.972	29.39	36.00	6.61	2.03	H	23.1	-5.59
560.117	24.08	36.00	11.92	1.25	H	20.6	-3.04

Remark: 1. Correction Factor = Antenna factor + Insertion loss(cable loss+amplifier gain)

2. Margin = Limit – Quasi-Peak



Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1425.00	---	30.65	54.00	23.35	1000.000	100.0	V	181.00	-13
1425.00	37.67	---	74.00	36.33	1000.000	103.0	V	179.00	-13
1994.50	38.53	---	74.00	35.47	1000.000	102.0	V	165.00	-10
1994.50	---	28.25	54.00	25.75	1000.000	109.0	V	164.00	-10
3133.50	38.22	---	74.00	35.78	1000.000	125.0	V	0.00	-6
3133.50	---	24.96	54.00	29.04	1000.000	116.0	V	328.00	-6
4476.50	40.40	---	74.00	33.60	1000.000	111.0	V	298.00	-3
4485.00	---	27.64	54.00	26.36	1000.000	125.0	H	83.00	-3
6223.25	45.82	---	74.00	28.18	1000.000	124.0	H	144.00	4
6325.25	---	31.88	54.00	22.12	1000.000	218.0	H	262.00	3
8178.25	48.64	---	74.00	25.36	1000.000	176.0	V	30.00	7
8467.25	---	35.20	54.00	18.80	1000.000	324.0	H	124.00	6

Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)

2. Margin = Limit – MaxPeak / Average

3.2 Conducted Emission

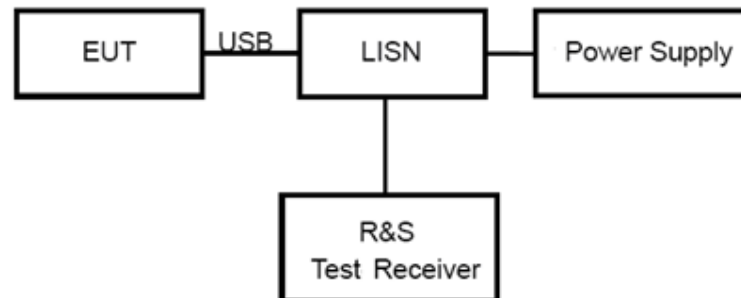
Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	30% ~ 60%

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage 120V/60Hz.

Limits

Frequency (MHz)	Class A (dB μ V)		Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 to 56 *	56 to 46*
0.5 - 5	73	60	56	46
5 - 30	73	60	60	50

*: Decreases with the logarithm of the frequency.

Note: The EUT should meet CLASS B limit.

Test Results

The equipment is not connected to the public network, so test items do not apply.

4 Uncertainty Measurement

Case	Uncertainty	Factor k
Radiated Emission 30MHz – 200MHz	3.39 dB	1.96
Radiated Emission 200MHz – 1GHz	3.82 dB	1.96
Radiated Emission 1GHz – 18GHz	6.51 dB	1.96

5 Main Test Instruments

Name of Equipment	Manufacturer	Type/Model	Serial Number	Calibration Date	Expiration Time
Radiated Emission					
EMI Test Receiver	R&S	ESCI3	100948	2024-05-07	2025-05-06
Signal Analyzer	R&S	FSV40	101186	2024-05-07	2025-05-06
EMI Test Receiver	R&S	ESR	102720	2024-05-07	2025-05-06
EMI Test Receiver	R&S	ESR	102721	2024-05-07	2025-05-06
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	01111	2022-10-25	2025-10-24
Horn Antenna	SCHWARZBECK	BBHA 9120D	430	2024-07-18	2027-07-17
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	01614	2023-09-13	2026-09-12
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	01615	2023-10-19	2026-10-18
Software	R&S	EMC32	9.26.01	/	/
Software	R&S	ELEKTRA	5.00.2	/	/

ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.

***** END OF REPORT *****