

APPLICATION CERTIFICATION FCC Part 15C

On Behalf of
Elec-Tech International Co., Ltd.

LED Horticultural Luminaire
Model No.: 554021XX(XX=00~99)

FCC ID: XZH-5540312018

Prepared for : Elec-Tech International Co., Ltd.
Address : No.1 Jinfeng Road, Tangjiawan Town, Xiangzhou Dist, Zhuhai
City, Guangdong Province, China

Prepared by : Shenzhen Accurate Technology Co., Ltd.
Address : 1/F., Building A, Changyuan New Material Port, Science & Industry
Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: (0755) 26503290
Fax: (0755) 26503396

Report No. : ATE20180949 002
Date of Test : May 24, 2018
Date of Report of Rev. 1 : June 8, 2018
Date of Report of Rev. 2 : June 8, 2018

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Test Report Certification

Applicant : Elec-Tech International Co., Ltd.
 Manufacturer : ETI Solid State Lighting (Zhuhai) Ltd
 EUT Description : LED Horticultural Luminaire
 Model No. : 554021XX(XX=00~99)
 Trade Name : ETI, Commercial Electric, Hampton Bay

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247 ANSI C63.10: 2013

The EUT was tested according to DTS test procedure of Apr 05, 2017 KDB558074 D01 DTS Meas Guidance v04 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by Shenzhen Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and Shenzhen Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Accurate Technology Co., Ltd.

Date of Test :	May 24, 2018
Date of Report of Rev. 1:	June 8, 2018
Date of Report of Rev. 2:	June 8, 2018

Prepared by :



(Bao Wang, Engineer)

Approved & Authorized Signer :



(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : LED Horticultural Luminaire
 Model Number : 554021XX(XX=00~99)
 (Note: XX = 00-99, which represents different LED color temperature, Therefore only model 55402101 is tested for EMC tests.)
 Modulation Type : ZigBee
 Frequency Range : 2405-2480MHz
 Number of Channels : 16
 Channel Spacing : 5 MHz
 Antenna Gain : 0dBi
 Antenna Type : Ceramic Antenna
 Rating : AC 120-277V; 50/60Hz, 250W for all models
 Applicant : Elec-Tech International Co., Ltd.
 Address : No.1 Jinfeng Road, Tangjiawan Town, Xiangzhou Dist, Zhuhai City, Guangdong Province, China

 Manufacturer : ETI Solid State Lighting (Zhuhai) Ltd
 Address : No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City, Guangdong Prov., China
 Date of sample receiver : May 20, 2018
 Date of Test : May 24, 2018
 Sample No. : 1800769

1.2. Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	17	2435	23	2465
12	2410	18	2440	24	2470
13	2415	19	2445	25	2475
14	2420	20	2450	26	2480
15	2425	21	2455		
16	2430	22	2460		

1.3.Special Accessory and Auxiliary Equipment

N/A

1.4.Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISED) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.5.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

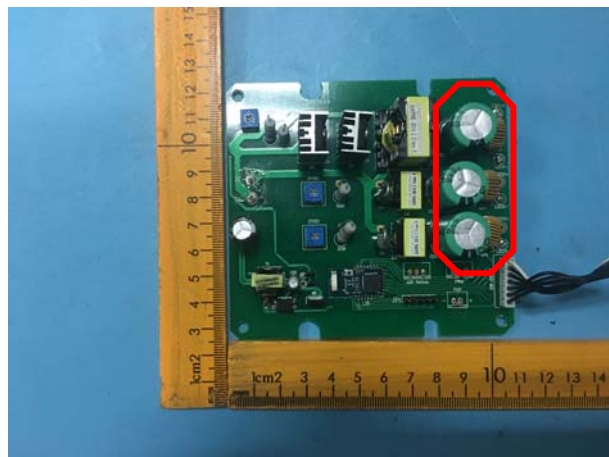
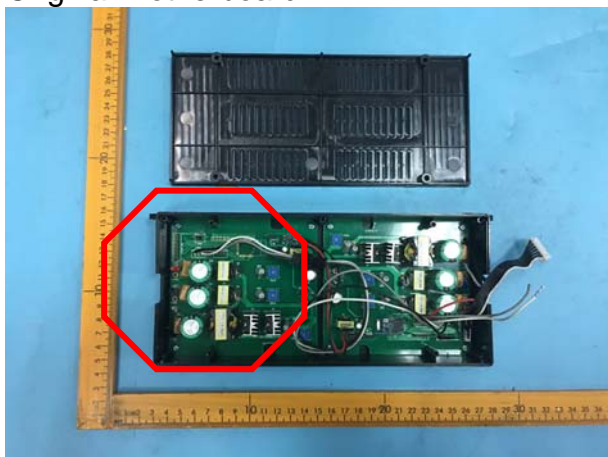
2. DESCRIPTION OF VERSION

Edition No.	Date of Rev.	Summary	Report No.
REV.1	June 8, 2018	Original Report	ATE20180949
REV.2	June 8, 2018	Replace Model and motherboard	ATE20180949 002

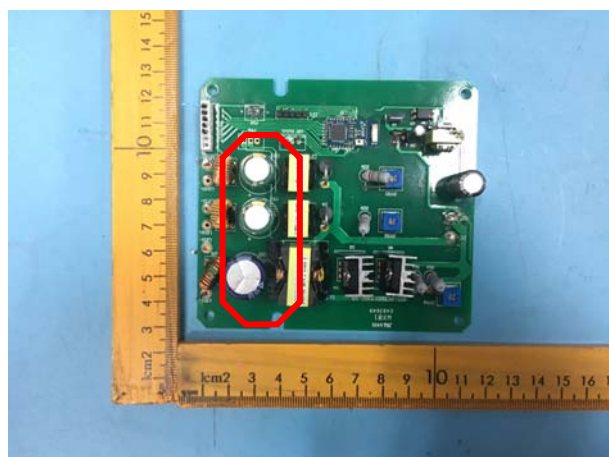
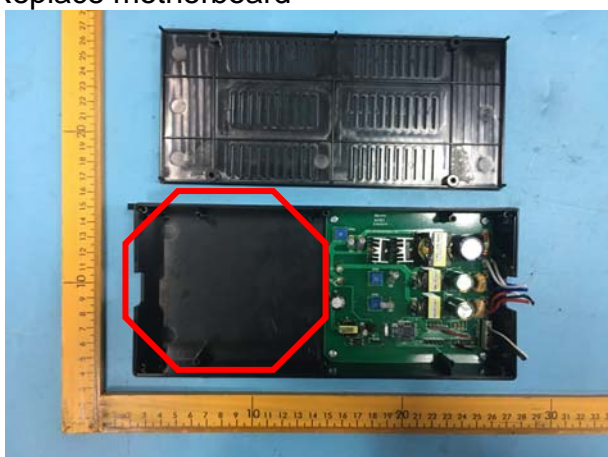
Remark for Rev. 2

1. This report is an additional version with original report number ATE20180949. The different with original report please see the above table of REV.2.
2. Compared with the original report ATE20180949, sample of the new provision is exactly the same as the old one. Through evaluation of the above difference, Conducted Emission and Radiated emission (Below 1GHz) is need to retest, portion test data and test pictures would refer to ATE20180949.
3. This report is based on report of ATE20180949.
4. For testing items not reflected in this report, Please refer to the original report.

