EMC TEST REPORT

EN 55015: 2013/A1:2015
EN 61547: 2009
EN 61000-3-2: 2014
EN 61000-3-3: 2013
MEASUREMENT AND TEST REPORT

For

Guangzhou BaoLun Electronics Co., Ltd.
NO.1 Building B Block Zhongcun Street Panyu Guangzhou China

Models:
TL-YSD0-01,TL-YSD0-02,TL-YSD0-03,TL-YSD0-04,TL-YSD0-05,TL-YSD0-06,
TL-YSD0-07,TL-YSD0-08,TL-YSA0-01,TL-YSA0-02,TL-YSA0-03,TL-YSA0-04,
TL-YSB0-01,TL-YSB0-02,TL-YSC1-01

January 25, 2019

This Report Concerns:	**Equipment Type:**
☒ Original Report	**Stage Luminaire**

Test By:	Eric/
Report Number:	TH19AR-142E
Test Date:	January 18~25 , 2019
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of Shenzhen Tian Hai Test Technology Co.,Ltd.

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	**Guangzhou BaoLun Electronics Co., Ltd.**
Address of applicant:	NO.1 Building B Block Zhongcun Street Panyu Guangzhou China
Manufacturer:	**Guangzhou BaoLun Electronics Co., Ltd.**
Address of Manufacturer:	NO.1 Building B Block Zhongcun Street Panyu Guangzhou China

General Description of E.U.T

EUT Description:	**Stage Luminaire**
Model No:	TL-YSD0-01,TL-YSD0-02,TL-YSD0-03,TL-YSD0-04,TL-YSD0-05, TL-YSD0-06,TL-YSD0-07,TL-YSD0-08,TL-YSA0-01,TL-YSA0-02, TL-YSA0-03,TL-YSA0-04,TL-YSB0-01,TL-YSB0-02,TL-YSC1-01
Rating:	AC100 -240V, 50/60Hz, 0.9A, 200W
Trade Mark:	ITC
Note:	All models share the same circuit diagram ,just different size,power and brightness.All test performance on:TL-YSD0-02.

** The test data gathered are from the production sample provided by the manufacturer.*
Supplementary Models share same circuit and with different appearance.

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

EN 55015: 2013/A1:2015

EN 61547: 2009

EN 61000-3-2:2014

EN 61000-3-3:2013

The objective of the manufacturer is to demonstrate compliance with the described standards above.

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1.3 Test Summary

For the EUT described above. The standards used were EN 55015 for Emissions & EN 61547 for Immunity.
Table 1 : Tests Carried Out Under EN 55015: 2013/A1:2015

Standard	Test Items	Status
EN 55015: 2013/A1:2015	Disturbance Voltage at The Mains Terminals (0.009~30MHz)	√
	Magnetic Field Emission (0.009~30MHz)	x
	Radiated Disturbances (30MHz To 300MHz)	√

√ Indicates that the test is applicable
× Indicates that the test is not applicable

Table 2 : Tests Carried Out Under EN 61000-3-2: 2014 / EN 61000-3-3: 2013

Standard	Test Items	Status
EN 61000-3-2: 2014	Harmonic Current Test	√
EN 61000-3-3: 2013	Voltage Fluctuations and Flicker Test	√

√ Indicates that the test is applicable
× Indicates that the test is not applicable

Table 3 : Tests Carried Out Under EN 61547: 2009

Standard	Test Items	Status
EN61000-4-2:2009	Electrostatic discharge Immunity	√
EN 61000-4-3:2006+A1:2008 +A2:2010	Radiated Susceptibility (80MHz to 1GHz)	√
EN61000-4-4:2012	Electrical Fast Transient/Burst Immunity	√
EN61000-4-5:2014	Surge Immunity	√
EN61000-4-6:2014/AC:2015	Conducted Susceptibility (150kHz to 80MHz)	√
EN61000-4-8:2010	Power Frequency Magnetic Field Immunity (50/60Hz)	√
EN61000-4-11:2004/A1:2017	Voltage Dips, Short Interruptions Immunity	√

√ Indicates that the test is applicable
× Indicates that the test is not applicable

1.4 Test Methodology

All measurements contained in this report were conducted with CISPR 16-1: 2006, radio disturbance and immunity measuring apparatus, and CISPR16-2: 2002, Method of measurement of disturbances and immunity.

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1.5 Test Equipment List and Details

No.	Equipment	Manufacturer	Model No.	S/N	Calculator date	Calculator due date
1	EMI Test Receiver	R&S	ESCI	100687	2018-03-16	2019-03-15
2	EMI Test Receiver	R&S	ESPI	100097	2018-03-16	2019-03-15
3	Amplifier	HP	8447D	1937A02492	2018-03-16	2019-03-15
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	7101	2018-03-16	2019-03-15
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	7102	2018-03-16	2019-03-15
6	Power Clamp	SCHWARZBECK	MDS-21	3812	2018-03-16	2019-03-15
7	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2018-03-16	2019-03-15
9	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2018-03-16	2019-03-15
10	Fast Transient Noise Simulator	NoiseAbby	FNS-105AX	31485	2018-03-16	2019-03-15
11	Color TV Pattern Genenator	PHILIPS	PM5418	TM209947	N/A	N/A
12	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2018-03-16	2019-03-15
13	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2018-03-16	2019-03-15
14	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2018-03-16	2019-03-15
15	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2018-03-16	2019-03-15
16	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2018-03-16	2019-03-15
17	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2018-03-16	2019-03-15
18	Horn Antenna	SCHWARZBECK	BBHA9120A	B08000991-0001	2018-03-16	2019-03-15
19	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	D-69250	2018-03-16	2019-03-15
20	Electricity bridge	Zentech	100 LCR METER	803024	2018-03-16	2019-03-15
21	RF Current Probe	FCC	F-33-4	80	N/A	N/A
22	Signal Generator	HP	8647A	3349A02296	2018-03-16	2019-03-15
23	Microwave Amplifier	HP	8349B	2627A00994	2018-03-16	2019-03-15
24	Triple-Loop Antenna	EVERFINE	LLA-2	607004	2018-03-16	2019-03-15

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2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being normal operation.

