FCC PART 15B TEST REPORT FOR CERTIFICATION

On Behalf of

Ningbo Shenghe Lighting Co.,LTD
****

FCC ID：2AVIPZFGBL880A

Report Type：	**Product Type：**
Original report	Horticultural Luminaire

Test Engineer: **Clint Chen** Clint Chen

Report Number: **STDNB-201264F-005**

Report Date: **2021-03-30**

Reviewed By: **Lion Li** Lion Li

Prepared By: Standard-Tech Co., Ltd. Testing Center
Standard-Tech Building, No. 6 Guanhong Road, Guangzhou
Science City, Guangzhou 510663, China
Tel: +86-20-32290320 /32290719
Fax: +86-20-32290422 /32290556
www.standard-tech.com

The device described above is tested by Standard-Tech Co., Ltd. Testing Center. to confirm comply with all the FCC Part 15 Subpart C requirements. The test results are contained in this test report and Standard-Tech Co., Ltd. Testing Center is assumed full responsibility for the accuracy and completeness of these tests. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements. This Report is made under FCC Part 2.1074. No modifications were required during testing to bring this product into compliance. This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Standard-Tech Co., Ltd. Testing Center.

TABLE OF CONTENTS

Description Page

1. SUMMARY OF STANDARDS AND RESULTS 3

1.1. Description of Standards and Results 3

2. GENERAL INFORMATION 3

2.1. Description of Equipment Under Test 3

2.2. Equipments Used during the Test 4

2.3. Test Facility 4

2.4. Measurement Uncertainty (95% confidence levels, k=2) 5

3. POWER LINE CONDUCTED EMISSION TEST 6

3.1. Block Diagram of Test Setup 6

3.2. Power Line Conducted Emission Test Limits 6

3.3. Test Procedure 6

3.4. Test Environment 6

4. RADIATED EMISSION TEST 11

4.1. Block Diagram of Test Setup 11

4.2. Radiated Emission Limit 12

4.3. Test Procedure 13

4.4. Test Environment 13

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT has been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	**Standard**	**Results**
Power Line Conducted Emission	FCC Part 15: 15.107	PASS
Radiated Emission	FCC Part 15: 15.109	PASS

2. GENERAL INFORMATION

2.1.Description of Equipment Under Test

Applicant	Ningbo Shenghe Lighting Co.,LTD
Address	No.311, Penglai Road, Xiangshan Industrial Zone, Ningbo, Zhejiang, 315700
Manufacturer	Ningbo Shenghe Lighting Co.,LTD
Address	No.311, Penglai Road, Xiangshan Industrial Zone, Ningbo, Zhejiang, 315700
Factory 1	Ningbo Shenghe Lighting Co.,LTD
Address	No.311, Penglai Road, Xiangshan Industrial Zone, Ningbo, Zhejiang, 315700
Factory 2	SHININGMOON LIGHTING (CAMBODIA) CO.,LTD
Address	D3 Y Seven Industrial Park III ,National road no.4, Sangkrous Cheat village, Trapang Korng Commune, Samrong Toung District, Kampong Speu, Cambodia
Brand Name	ZEGGWELL
Product	Horticultural Luminaire
Model No.	ZF-G-BL-880A1-XX (Remark: “X” can be 0 to 9 (commerical code).)
Difference	The series model ZF-G-BL-880A1-XX is models use the same circuit principle, the same PCB layout,
Power Adapter	AC 120-277V, 60Hz, 880W
Sample Type	Prototype production
Date of Receipt	2021/03/28
Date of Test	2021/03/28-2021/03/30

2.2. Equipments Used during the Test

Conducted Emissions

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Shielding Room	AUDIX	N/A	N/A	2018/07/28	3 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESR7	101487	2020/07/29	2 Year
3.	V-LISN	Rohde & Schwarz	NNLK 8122	8122-00128	2019/07/20	2 Year
4.	RF Cable	YuanDao	RG223	N/A	2020/05/25	1 Year
5.	Test Software	AUDIX	e3	N/A	N/A	N/A
Note: N/A means Not applicable.						

For frequency range 30MHz~1000MHz (In 3m Anechoic Chamber)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Semi-anechoic chamber	AUDIX	N/A	N/A	2018/11/18	3 Year
2.	EMI Test Receiver	R&S	ESR7	101487	2020/07/29	2 Year
3.	Biconical Logarithmic Antenna	SCHWARDZBECK	VULB 9162	9162-104	2021/01/05	2 Year
4.	Cable Line	PEWC	CFD400NL	N/A	2020/05/25	1 Year
5.	Loop Antenna	Beijing Daze	ZN30900C	1062	2019/12/20	2 Year
6.	Test Software	AUDIX	e3	N/A	N/A	1 Year
Note: N/A means Not applicable.						