Original motherboard



Replace motherboard



Note: The Capacitance and power of two motherboards are differently.

3. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 06, 2018	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 06, 2018	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 06, 2018	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 06, 2018	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 06, 2018	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 06, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 06, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 06, 2018	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 06, 2018	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 06, 2018	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10S S	N/A	Jan. 06, 2018	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2 375/2510-60/11SS	N/A	Jan. 06, 2018	1 Year
RF COAXIAL CABLE	SUHNER	N-5m(Frequency range:9KHz-26.5GHz)	NO.3	Jan. 06, 2018	1 Year
RF COAXIAL CABLE	SUHNER	N-5m(Frequency range:9KHz-26.5GHz)	NO.4	Jan. 06, 2018	1 Year
RF COAXIAL CABLE	SUHNER	N-1m(Frequency range:9KHz-26.5GHz)	NO.5	Jan. 06, 2018	1 Year
RF COAXIAL CABLE	SUHNER	N-1m(Frequency range:9KHz-26.5GHz)	NO.6	Jan. 06, 2018	1 Year
Temporary antenna connector	NTGS	14AE	N/A	May 22, 2018	N/A

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

4. OPERATION OF EUT DURING TESTING

4.1.Operating Mode

The mode is used: **Transmitting mode**

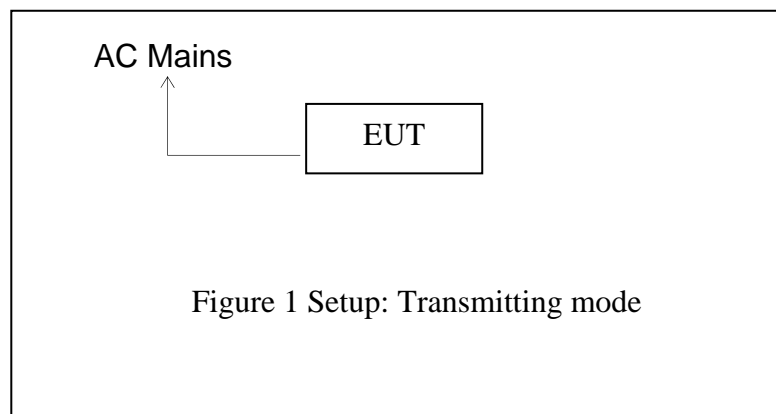
Low Channel: 2405MHz

Middle Channel: 2445MHz

High Channel: 2480MHz

Note: Its duty cycle setting is greater than 98%.

4.2.Configuration and peripherals



5. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(2)	6dB Bandwidth Test	refer to the original report
Section 15.247(e)	Power Spectral Density Test	refer to the original report
Section 15.247(b)(3)	Maximum Peak Output Power Test	refer to the original report
Section 15.247(d)	Band Edge Compliance Test	refer to the original report
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	refer to the original report(Above 1GHz test data)
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	refer to the original report

Shenzhen Accurate Technology Co., Ltd.

6.2.Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μ V)	
	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.		
NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

6.3.Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in test mode and measure it.

6.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines 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 C63.10 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

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

6.6.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dB μ V)	Average Level (dB μ V)	QuasiPeak Limit (dB μ V)	Average Limit (dB μ V)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
XX.XXXX	10.7	40.50	30.20	57.0	47.0	16.2	16.5	Pass

Frequency(MHz) = Emission frequency in MHz

Transducer value(dB) = Insertion loss of LISN + Cable Loss

Level(dB μ V) = Quasi-peak Reading/Average Reading + Transducer value

Limit (dB μ V) = Limit stated in standard

Margin = Limit (dB μ V) - Level (dB μ V)

Calculation Formula:

Margin = Limit (dB μ V) - Level (dB μ V)

6.7.Power Line Conducted Emission Measurement Results

PASS.

Test Lab: Shielding room

Test Engineer: Bob

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

Test mode : On(AC 120V/60Hz)								
EUT mode : 55402101								
MEASUREMENT RESULT: "950-07_fin"								
2018-5-24 10:07								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.172000	47.30	10.8	65	17.6	QP	N	GND	
0.432000	35.40	11.0	57	21.8	QP	N	GND	
1.290000	29.00	11.2	56	27.0	QP	N	GND	
4.650000	44.00	11.4	56	12.0	QP	N	GND	
5.145000	39.40	11.4	60	20.6	QP	N	GND	
20.515000	26.00	11.7	60	34.0	QP	N	GND	
MEASUREMENT RESULT: "950-07_fin2"								
2018-5-24 10:07								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.174000	38.20	10.8	55	16.6	AV	N	GND	
0.438000	30.20	11.0	47	16.9	AV	N	GND	
0.972000	22.80	11.1	46	23.2	AV	N	GND	
4.650000	36.70	11.4	46	9.3	AV	N	GND	
5.150000	32.60	11.4	50	17.4	AV	N	GND	
20.630000	17.90	11.7	50	32.1	AV	N	GND	
MEASUREMENT RESULT: "950-08_fin"								
2018-5-24 10:09								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.172000	47.60	10.8	65	17.3	QP	L1	GND	
0.444000	31.90	11.0	57	25.1	QP	L1	GND	
1.744000	25.90	11.2	56	30.1	QP	L1	GND	
4.665000	41.70	11.4	56	14.3	QP	L1	GND	
5.150000	37.30	11.4	60	22.7	QP	L1	GND	
21.985000	26.40	11.7	60	33.6	QP	L1	GND	
MEASUREMENT RESULT: "950-08_fin2"								
2018-5-24 10:09								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.172000	36.80	10.8	55	18.1	AV	L1	GND	
0.436000	26.60	11.0	47	20.5	AV	L1	GND	
1.210000	19.20	11.2	46	26.8	AV	L1	GND	
4.700000	34.40	11.4	46	11.6	AV	L1	GND	
5.200000	29.80	11.4	50	20.2	AV	L1	GND	
21.640000	19.30	11.7	50	30.7	AV	L1	GND	

Test mode : On(AC 277V/60Hz)