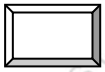
2.3 Special Accessories

As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by EUT and its respective support equipment manufacturers.

2.4 Equipment Modifications

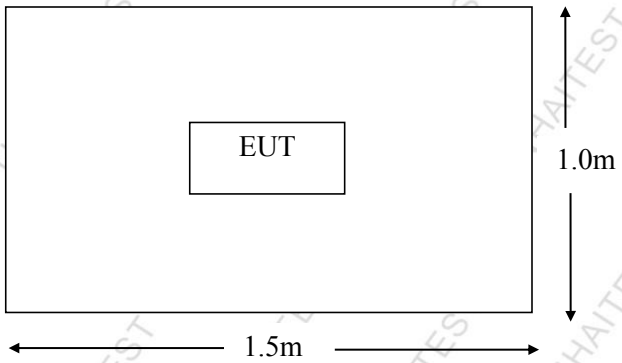
The EUT tested was not modified by TH.

2.5 Configuration of Test System



EUT

2.6 Test Setup Diagram



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3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is 3.4 dB.

3.2 Limit of Disturbance Voltage At The Mains Terminals (Class B)

Frequency Range (MHz)	Limits (dBuV)*	
	Quasi-Peak	Average
0.009~0.050**	110	—
0.050~0.150**	90~80***	—
0.150～0.500	66～56***	56～46***
0.500~5.0	56	46
5.0～30.0	60	50

Remark: * At the transition frequency, the lower limit applies.
** The limit values in the frequency range 9kHz to 150 kHz are considered to be “provisional limit”, which may be modified after some years of experience.
*** The limit decreases linearly with the logarithm of the frequency in the ranges 50kHz to 150 kHz and 150kHz to 0.5MHz

3.3 EUT Setup

The setup of EUT is according with CISPR 16-1: 2006, CISPR16-2: 2002 measurement procedure. The specification used was the EN 55015 limits.

The EUT was placed center and the back edge of the test table.

The AV cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

3.4 Instruments Setup

The receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range…….9KHz to 30 MHz
Detector……..Peak & Quasi-Peak
IF Band Width……..200Hz / 9KHz
Frequency Range…….9KHz to 150KHz / 150KHz to 30MHz

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3.5 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dBμV of specification limits). Quasi-peak readings are distinguished with a "**QP**". Average readings are distinguished with a "**AV**".

3.6 Summary of Test Results

According to the data in section 3.6, the EUT complied with the EN 55015 Conducted margin, which represented worst margin reading.

3.7 Disturbance Voltage Test Data

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

Test data see following pages

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.
(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

3.8 Test Result

Pass

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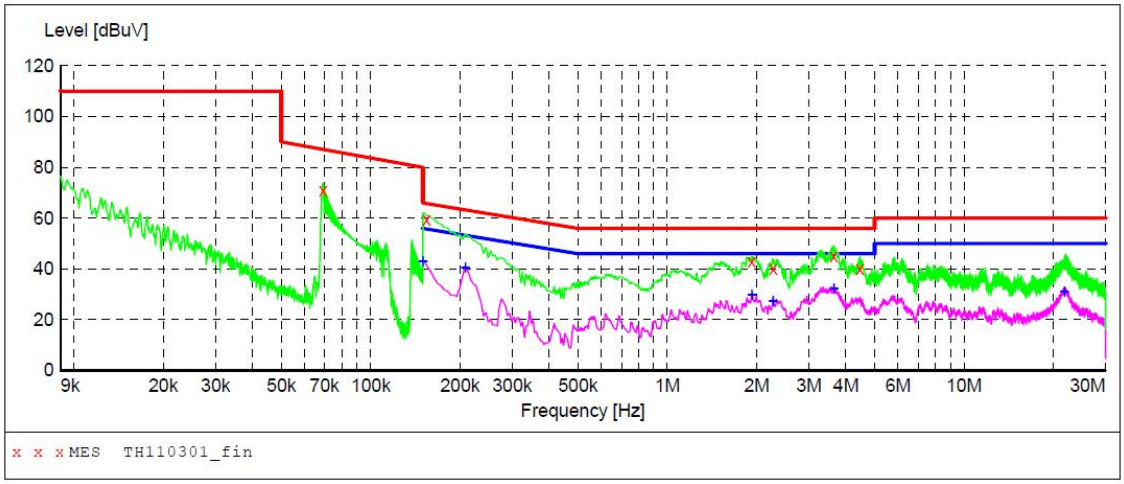
Conducted Emission Test Data

EUT:	Stage Luminaire	M/N: TL-YSD0-02
Operating Condition:	ON	
Test Site:	Shielded Room	
Operator:	Eric	
Test Specification:	AC 230V 50Hz	
Comment:	Live Line	Tem:23℃ Hum:50%
Start of Test:	01/20/19/	



Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	43.10	15.4	56	12.9	AV	N	GND
0.208500	40.60	14.8	53	12.7	AV	N	GND
1.923000	29.70	13.1	46	16.3	AV	N	GND
2.269500	27.50	13.0	46	18.5	AV	N	GND
3.642000	32.30	13.0	46	13.7	AV	N	GND
21.763500	31.20	12.4	50	18.8	AV	N	GND

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.069100	70.80	17.0	87	16.3	QP	N	GND
0.154500	59.60	15.4	66	6.2	QP	N	GND
1.923000	42.80	13.1	56	13.2	QP	N	GND
2.274000	40.10	13.0	56	15.9	QP	N	GND
3.642000	45.00	13.0	56	11.0	QP	N	GND
4.456500	40.20	13.4	56	15.8	QP	N	GND

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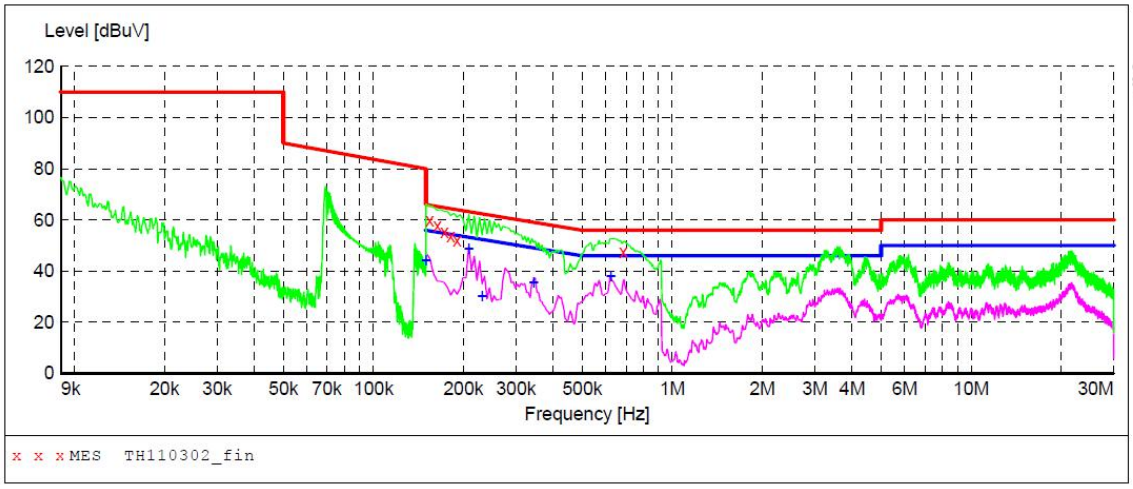
Conducted Emission Test Data

EUT:	Stage Luminaire M/N: TL-YSD0-02	
Operating Condition:	ON	
Test Site:	Shielded Room	
Operator:	Eric	
Test Specification:	AC 230V 50Hz	
Comment:	Neutral Line	Tem:23℃ Hum:50%
Start of Test:	01/20/19/	



Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.154500	59.80	15.4	66	6.0	QP	L1	GND
0.163500	57.60	15.3	65	7.7	QP	L1	GND
0.172500	55.50	15.2	65	9.3	QP	L1	GND
0.181500	53.60	15.1	64	10.8	QP	L1	GND
0.190500	51.90	15.0	64	12.1	QP	L1	GND
0.685500	47.50	10.3	56	8.5	QP	L1	GND

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	44.00	15.4	56	12.0	AV	L1	GND
0.208500	48.50	14.8	53	4.5	AV	L1	GND
0.231000	30.40	14.3	52	22.0	AV	L1	GND
0.343500	35.50	11.0	49	13.5	AV	L1	GND
0.622500	38.00	10.4	46	8.0	AV	L1	GND

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4- RADIATED DISTURBANCES

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is 4.0 dB.

4.2 Limit of Radiated Disturbances (Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dBμV/m)
30~ 230	3	40
230 ~ 300	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.3 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the CISPR 16-1: 2006, CISPR16-2: 2002. The specification used was EN61000-6-3 Class B limits.

The EUT was placed on the center of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

4.4 Test Receiver Setup

According to EN61000-6-3 rules, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting:

Detector……..Peak & Quasi-Peak
IF Band Width……..…..120KHz
Frequency Range…….30MHz to 1000MHz
Turntable Rotated…….0 to 360 degrees
Antenna Position:
Height……..…1m to 4m
Polarity……....Horizontal and Vertical

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4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -10 dBμV of specification limits), and are distinguished with a "QP" in the data table.

4.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The **"Margin"** column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dBμV means the emission is 7dBμV below the maximum limit for Class A. The equation for margin calculation is as follows:

Margin = Class A Limit – Corr. Ampl.