2.3. Test Facility

Site Description

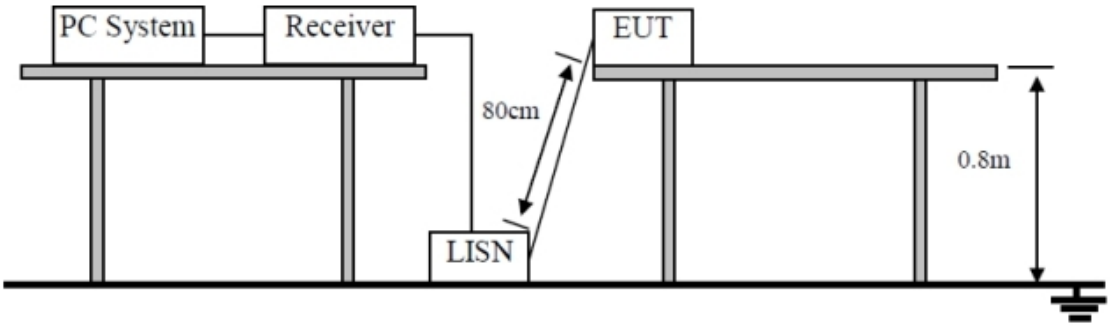
Name of Firm	:	STANDARD-TECH TESTING SERVICES Standard-Tech Building, No. 6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China
EMC Lab.	:	Certificated by Industry Canada Registration Number: 20901 Valid Date: 2020/02/28
	:	Certificated by FCC USA. Designation No.: CN1222 Valid Date: 2020/02/28

2.4.Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	2.42dB(150KHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	3.94dB(30M~1GHz, Distance: 3m)
Uncertainty for Radiation Emission test in 3m chamber(1GHz-25GHz)	4.92dB(1~6GHz, Distance: 3m)
	5.24dB(6~40GHz, Distance: 3m)
Uncertainty for Output power test	0.67dB
Uncertainty for Bandwidth test	83kHz

3. POWER LINE CONDUCTED EMISSION TEST

3.1.Block Diagram of Test Setup



3.2.Power Line Conducted Emission Test Limits

FREQUENCY (MHz)	☐ Class A (dBμV)		☒ Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46*
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.3.Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power Via PC connected to the power mains through a line impedance stabilization network (V-LISN). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs). The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2014 on Conducted Emission Test.

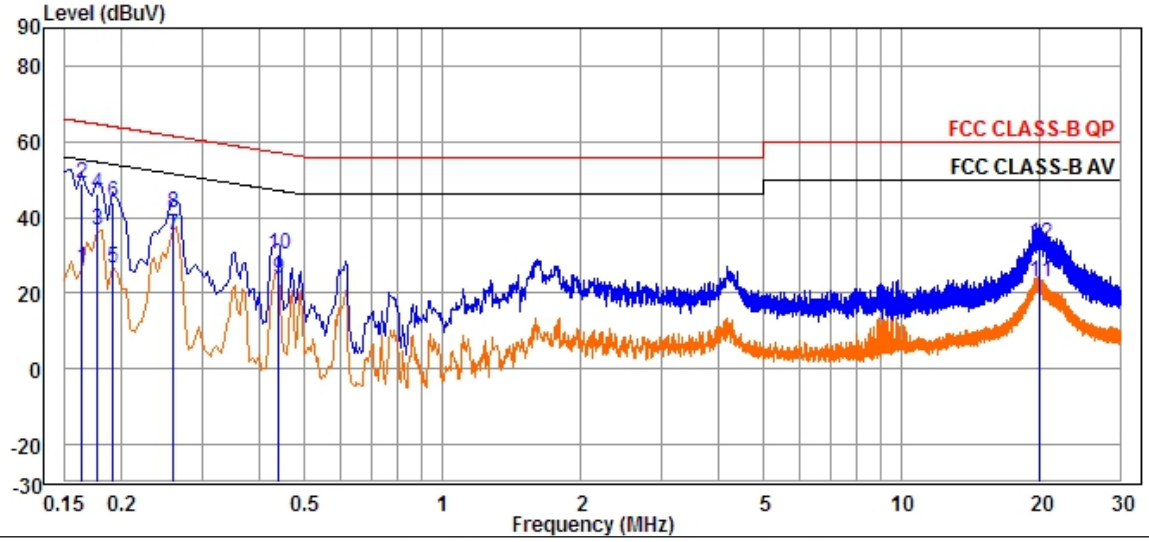
The bandwidth of test receiver (R & S ESR7) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.4.Test Environment