EUT mode : 55402101

MEASUREMENT RESULT: "950-03_fin"

2018-5-24 9:41

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	41.40	10.8	66	24.6	QP	L1	GND
0.588000	29.30	11.0	56	26.7	QP	L1	GND
1.274000	25.00	11.2	56	31.0	QP	L1	GND
4.615000	40.60	11.4	56	15.4	QP	L1	GND
5.140000	36.90	11.4	60	23.1	QP	L1	GND
21.190000	25.80	11.7	60	34.2	QP	L1	GND

MEASUREMENT RESULT: "950-03_fin2"

2018-5-24 9:41

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	35.70	10.8	56	20.3	AV	L1	GND
0.424000	22.00	11.0	47	25.4	AV	L1	GND
1.120000	17.90	11.2	46	28.1	AV	L1	GND
4.685000	33.60	11.4	46	12.4	AV	L1	GND
5.135000	30.30	11.4	50	19.7	AV	L1	GND
21.620000	19.10	11.7	50	30.9	AV	L1	GND

MEASUREMENT RESULT: "950-05_fin"

2018-5-24 9:53

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	51.00	10.8	66	15.0	QP	N	GND
0.732000	31.80	11.1	56	24.2	QP	N	GND
1.232000	26.10	11.2	56	29.9	QP	N	GND
4.515000	42.70	11.4	56	13.3	QP	N	GND
5.145000	46.90	11.4	60	13.1	QP	N	GND
20.680000	18.90	11.7	60	41.1	QP	N	GND

MEASUREMENT RESULT: "950-05_fin2"

2018-5-24 9:53

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	38.00	10.8	56	18.0	AV	N	GND
0.570000	17.70	11.0	46	28.3	AV	N	GND
0.906000	18.20	11.1	46	27.8	AV	N	GND
4.605000	36.00	11.4	46	10.0	AV	N	GND
5.135000	32.00	11.4	50	18.0	AV	N	GND
21.090000	6.20	11.7	50	43.8	AV	N	GND

Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are attached as below.

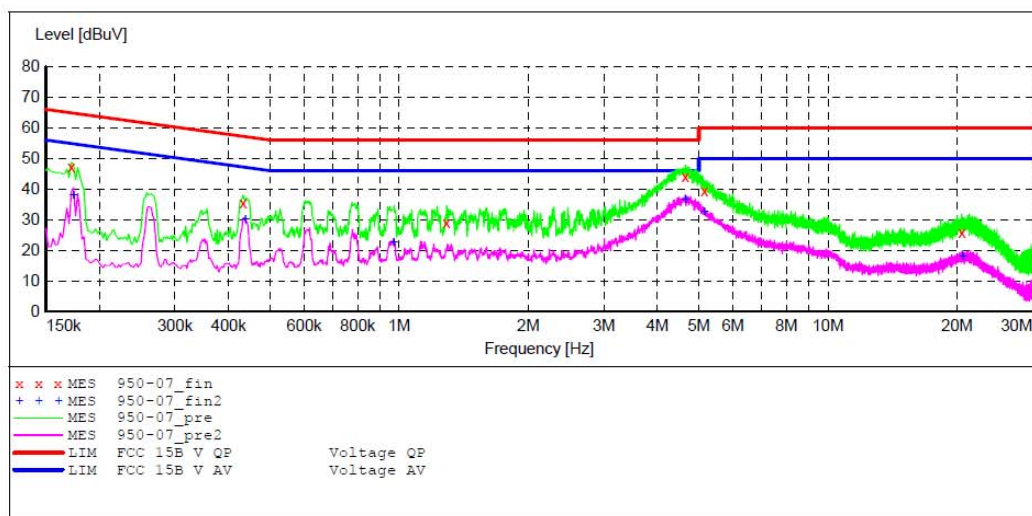
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: LED Horticultural Luminaire M/N:55402101
 Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd
 Operating Condition: On
 Test Site: 2#Shielding Room
 Operator: KEVIN
 Test Specification: N 120V/60Hz
 Comment: Report NO.:ATE20180949 002
 Start of Test: 2018-5-24 / 10:05:43

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "950-07_fin"

2018-5-24 10:07

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.172000	47.30	10.8	65	17.6	QP	N	GND
0.432000	35.40	11.0	57	21.8	QP	N	GND
1.290000	29.00	11.2	56	27.0	QP	N	GND
4.650000	44.00	11.4	56	12.0	QP	N	GND
5.145000	39.40	11.4	60	20.6	QP	N	GND
20.515000	26.00	11.7	60	34.0	QP	N	GND

MEASUREMENT RESULT: "950-07_fin2"

2018-5-24 10:07

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.174000	38.20	10.8	55	16.6	AV	N	GND
0.438000	30.20	11.0	47	16.9	AV	N	GND
0.972000	22.80	11.1	46	23.2	AV	N	GND
4.650000	36.70	11.4	46	9.3	AV	N	GND
5.150000	32.60	11.4	50	17.4	AV	N	GND
20.630000	17.90	11.7	50	32.1	AV	N	GND

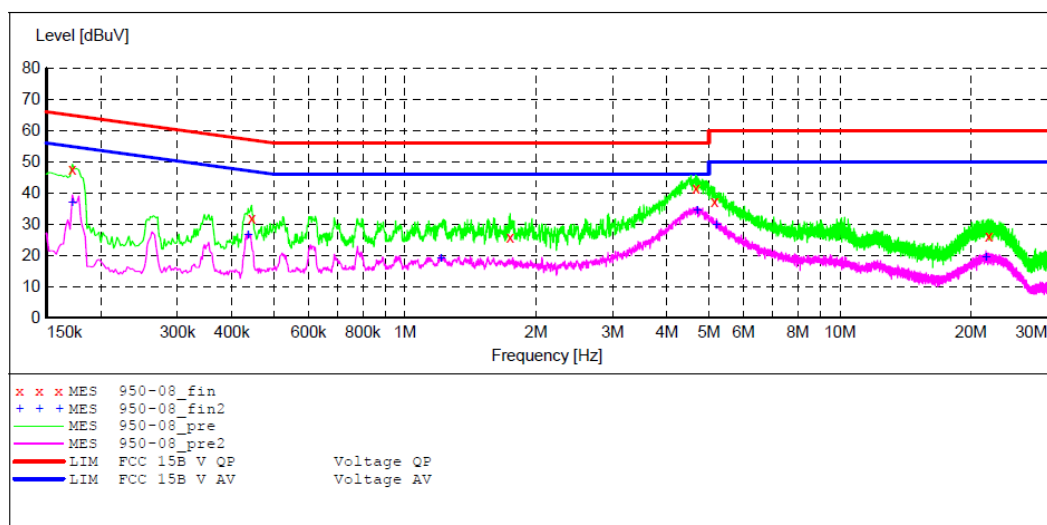
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: LED Horticultural Luminaire M/N:55402101
 Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd
 Operating Condition: On
 Test Site: 2#Shielding Room
 Operator: KEVIN
 Test Specification: L 120V/60Hz
 Comment: Report NO.:ATE20180949 002
 Start of Test: 2018-5-24 / 10:07:51