4.7 Radiated Disturbances Test Result

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

Test data see following pages

4.8 Test Result

PASS

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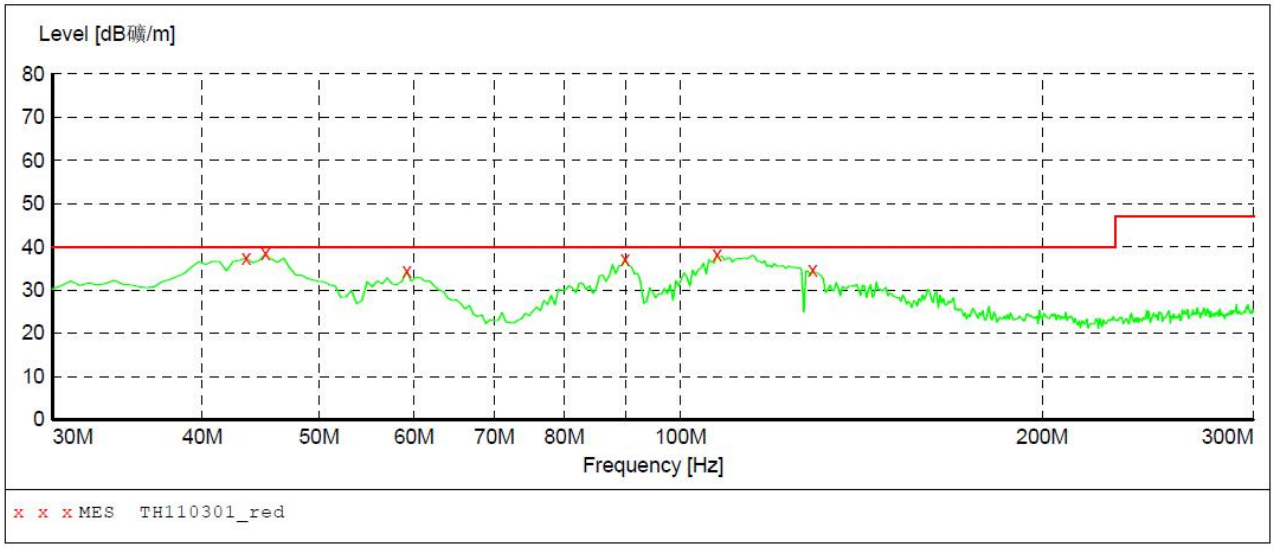
Radiated Disturbances Test Data

EUT:	Stage Luminaire	M/N: TL-YSD0-02
Operating Condition:	ON	
Test Site:	3m CHAMBER	
Operator:	Eric	
Test Specification	AC 220V 50Hz	
Comment:	Polarization: Horizontal	Tem:23℃ Hum:50%
Start of Test:	01/20/19/	



Frequency MHz	Level dB礦/m	Transd dB	Limit dB礦/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
43.500000	37.40	15.8	40.0	2.6	---	100.0	0.00	VERTICAL
45.120000	38.40	16.6	40.0	1.6	---	100.0	0.00	VERTICAL
59.160000	34.30	15.7	40.0	5.7	---	100.0	0.00	VERTICAL
89.940000	37.20	15.1	40.0	2.8	---	100.0	0.00	VERTICAL
107.220000	38.20	12.2	40.0	1.8	---	100.0	0.00	VERTICAL
128.820000	34.60	12.8	40.0	5.4	---	100.0	0.00	VERTICAL

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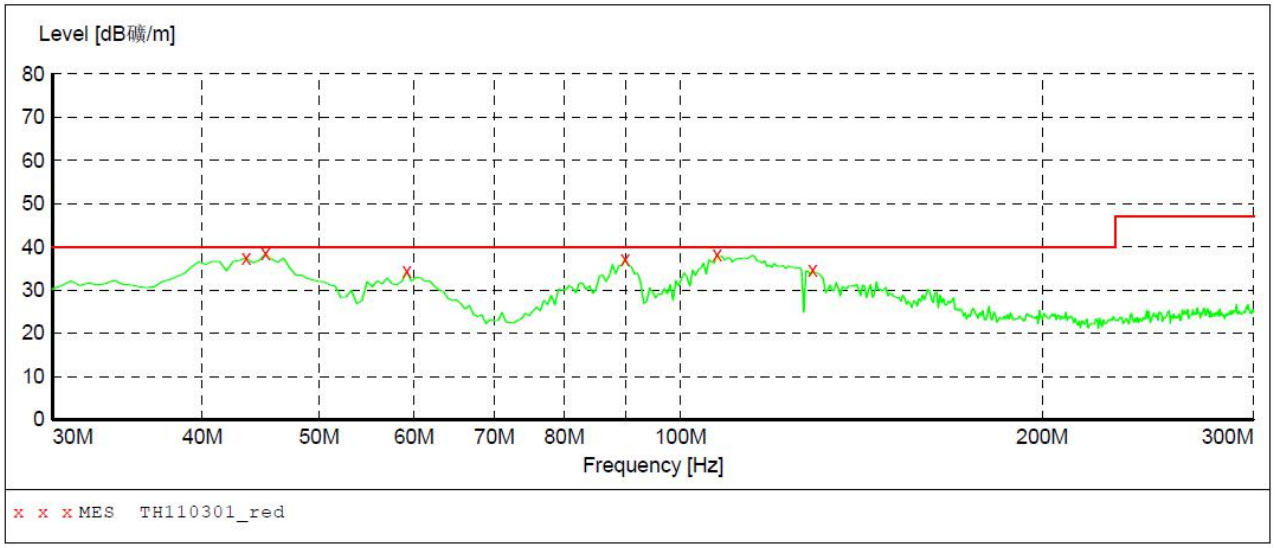
Radiated Disturbances Test Data