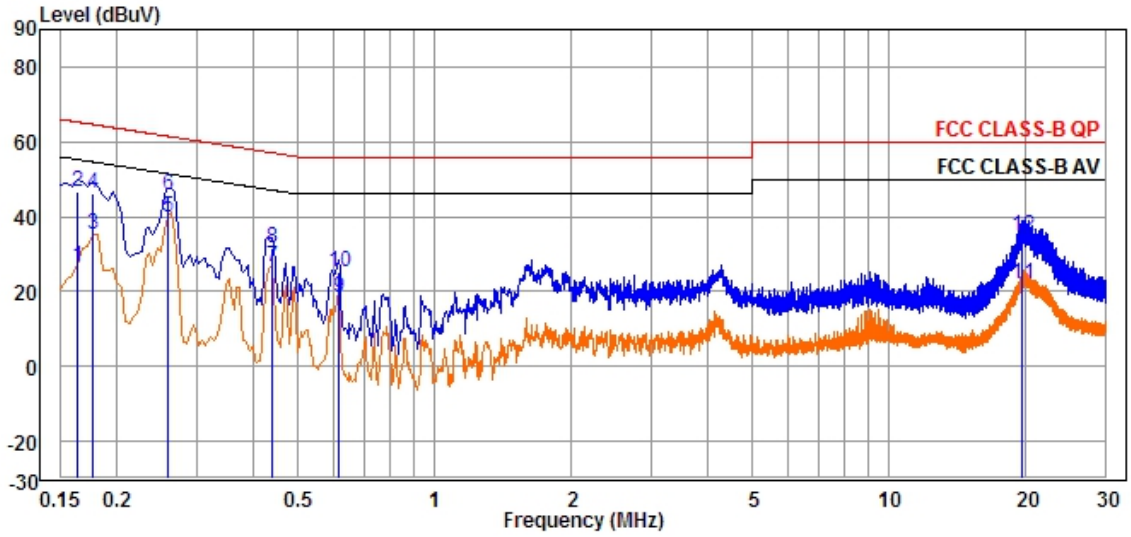
Temperature:	23.8℃
Humidity:	49.8%
ATM pressure:	101kPa

Test Model:	**ZF-G-BL-880A1-01**
Polarization:	**Line**
Test Voltage	**AC 120V/60Hz**



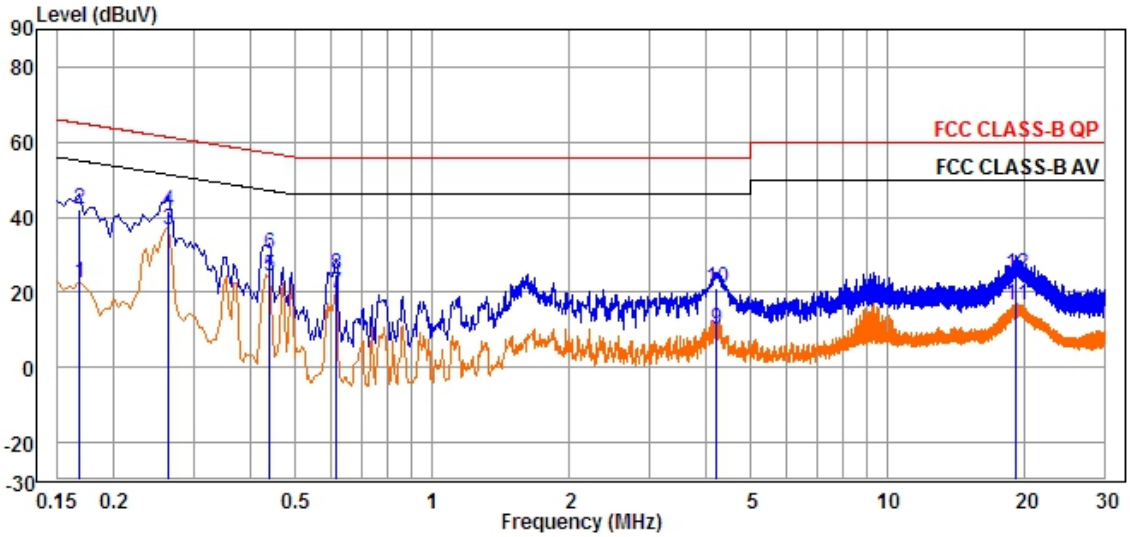
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.16	26.71	26.57	0.14	55.28	-28.57	Line	Average
2	0.16	48.71	48.57	0.14	65.28	-16.57	Line	QP
3	0.18	36.40	36.25	0.15	54.63	-18.23	Line	Average
4	0.18	46.40	46.25	0.15	64.63	-18.23	Line	QP
5	0.19	26.77	26.63	0.14	54.01	-27.24	Line	Average
6	0.19	43.77	43.63	0.14	64.01	-20.24	Line	QP
7	0.26	35.28	35.15	0.13	51.50	-16.22	Line	Average
8	0.26	41.28	41.15	0.13	61.50	-20.22	Line	QP
9	0.44	24.01	23.84	0.17	47.10	-23.09	Line	Average
10	0.44	30.01	29.84	0.17	57.10	-27.09	Line	QP
11	20.09	22.90	22.23	0.67	50.00	-27.10	Line	Average
12	20.09	32.90	32.23	0.67	60.00	-27.10	Line	QP