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "950-08_fin"

2018-5-24 10:09

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.172000	47.60	10.8	65	17.3	QP	L1	GND
0.444000	31.90	11.0	57	25.1	QP	L1	GND
1.744000	25.90	11.2	56	30.1	QP	L1	GND
4.665000	41.70	11.4	56	14.3	QP	L1	GND
5.150000	37.30	11.4	60	22.7	QP	L1	GND
21.985000	26.40	11.7	60	33.6	QP	L1	GND

MEASUREMENT RESULT: "950-08_fin2"

2018-5-24 10:09

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.172000	36.80	10.8	55	18.1	AV	L1	GND
0.436000	26.60	11.0	47	20.5	AV	L1	GND
1.210000	19.20	11.2	46	26.8	AV	L1	GND
4.700000	34.40	11.4	46	11.6	AV	L1	GND
5.200000	29.80	11.4	50	20.2	AV	L1	GND
21.640000	19.30	11.7	50	30.7	AV	L1	GND

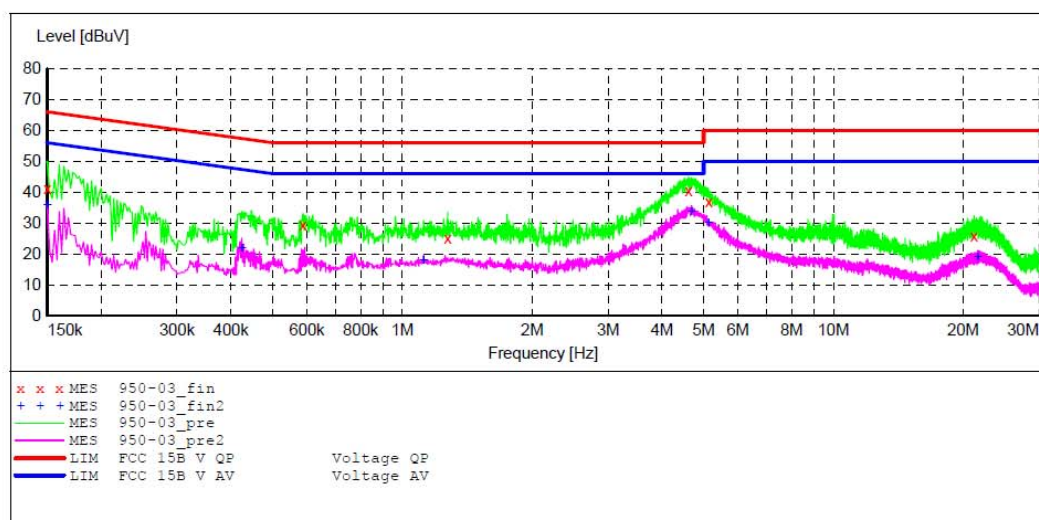
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: LED Horticultural Luminaire M/N:55402101
 Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd
 Operating Condition: On
 Test Site: 2#Shielding Room
 Operator: KEVIN
 Test Specification: L 277V/60Hz
 Comment: Report NO.:ATE20180949 002
 Start of Test: 2018-5-24 / 9:39:13

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "950-03_fin"

2018-5-24 9:41

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	41.40	10.8	66	24.6	QP	L1	GND
0.588000	29.30	11.0	56	26.7	QP	L1	GND
1.274000	25.00	11.2	56	31.0	QP	L1	GND
4.615000	40.60	11.4	56	15.4	QP	L1	GND
5.140000	36.90	11.4	60	23.1	QP	L1	GND
21.190000	25.80	11.7	60	34.2	QP	L1	GND

MEASUREMENT RESULT: "950-03_fin2"

2018-5-24 9:41

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	35.70	10.8	56	20.3	AV	L1	GND
0.424000	22.00	11.0	47	25.4	AV	L1	GND
1.120000	17.90	11.2	46	28.1	AV	L1	GND
4.685000	33.60	11.4	46	12.4	AV	L1	GND
5.135000	30.30	11.4	50	19.7	AV	L1	GND
21.620000	19.10	11.7	50	30.9	AV	L1	GND

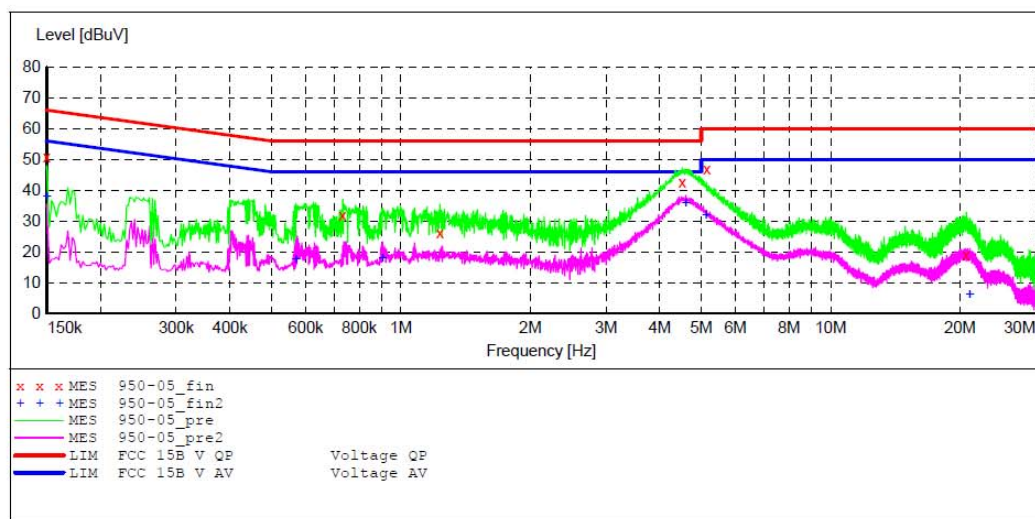
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: LED Horticultural Luminaire M/N:55402101
 Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd
 Operating Condition: On
 Test Site: 2#Shielding Room
 Operator: KEVIN
 Test Specification: N 277V/60Hz
 Comment: Report NO.:ATE20180949 002
 Start of Test: 2018-5-24 / 9:52:36

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "950-05_fin"