EUT:	Stage Luminaire M/N: TL-YSD0-02	
Operating Condition:	ON	
Test Site:	3m CHAMBER	
Operator:	Eric	
Test Specification	AC 220V 50Hz	
Comment:	Polarization: Vertical	Tem:23℃ Hum:50%
Start of Test:	01/20/19/	



Frequency MHz	Level dB礦/m	Transd dB	Limit dB礦/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
40.800000	30.10	15.8	40.0	9.9	---	300.0	0.00	HORIZONTAL
46.740000	30.40	16.9	40.0	9.6	---	100.0	0.00	HORIZONTAL
60.780000	31.00	15.2	40.0	9.0	---	300.0	0.00	HORIZONTAL
89.940000	44.60	15.1	40.0	-4.6	---	300.0	0.00	HORIZONTAL
102.360000	43.30	11.7	40.0	-3.3	---	300.0	0.00	HORIZONTAL
143.400000	41.40	12.3	40.0	-1.4	---	300.0	0.00	HORIZONTAL

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5 - HARMONIC CURRENT TEST (EN 61000-3-2)

5.1 Application of Harmonic Current Emission

Compliance to these standards ensures that tested equipment will not generate harmonic currents at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems.

5.2 Measurement Data

Note: For detailed test data, refer to the following pages:

Standard used:	EN/IEC 61000-3-2 - Equipment class C
Observation time:	150s
E. U. T.:	Stage Luminaire
M/N	TL-YSD0-02
Operation Mode	ON

Test Result	
E. U. T.:	PASS
	(Wave form of the input current PASS)
Power Source:	PASS

5.3 Test Results

Pass

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6 - VOLTAGE FLUCTUATIONS AND FLICKER TEST (EN 61000-3-3)

6.1 Application of Voltage Fluctuations and Flicker Test

Compliance to these standards ensures that tested equipment will not generate flickers and voltage change at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems.

6.2 Measurement Data

Note: For detailed test data, refer to the following pages:

Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flicker meter:	DC 24V
E. U. T.:	Stage Luminaire
M/N	TL-YSD0-02
Operation Mode	ON

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.030	1.00	PASS
dc [%]	0.027	3.30	PASS
dmax [%]	0.045	4.00	PASS
dt [s]	0.000	0.50	PASS

6.3 Test Results

The EUT was subjected to the voltage fluctuations and flicker test required by EN 61000-3-3: 2013.

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7 – IMMUNITY MEASUREMENT INSTRUMENTATION

7.1 Electrostatic Discharge Test System

An EM TEST DITOC0103Z ESD simulator is used for all testing. It is capable of applying Electrostatic discharges in both contact discharge modes to 4 kV and air discharge modes to 8 kV in both positive and negative polarities. This is in accordance with the IEC 61000-4-2 basic EMC publication.

7.2 Radiated Susceptibility Test System

An IFR 2032 signal generator and a Amplifier Research power amplifier are used to provide a signal at the appropriate power and frequency to a transmitting antenna to obtain the required electromagnetic field at the position of the EUT in accordance with the IEC 61000-4-3 basic EMC publication. The field was monitored by Amplifier Research field probe and Amplifier Research PM2002 power meter according the IEC 61000-4-3 standards.In order to judge the performance of the EUT, a set of monitor system is used.

7.3 Electrical Fast Transient/Burst Immunity Test System

An EM Test UCS 500-M6 Immunity test system is used for all testing. It is capable of applying fast transients to the AC line at any phase angle with respect to the AC line voltage wave form and to attached cables via a capacitive coupling clamp in accordance with the IEC 61000-4-4 basic EMC publication.

7.4 Surge Immunity Test System

An EM Test UCS 500-M6 Immunity test system is used for all testing. Both positive and negative polarities of voltage up to 2kV were applied to the AC input lines. The coupling network defined in the standard was used.

7.5 Conducted Susceptibility Test System

An IFR 2032A signal generator and a set of Amplifier Research test system are used for the testing. EUT was tested from 0.15 MHz to 80 MHz with 1kHz sine wave, 80% modulation with 3Vr.m.s. CDN coupling and de-coupling networks and EM clamp was tested. During the tests, injected was applied to power line by using CDNs-6.2.2 method, and I/O lines was injected by using EM clamp injection-6.2.3.method.

7.6 Power Frequency Magnetic Field Immunity Test System

An EM Test UCS 500-M6 Immunity test system is used for all testing. Test level as described in IEC 61000-4-8 titled “Table 1 – Test Levels for continuous field” was chosen. Single turn induction coil in 1m x 1m size was used to generate the magnetic field.

7.7 Voltage Dips, Short Interruptions Immunity Tests System

An EM Test UCS 500-M6 Immunity test system is used for all testing. Test level as described in IEC 61000-4-11, section 5, titled “Test Levels”.

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7.8 Equipment Test Table

IEC 61000-4-2: 1995 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by *0.5-millimeter* thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

IEC 61000-4-3 and IEC 61000-4-4 specify that a tabletop EUT be placed on a non-conducting table 80 centimeters above a ground reference plane and that floor-mounted equipment shall be placed on an insulating support approximately 10 centimeters above a ground plane. During the IEC 61000-4-3 tests, the EUT is positioned on a table in a shielded semi-anechoic test chamber to reduce reflections from the internal surfaces of the chamber. During the IEC 61000-4-4 tests, the EUT is positioned on a table over a ground reference plane in conformance with this requirement.

7.9 Instrument Calibration

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications.