Test Model:	**ZF-G-BL-880A1-01**
Polarization:	**Neutral**
Test Voltage	**AC 120V/60Hz**



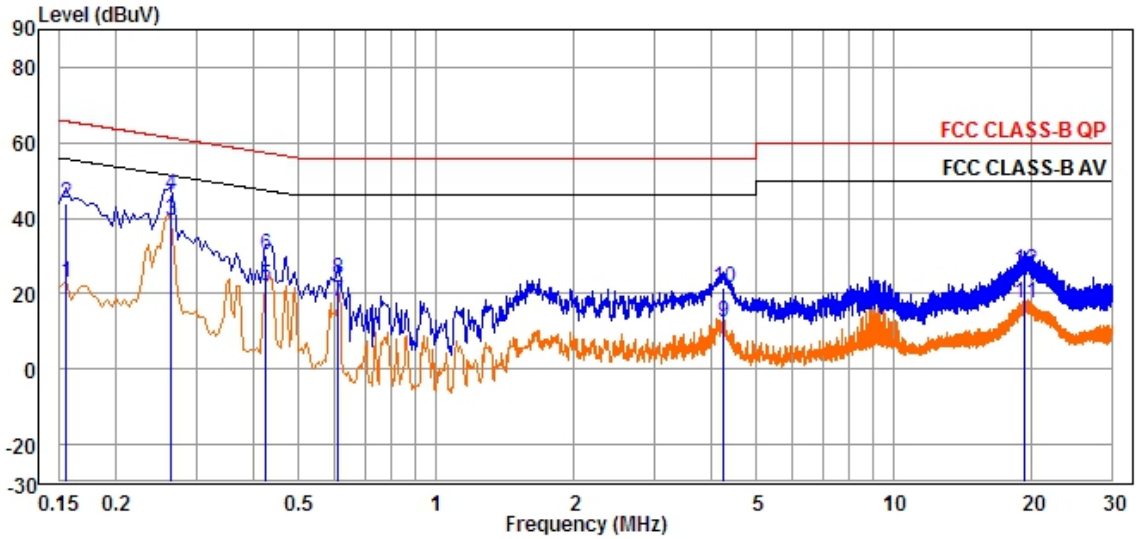
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.16	26.63	26.49	0.14	55.28	-28.65	Neutral	Average
2	0.16	46.63	46.49	0.14	65.28	-18.65	Neutral	QP
3	0.18	35.40	35.26	0.14	54.63	-19.23	Neutral	Average
4	0.18	46.40	46.26	0.14	64.63	-18.23	Neutral	QP
5	0.26	39.72	39.60	0.12	51.50	-11.78	Neutral	Average
6	0.26	45.72	45.60	0.12	61.50	-15.78	Neutral	QP
7	0.44	26.48	26.31	0.17	47.10	-20.62	Neutral	Average
8	0.44	31.48	31.31	0.17	57.10	-25.62	Neutral	QP
9	0.61	18.38	18.25	0.13	46.00	-27.62	Neutral	Average
10	0.61	25.38	25.25	0.13	56.00	-30.62	Neutral	QP
11	19.62	22.02	21.44	0.58	50.00	-27.98	Neutral	Average
12	19.62	35.02	34.44	0.58	60.00	-24.98	Neutral	QP

Test Model:	**ZF-G-BL-880A1-01**
Polarization:	**Line**
Test Voltage	**AC 277V/60Hz**



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.17	22.25	22.10	0.15	55.06	-32.81	Line	Average
2	0.17	42.25	42.10	0.15	65.06	-22.81	Line	QP
3	0.26	36.77	36.63	0.14	51.35	-14.58	Line	Average
4	0.26	41.77	41.63	0.14	61.35	-19.58	Line	QP
5	0.44	24.14	23.97	0.17	47.10	-22.96	Line	Average
6	0.44	30.14	29.97	0.17	57.10	-26.96	Line	QP
7	0.61	19.69	19.54	0.15	46.00	-26.31	Line	Average
8	0.61	24.69	24.54	0.15	56.00	-31.31	Line	QP
9	4.20	10.31	10.15	0.16	46.00	-35.69	Line	Average
10	4.20	21.31	21.15	0.16	56.00	-34.69	Line	QP
11	19.13	16.73	16.07	0.66	50.00	-33.27	Line	Average
12	19.13	24.73	24.07	0.66	60.00	-35.27	Line	QP

Test Model:	**ZF-G-BL-880A1-01**
Polarization:	**Neutral**
Test Voltage	**AC 277V/60Hz**