2018-5-24 9:53

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	51.00	10.8	66	15.0	QP	N	GND
0.732000	31.80	11.1	56	24.2	QP	N	GND
1.232000	26.10	11.2	56	29.9	QP	N	GND
4.515000	42.70	11.4	56	13.3	QP	N	GND
5.145000	46.90	11.4	60	13.1	QP	N	GND
20.680000	18.90	11.7	60	41.1	QP	N	GND

MEASUREMENT RESULT: "950-05_fin2"

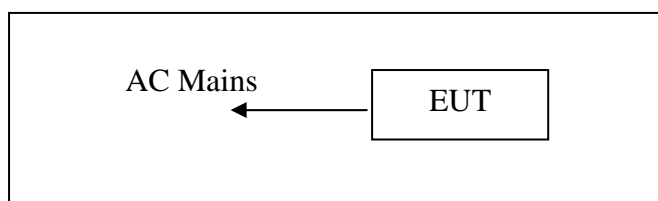
2018-5-24 9:53

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	38.00	10.8	56	18.0	AV	N	GND
0.570000	17.70	11.0	46	28.3	AV	N	GND
0.906000	18.20	11.1	46	27.8	AV	N	GND
4.605000	36.00	11.4	46	10.0	AV	N	GND
5.135000	32.00	11.4	50	18.0	AV	N	GND
21.090000	6.20	11.7	50	43.8	AV	N	GND

7. RADIATED SPURIOUS EMISSION TEST

7.1. Block Diagram of Test Setup

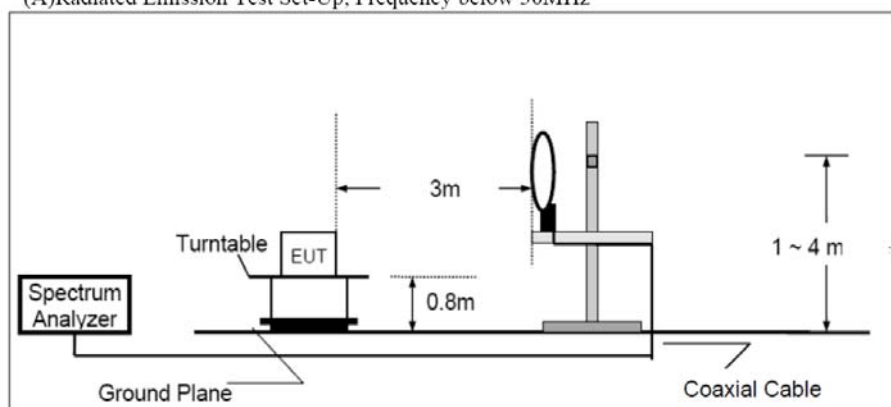
7.1.1. Block diagram of connection between the EUT and peripherals



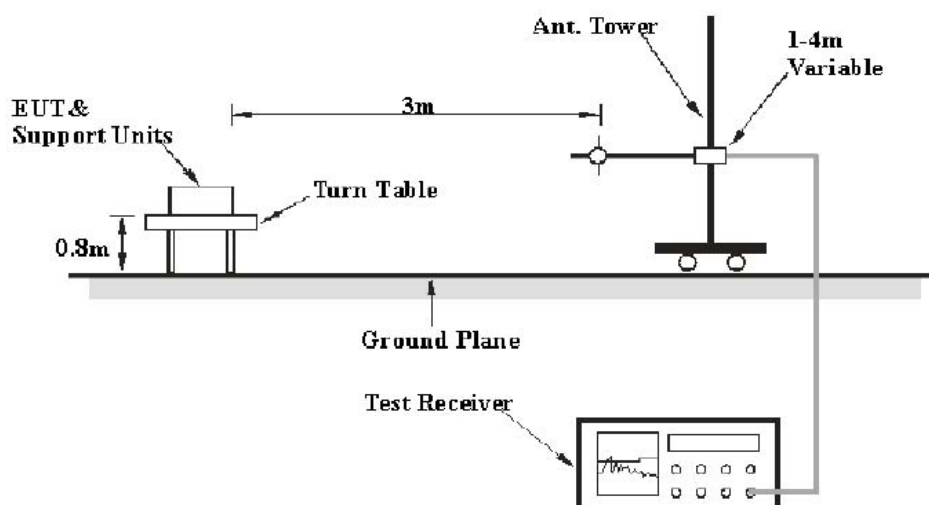
Setup: Transmitting mode

7.1.2. Semi-Anechoic Chamber Test Setup Diagram

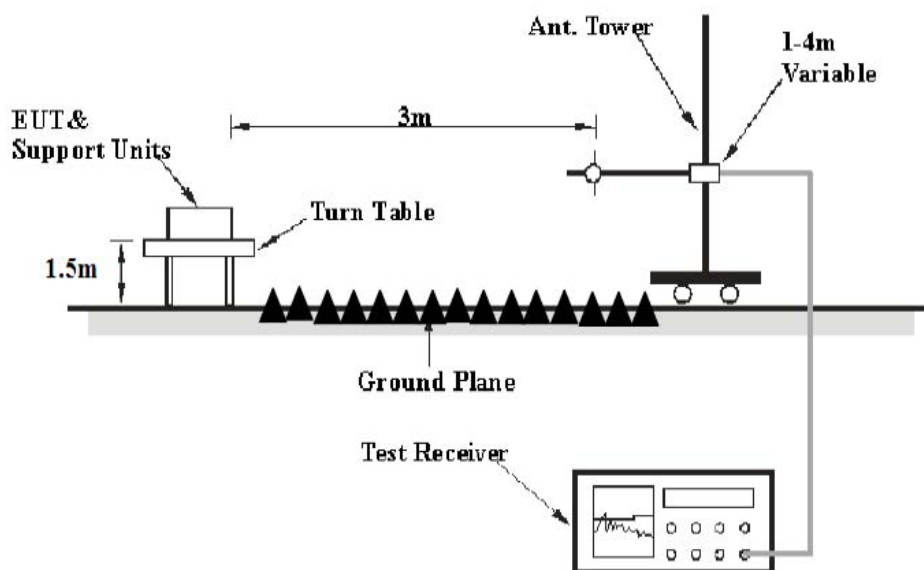
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency 30MHz-1GHz



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



7.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

7.3. Restricted bands of operation

7.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510

²Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

7.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.5. Operating Condition of EUT

7.5.1. Setup the EUT and simulator as shown as Section 9.1.

7.5.2. Turn on the power of all equipment.

7.5.3. Let the EUT work in TX modes measure it. The transmit frequency are 2405-2480MHz. We select 2405MHz, 2445MHz, and 2480MHz TX frequency to transmit.