Extensive engineering efforts have been made to ensure test data reliability through Quality Control and regular equipment calibration schedules. However, the application of radio frequency fields and voltages are not without an unavoidable level of uncertainty. These include inaccuracies in antenna factors, chamber imperfections and possible test generator output uncertainties.

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8- IMMUNITY TEST PROCEDURES

8.1 EUT and Cable Placement

The EUT and any peripherals are located at the center of the table for tabletop devices and in the center of the ground plane with the insulating support for floor-standing devices. The standards require that interconnecting cables to be connected to available ports of the unit and that the placement of the unit and the attached cables simulate a typical installation so far as to be practical.

8.2 Application of Electrostatic Discharge Immunity Test

The test is conducted in the following order according to the basic standard IEC 61000-4-2: Air Discharge, Direct Contact Discharge, Indirect Contact Horizontal Coupling Plane Discharge, and Indirect Contact Vertical Coupling Plane Discharge. The Electrostatic Discharge test levels are set and discharges for the different test modes are set appropriately. The Electrostatic Discharge is applied to the conductive surface of the EUT, and along all seams and control surfaces on the EUT. When a discharge occurs and an error is caused, the type of error, discharge level and location is recorded.

8.3 Application of Radiated Susceptibility Test

The electromagnetic field is established at the front edge of the EUT. The frequency range is swept from 80 to 1000 MHz using a power level necessary to obtain a 3 volt/meter and 80% amplitude of a 1 kHz sine wave modulated field Strength is directed at the EUT. The test is performed with each of four sides of EUT facing the transmitting antenna. If an error is detected when the susceptible side of the EUT facing the transmitting antenna, the field is reduced until the error is not repeatable, the field is then manually increased until the error begins to occur. This threshold level, the frequency and the error created are noted before continuing. Both horizontal and vertical polarization of the antenna are set on test and measured individually

8.4 Application of Electrical Fast Transient/Burst Immunity Test

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility's electrical earth.

8.5 Application of Surge Immunity Test

The EUT was setup as described in IEC 61000-4-5 and the test shall be performed according to the test plan.

8.6 Application of Conducted Susceptibility Test

The EUT was setup according to the IEC 61000-4-6 and the test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF input ports of the coupling devices are terminated by a 50 Ω load resistor. The frequency range is 150kHz to 80 MHz.

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8.7 Application of Power Frequency Magnetic Field Immunity Test

The EUT was setup according to the IEC 61000-4-8 and the test shall be done as the procedure described in the standard.

8.8 Application of Voltage Dips, Short Interruptions Immunity Tests

The EUT was setup according to the IEC 61000-4-11 and the test shall be done as the procedure described in the standard.

8.9 Deviations from the Standard

No deviations from EN 61547 were made when performing the tests described in this report.

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9 - TEST DATA

9.1 Electrostatic Discharge Immunity Test (IEC 61000-4-2)

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Shell 2 points	A	A	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
N/A	/	/	/	/	/	/	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

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9.2 Radiated Susceptibility Test (IEC 61000-4-3)

Frequency Range (MHz): 80~1000MHz
Modulation: Amplitude 80%, 1kHz sinewave
Severity Level: 3V/m

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

Frequency Range (MHz)	Front (3 V/m)		Rear (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000 1400-2700	A	A	A	A	A	A	A	A

9.3 Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4)

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

IEC 61000-4-4 Test Points		Test Levels (kV)							
		+0. 5	-0. 5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
Power Supply Power Line of EUT	L1	A	A	A	A	/	/	/	/
	L2	A	A	A	A	/	/	/	/
	Earth	A	A	A	A	/	/	/	/
	L1+L2	A	A	A	A	/	/	/	/
	L1 + Earth	A	A	A	A	/	/	/	/
	L2 + Earth	A	A	A	A	/	/	/	/
	L1+L2+Earth	A	A	A	A	/	/	/	/

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9.4 Surge Immunity Test (IEC 61000-4-5)

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

Table 1: Surge Power Supply

Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	L-N	A	/
2	1kV	±	L-N	A	/
3	2kV	±	L-PE, N-PE	A	/
4	4kV	±	L-N, L-PE, N-PE	/	/

9.5 Conducted Susceptibility Test (IEC 61000-4-6)

Frequency Range (MHz): 0.15~80MHz
Modulation: Amplitude 80%, 1kHz sinewave
Severity Level: 3Vr.m.s.

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

Level	Voltage Level (e.m.f.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

9.6 Power Frequency Magnetic Field Immunity Test (IEC 61000-4-8)

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

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Level	Magnetic Field Strength A/M	X (Horizontal)	Y (Vertical)	Z (Special)
1	1	/	/	/
2	3	A	A	A
3	10	/	/	/
4	30	/	/	/
5	100	/	/	/
X	Special	/	/	/

9.7 Voltage Dips, Short Interruptions Immunity Tests (IEC 61000-4-11)

Temperature (℃)	15~35
Humidity (%RH)	30~60
Barometric Pressure (mbar)	860~1060
EUT	Stage Luminaire
M/N	TL-YSD0-02
Operating Mode	ON

Level	U2	td	Phase Angle	N	Pass	Fail
1	100	10ms	N/A	3	B	/
2	30%	200ms	N/A	3	C	/

Note:

A ----- Performance Criteria A as stated in Section 1.2 of this report
B ----- Performance Criteria B as stated in Section 1.2 of this report
C ----- Performance Criteria C as stated in Section 1.2 of this report

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10 - TEST RESULTS

The following tests were performed on the EUT product; the actual test results are contained within the Test Data section of this report.