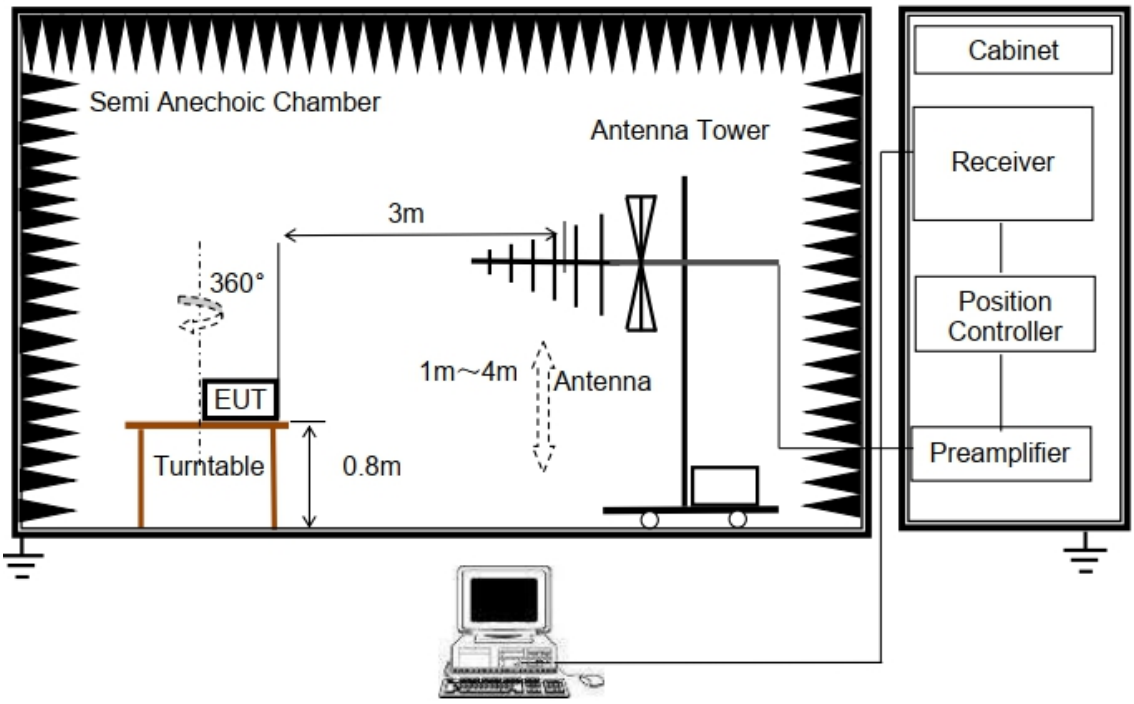


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.15	22.94	22.79	0.15	55.75	-32.81	Neutral	Average
2	0.15	43.94	43.79	0.15	65.75	-21.81	Neutral	QP
3	0.26	39.41	39.29	0.12	51.35	-11.94	Neutral	Average
4	0.26	46.41	46.29	0.12	61.35	-14.94	Neutral	QP
5	0.42	22.18	22.01	0.17	47.36	-25.18	Neutral	Average
6	0.42	30.18	30.01	0.17	57.36	-27.18	Neutral	QP
7	0.61	17.70	17.57	0.13	46.00	-28.30	Neutral	Average
8	0.61	23.70	23.57	0.13	56.00	-32.30	Neutral	QP
9	4.24	12.50	12.34	0.16	46.00	-33.50	Neutral	Average
10	4.24	21.50	21.34	0.16	56.00	-34.50	Neutral	QP
11	19.34	17.32	16.74	0.58	50.00	-32.68	Neutral	Average
12	19.34	26.32	25.74	0.58	60.00	-33.68	Neutral	QP