7.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground (Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground (Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. This EUT was tested in 3 orthogonal positions and the worst case position data was reported.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector. The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading.

7.7.Data Sample

Frequency (MHz)	Reading (dB μ v)	Factor (dB/m)	Result (dB μ v/m)	Limit (dB μ v/m)	Margin (dB)	Remark
X.XX	43.85	-22.22	21.63	43.5	-21.87	QP

Frequency(MHz) = Emission frequency in MHz

Reading(dB μ v) = Uncorrected Analyzer/Receiver reading

Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain

Result(dB μ v/m) = Reading(dB μ v) + Factor(dB/m)

Limit (dB μ v/m) = Limit stated in standard

Margin (dB) = Result(dB μ v/m) - Limit (dB μ v/m)

QP = Quasi-peak Reading

Calculation Formula:

Margin(dB) = Result (dB μ V/m)–Limit(dB μ V/m)

Result(dB μ V/m)= Reading(dB μ V)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

7.8.The Field Strength of Radiation Emission Measurement Results

Pass.

Test Lab: 3m Anechoic chamber

Test Engineer: Bob

The frequency range from 9kHz to 26.5GHz is checked.

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The radiation emissions from 9kHz-30MHz and 18-26.5GHz are not reported, because the test values lower than the limits of 20dB.

4. Above 1GHz test data please refer to the original report.

The spectrum analyzer plots are attached as below.

Below 1GHz



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: NTC #848

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: LED Horticultural Luminaire

Mode: TX 2405MHz

Model: 55402101

Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

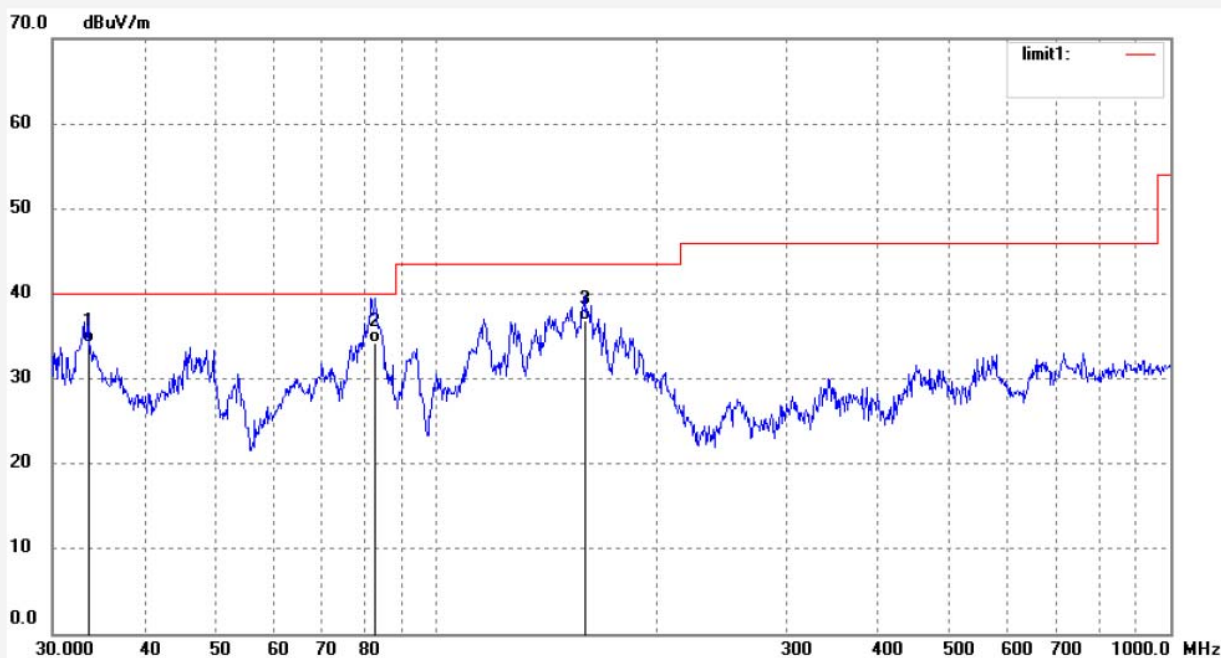
Date: 18/05/24/

Time: 13/01/20

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180949 002



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	33.5624	44.28	-9.99	34.29	40.00	-5.71	QP	200	136	
2	82.4462	50.22	-15.92	34.30	40.00	-5.70	QP	200	113	
3	159.2247	51.29	-14.51	36.78	43.50	-6.72	QP	200	47	



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: NTC #849

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: LED Horticultural Luminaire

Mode: TX 2405MHz

Model: 55402101

Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

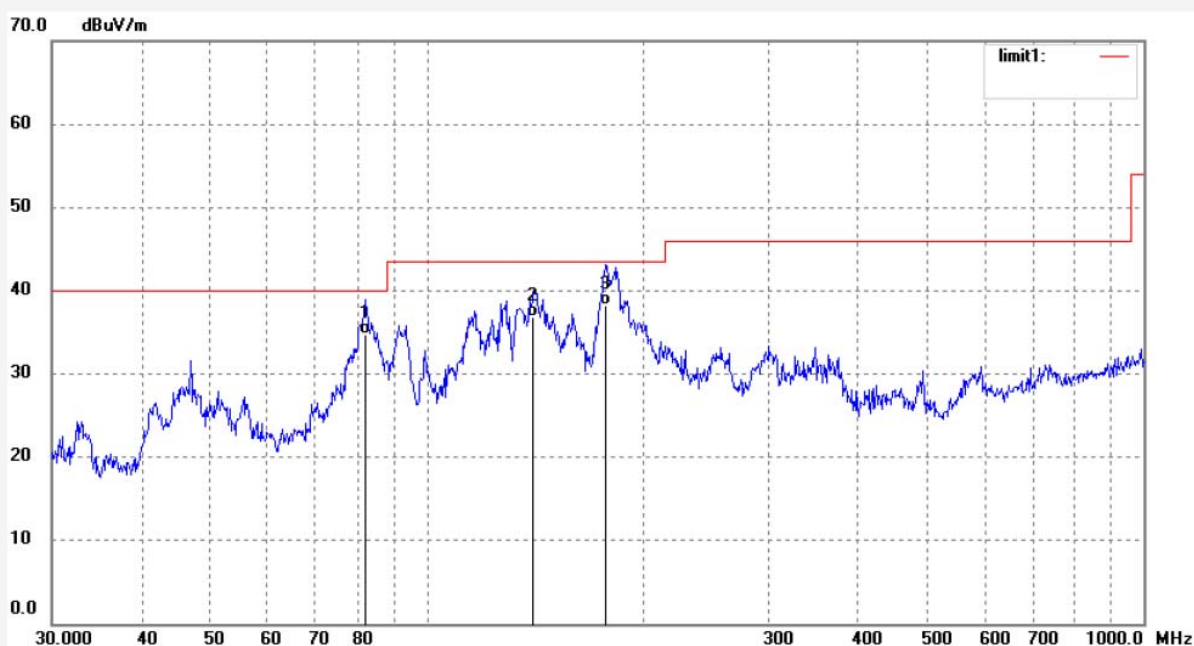
Date: 18/05/24/

Time: 13/05/10

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180949 002



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	82.6096	50.68	-15.88	34.80	40.00	-5.20	QP	200	13	
2	140.8351	51.95	-15.13	36.82	43.50	-6.68	QP	200	103	
3	176.9569	51.72	-13.42	38.30	43.50	-5.20	QP	200	214	