10.1 IEC 61000-4-2 Electrostatic Discharge Immunity Test Configuration

The EUT was subjected to the electrostatic discharge tests required by EN 61547 and all lower levels specified in IEC 61000-4-2.

The EUT continued to perform as intended during and after the application of the ESD.

10.2 IEC 61000-4-3 Radiated Susceptibility Test Configuration

The EUT was subjected to a 3-volt/meter, 80% Amplitude, 1 kHz Sine wave field as required by EN 61547 and all lower levels specified in IEC 61000-4-3.

The EUT continued to perform as intended during and after the application of the electromagnetic field.

10.3 IEC 61000-4-4 Electrical Fast Transient/Burst Immunity Test Configuration

The EUT was subjected to the electrical fast transient tests required by EN 61547 and all lower levels specified in IEC 61000-4-4.

The EUT continued to perform as intended during and after the application of the EFT/B.

10.4 IEC 61000-4-5 Surge Immunity Test Configuration

The EUT was subjected to the Surge Immunity tests required by EN 61547 and all lower levels specified in IEC 61000-4-5.

The EUT continued to perform as intended during and after the application of the Surge Immunity Test.

10.5 IEC 61000-4-6 Conducted Susceptibility Test Configuration

The EUT was subjected to the Conducted Susceptibility tests required by EN 61547 and all lower levels specified in IEC 61000-4-6.

The EUT continued to perform as intended during and after the application of the Conducted Susceptibility Test.

10.6 IEC 61000-4-8 Frequency Magnetic Field Immunity Test Configuration

The EUT was subjected to the Frequency Magnetic Field Immunity tests required by EN 61547 and all lower levels specified in IEC 61000-4-8.

The EUT continued to perform as intended during and after the application of the Frequency Magnetic Field Immunity Test.

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10.7 IEC 61000-4-11 Voltage Dips, Short Interruptions Immunity Tests Configuration

The EUT was subjected to the Voltage Dips/Interruptions tests required by EN 61547 and all lower levels specified in IEC 61000-4-11.

The EUT continued to perform as intended during and after the application of the Voltage Dips/Interruptions Test.

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APPENDIX A - PRODUCT LABELING

CE Marking Label Specification

Specification: Text is Black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.

Proposed Label Location on EUT

EUT Rear View/Proposed CE Marking Location

CE

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APPENDIX B - EUT PHOTOGRAPHS

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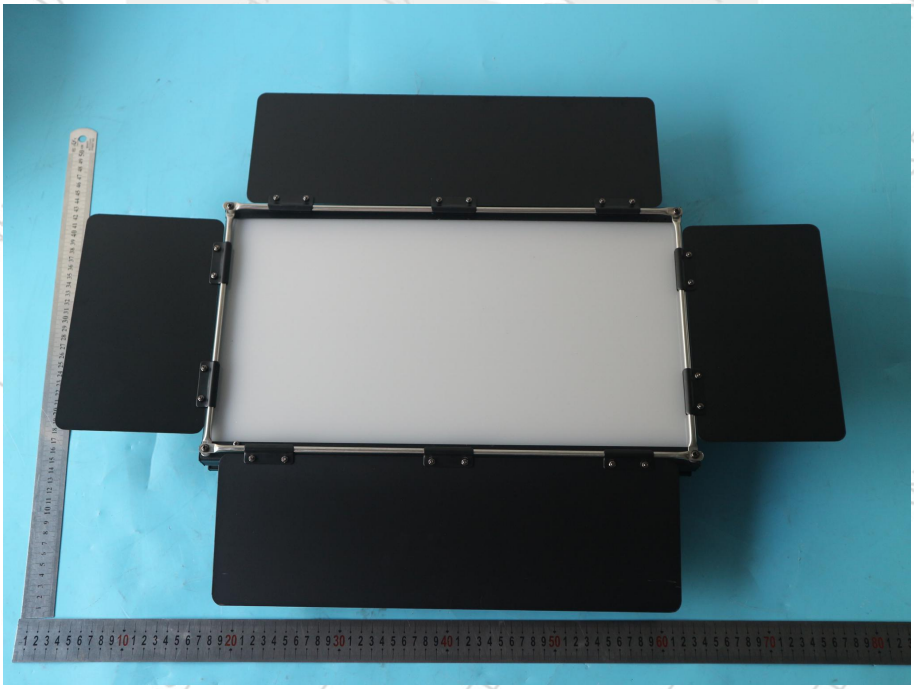