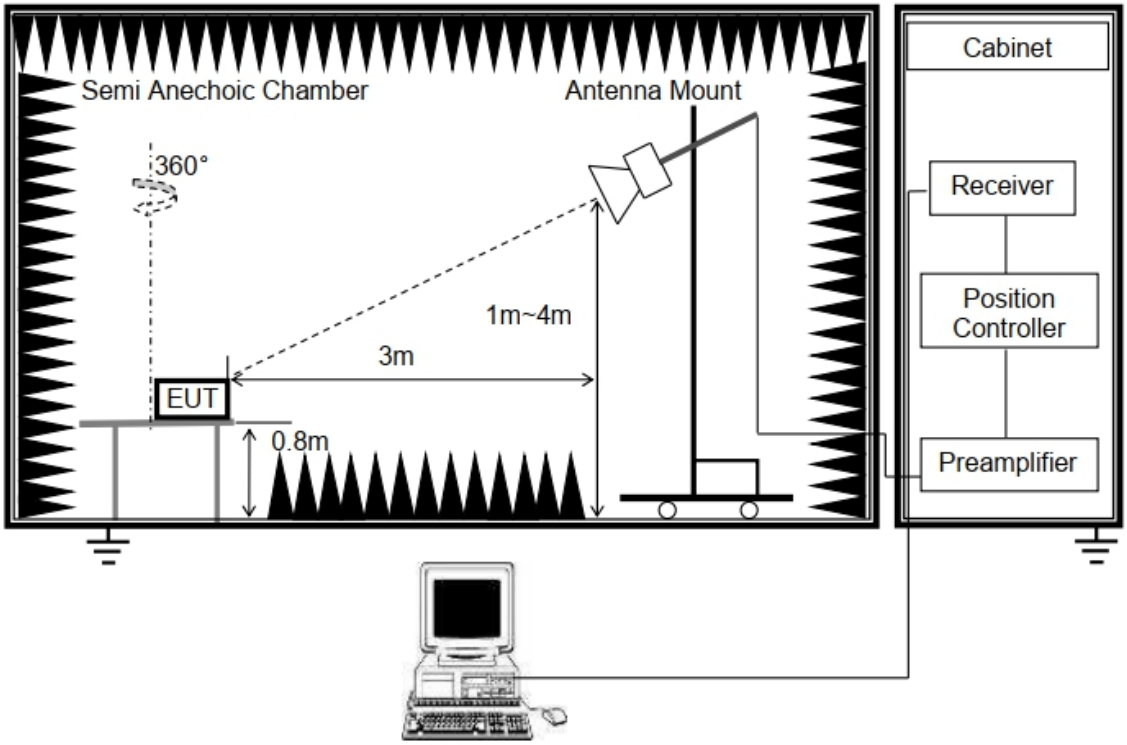
4. RADIATED EMISSION TEST

4.1.Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range 1GHz-25GHz



4.2.Radiated Emission Limit

15.209 limits

Below 1GHz

Frequency (MHz)	☐ Class A		☒ Class B
	Field strength (dBuV/m) (at 10m)	Field strength (dBuV/m) (at 3m)	Field strength (dBuV/m) (at 3m)
30 - 88	39	49	40
88 - 216	43.5	53.5	43.5
216 - 960	46	56	46
Above 960	49.5	59.5	54

Above 1 GHz

Frequency (MHz)	☐ Class A				☐ Class B	
	(dBuV/m) (at 3m)		(dBuV/m) (at 10m)		(dBuV/m) (at 3m)	
	Peak	Average	Peak	Average	Peak	Average
Above 1000	80	60	69.5	49.5	74	54

Frequency Range of Radiated Disturbance Measurement

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	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

Remark: (1) Emission level dBμV = 20 log Emission level μV/m

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

(3) 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

Frequency below 30MHz:
The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-2014 regulation.

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground for frequency 30MHz~1000MHz, 1.5 meter high above ground for frequency above 1GHz and put the absorbing with 2.4m(L)*2.4m(W)*0.3m(H) on the ground . The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it.EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna for frequency 30MHz~1000MHz, and the Horm antenna is used as receiving antenna for frequency above 1GHz. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission Test.

The bandwidth of the EMI test receiver (R&S ESR7) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

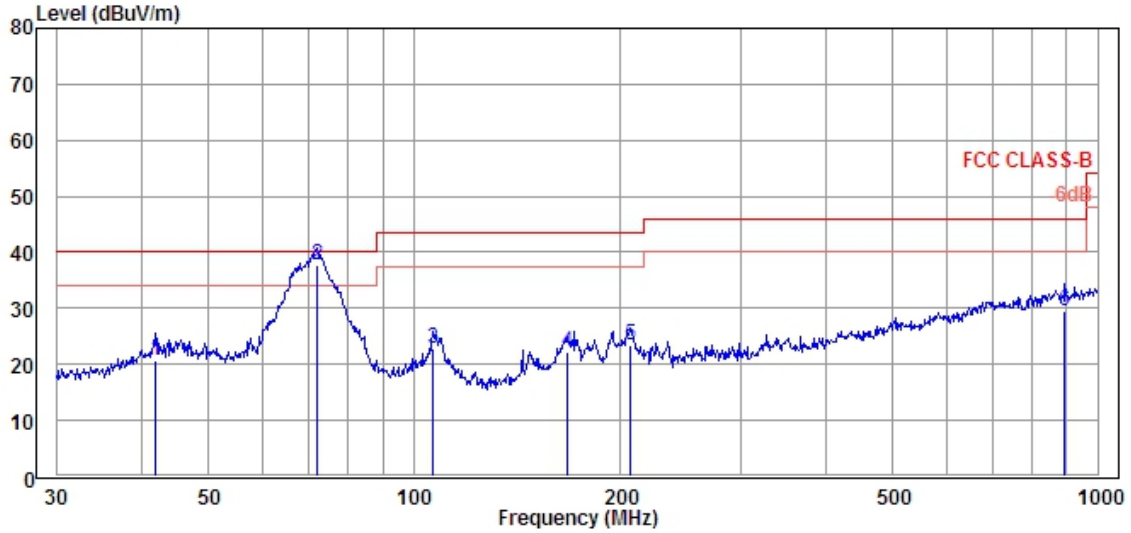
The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