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: NTC #850

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: LED Horticultural Luminaire

Mode: TX 2445MHz

Model: 55402101

Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

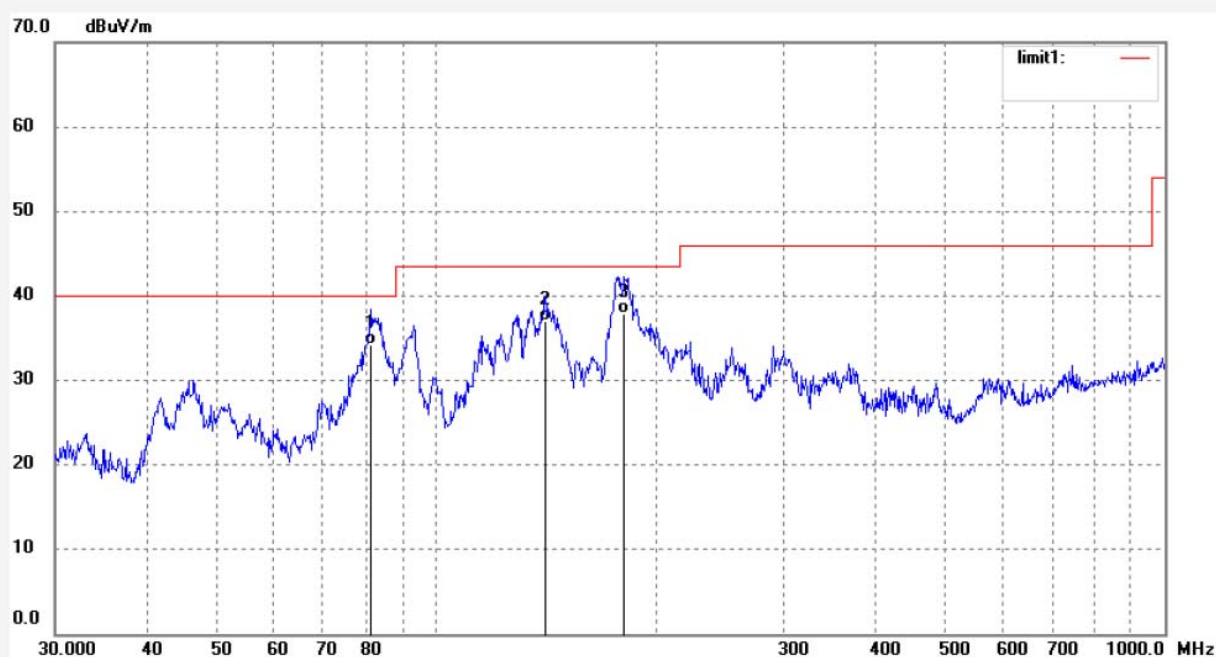
Date: 18/05/24/

Time: 13/13/08

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180949 002



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	81.7789	50.37	-16.07	34.30	40.00	-5.70	QP	200	106	
2	141.3298	52.21	-15.13	37.08	43.50	-6.42	QP	200	164	
3	181.5537	50.98	-13.08	37.90	43.50	-5.60	QP	200	133	

Job No.: NTC #851

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: LED Horticultural Luminaire

Mode: TX 2445MHz

Model: 55402101

Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

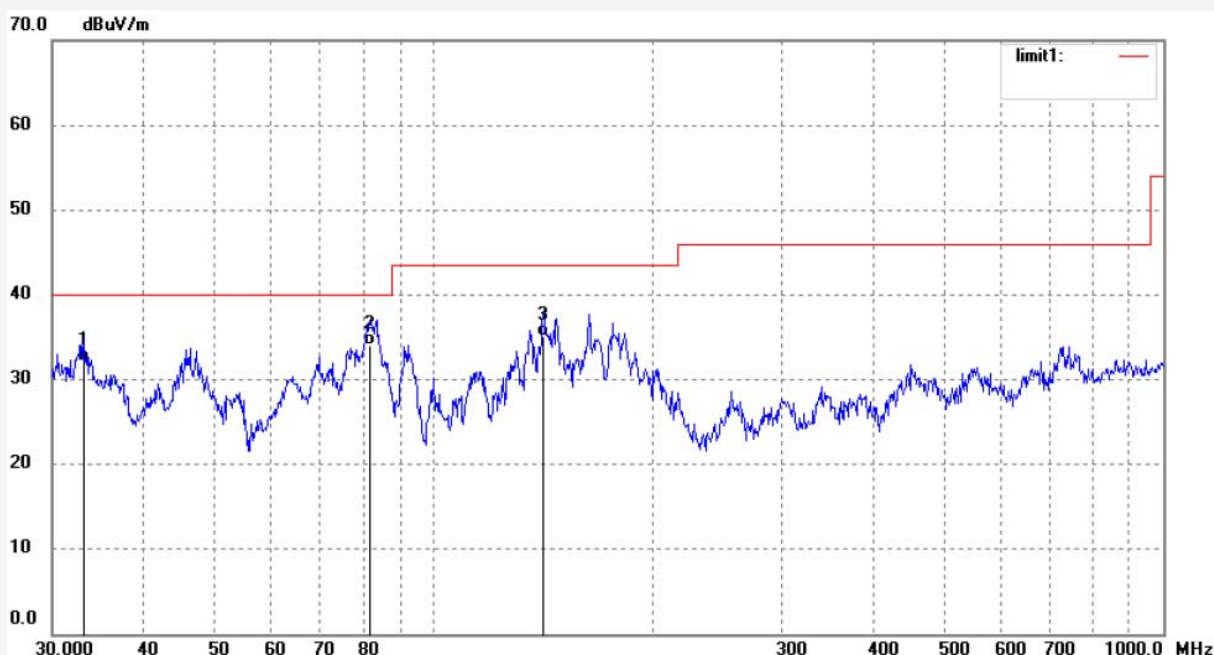
Date: 18/05/24/

Time: 13/17/48

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180949 002



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	33.0950	41.94	-9.86	32.08	40.00	-7.92	QP	200	222	
2	81.7833	50.15	-16.07	34.08	40.00	-5.92	QP	200	301	
3	141.3298	50.26	-15.13	35.13	43.50	-8.37	QP	200	164	