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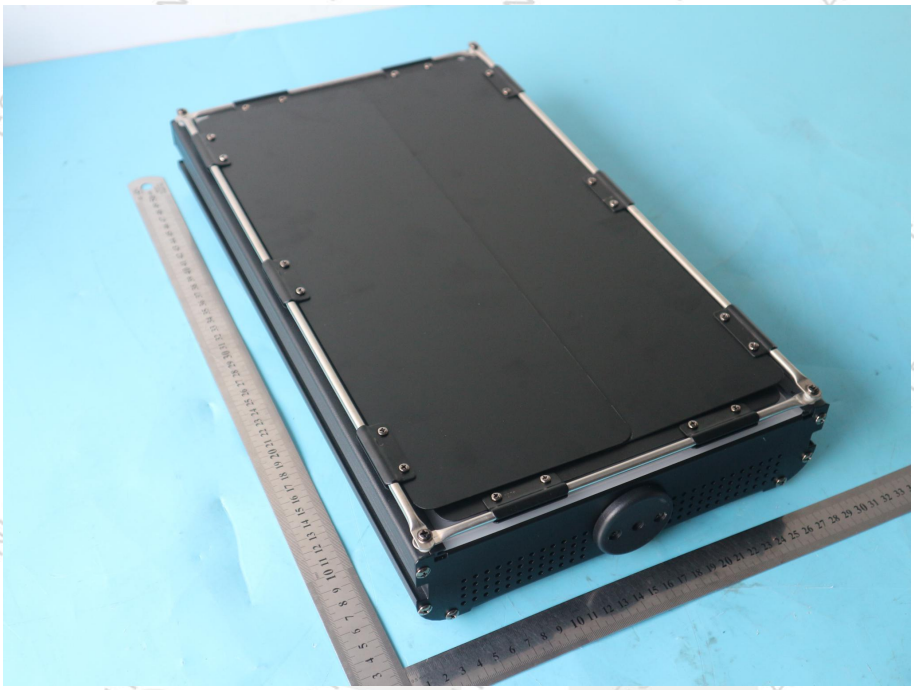

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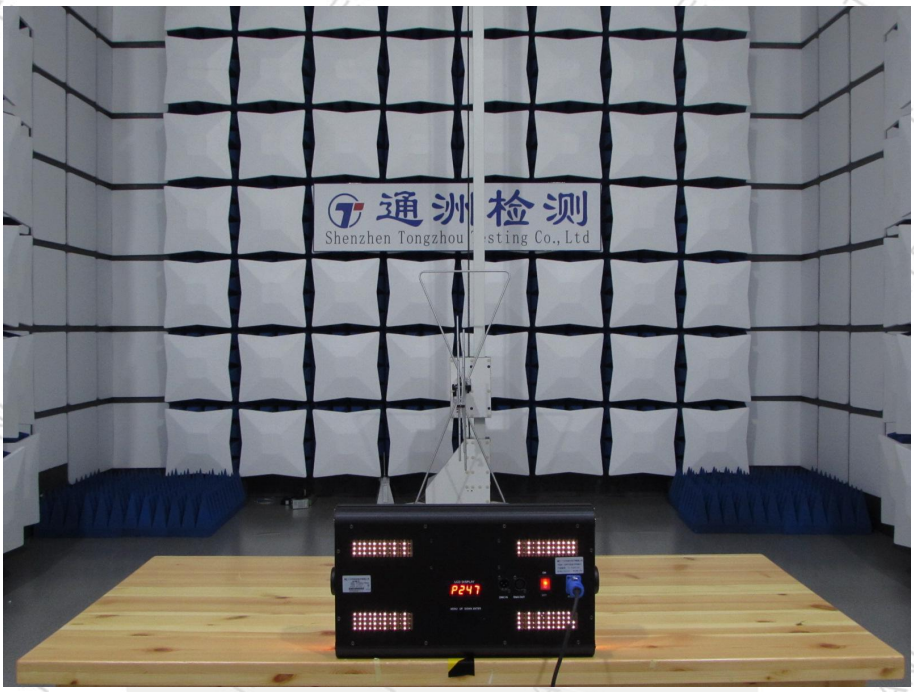
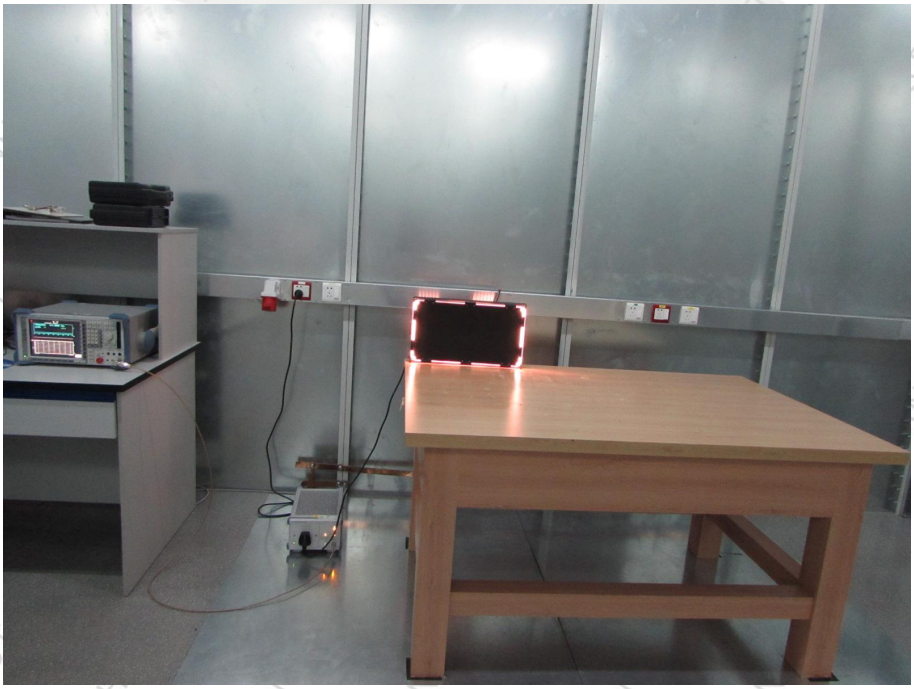
APPENDIX C - TEST SETUP PHOTOGRAPHS





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

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