4.4. Test Environment

Temperature:	24.6℃
Humidity:	49.2%
ATM pressure:	101kPa

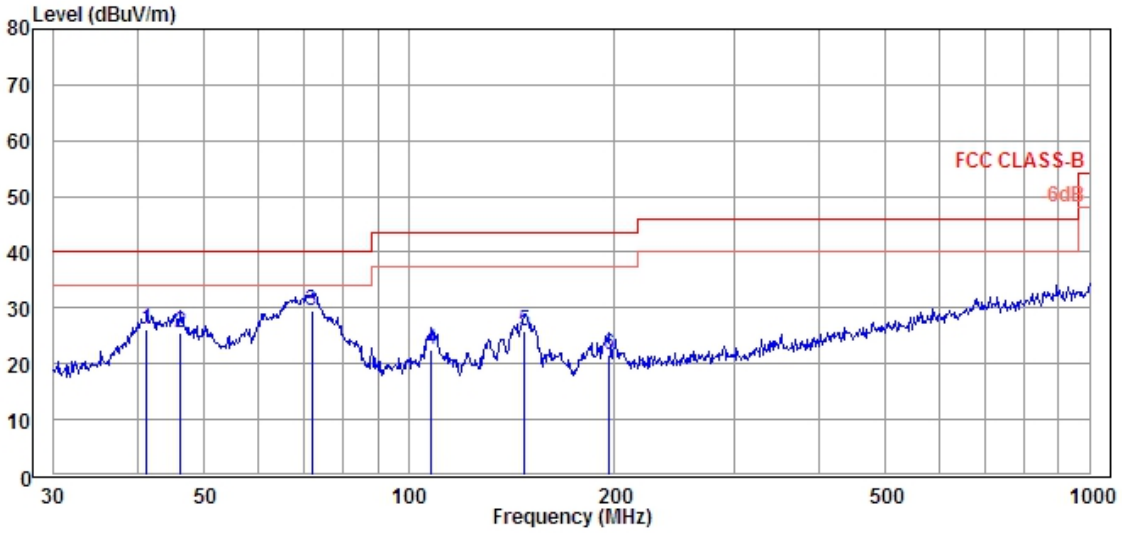
Frequency: 30MHz~1GHz

Test Model:	**ZF-G-BL-880A1-01**
Polarization:	**Horizontal**
Test Voltage	**AC 120V/60Hz**



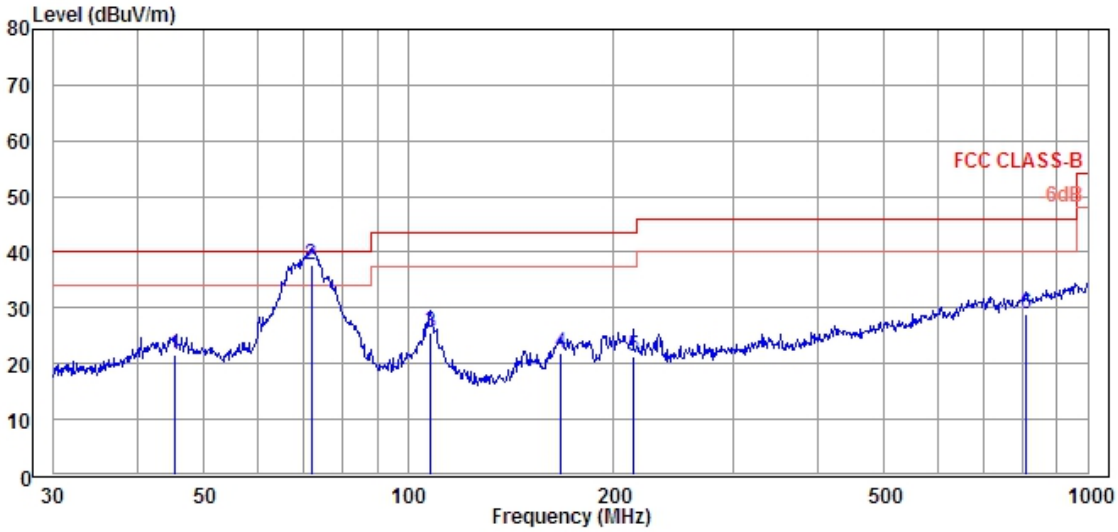
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB		
1	41.71	20.67	-1.53	22.20	40.00	-19.33	Horizontal	QP
2	72.08	37.58	20.90	16.68	40.00	-2.42	Horizontal	QP
3	106.39	22.76	2.23	20.53	43.50	-20.74	Horizontal	QP
4	167.24	22.06	4.93	17.13	43.50	-21.44	Horizontal	QP
5	207.12	23.48	3.66	19.82	43.50	-20.02	Horizontal	QP
6	893.86	29.48	-2.93	32.41	46.00	-16.52	Horizontal	QP