Job No.: NTC #852

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: LED Horticultural Luminaire

Mode: TX 2480MHz

Model: 55402101

Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

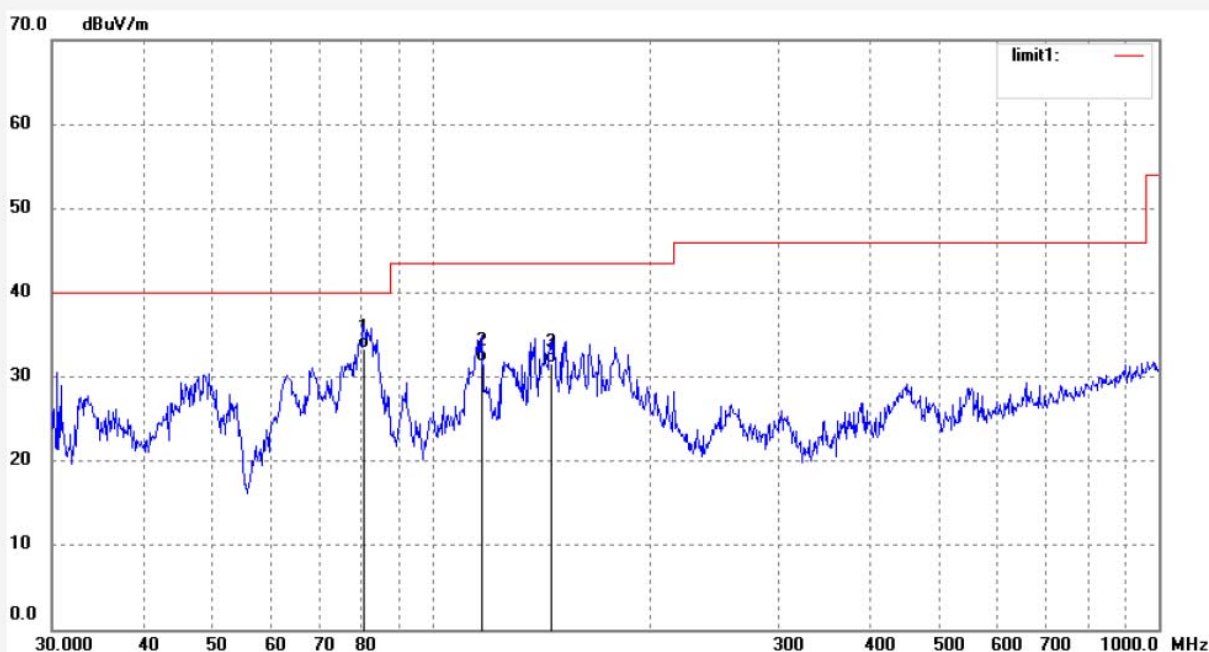
Date: 18/05/24/

Time: 13/20/00

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180949 002



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	80.6442	49.68	-16.31	33.37	40.00	-6.63	QP	200	111	
2	117.3603	44.92	-13.07	31.85	43.50	-11.65	QP	200	201	
3	145.8608	46.75	-15.09	31.66	43.50	-11.84	QP	200	146	



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: NTC #853

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: LED Horticultural Luminaire

Mode: TX 2480MHz

Model: 55402101

Manufacturer: ETI Solid State Lighting (Zhuhai) Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

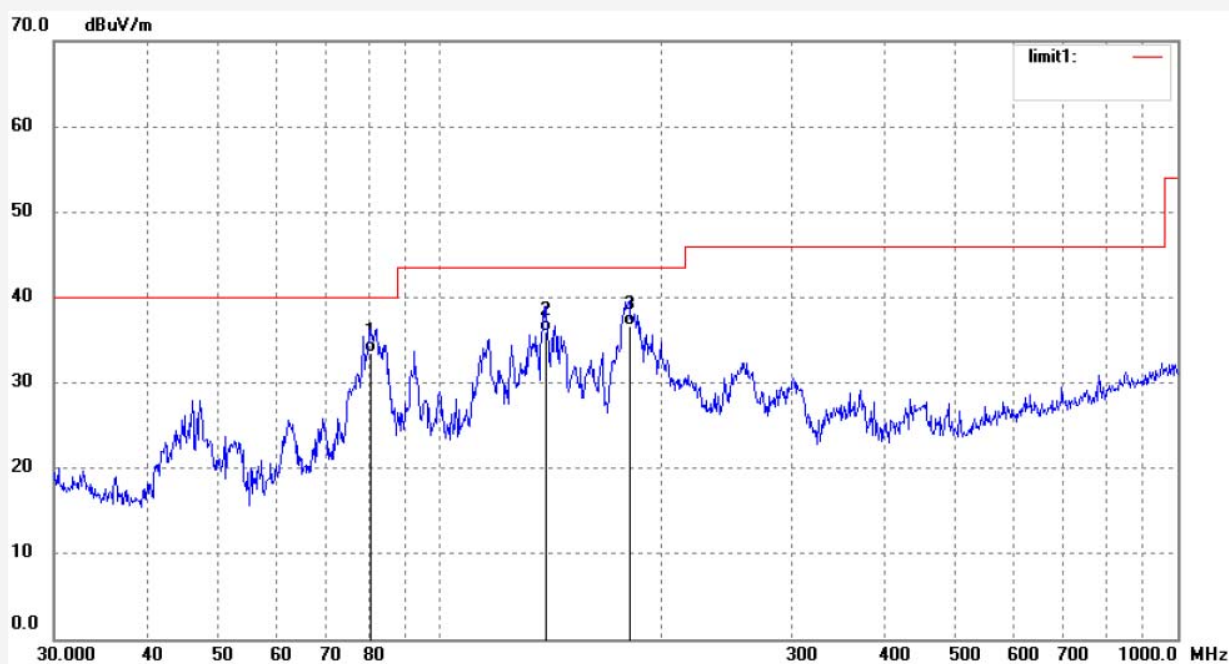
Date: 18/05/24/

Time: 13/22/13

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180949 002



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	80.6442	49.75	-16.31	33.44	40.00	-6.56	QP	200	14	
2	139.3613	50.92	-14.97	35.95	43.50	-7.55	QP	200	147	
3	180.6488	49.95	-13.22	36.73	43.50	-6.77	QP	200	222	

***** End of Test Report *****