Test Model:	**ZF-G-BL-880A1-01**
Polarization:	**Vertical**
Test Voltage	**AC 120V/60Hz**



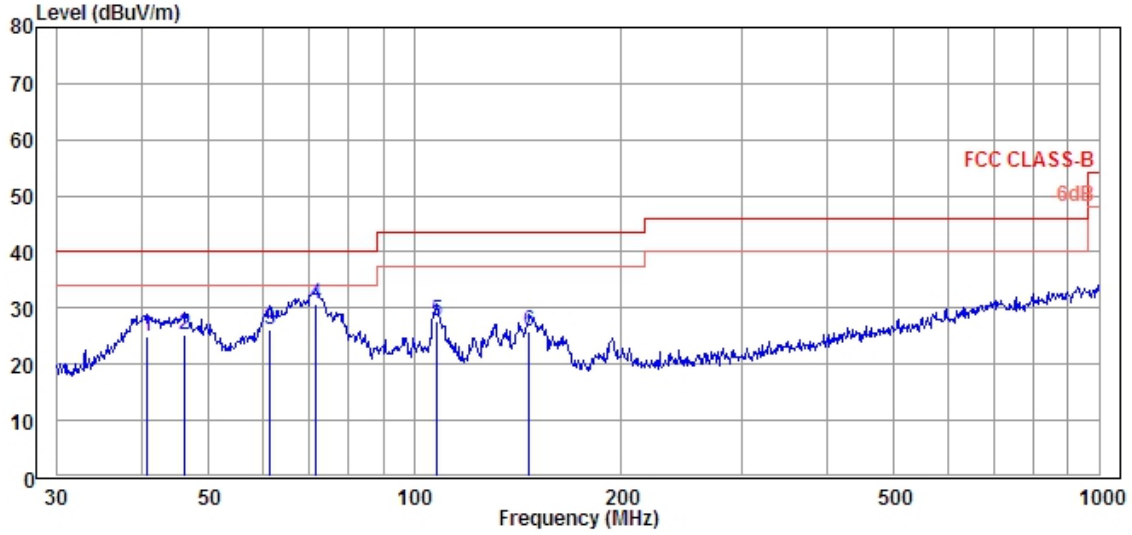
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB		
1	41.13	26.07	4.00	22.07	40.00	-13.93	Vertical	QP
2	46.18	25.50	2.64	22.86	40.00	-14.50	Vertical	QP
3	71.83	29.61	12.84	16.77	40.00	-10.39	Vertical	QP
4	107.89	22.40	1.95	20.45	43.50	-21.10	Vertical	QP
5	147.92	25.90	9.15	16.75	43.50	-17.60	Vertical	QP
6	196.51	21.70	1.48	20.22	43.50	-21.80	Vertical	QP

Test Model:	**ZF-G-BL-880A1-01**
Polarization:	**Horizontal**
Test Voltage	**AC 277V/60Hz**



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB		
1	45.22	21.73	-1.11	22.84	40.00	-18.27	Horizontal	QP
2	71.83	37.58	20.81	16.77	40.00	-2.42	Horizontal	QP
3	107.89	25.45	5.00	20.45	43.50	-18.05	Horizontal	QP
4	167.24	21.76	4.63	17.13	43.50	-21.74	Horizontal	QP
5	213.76	21.29	1.51	19.78	43.50	-22.21	Horizontal	QP
6	810.27	28.80	-2.99	31.79	46.00	-17.20	Horizontal	QP

Test Model:	**ZF-G-BL-880A1-01**
Polarization:	**Vertical**
Test Voltage	**AC 277V/60Hz**



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB		
1	40.70	24.85	2.87	21.98	40.00	-15.15	Vertical	QP
2	46.02	25.15	2.29	22.86	40.00	-14.85	Vertical	QP
3	61.35	26.29	5.75	20.54	40.00	-13.71	Vertical	QP
4	71.58	30.58	13.71	16.87	40.00	-9.42	Vertical	QP
5	107.89	27.83	7.38	20.45	43.50	-15.67	Vertical	QP
6	146.89	25.92	9.16	16.76	43.50	-17.58	Vertical	QP

``End of Report``

FCC LABELING AND INSTRUCTION MANUAL REQUIREMENTS

A device subject to Supplier's Declaration of Conformity shall bear the following statement in a conspicuous location on the device. The label can be affixed at any space external to the product except the battery door or detachable parts.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

In addition, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- **Reorient or relocate the receiving antenna.**
- **Increase the separation between the equipment and receiver.**
- **Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.**
- **Consult the dealer or an experienced radio/ TV technician for help.**