Product Name: led high bay light

Model: QH-HBGKH-100W

Prepared For : **Shenzhen Qinhan Lighting Co.,Limited**
A building, Chuangze Industrial City, Dalang Town, Dongguan, Guangdong, China.

Prepared By : **TMC Testing Services(Shenzhen) Co., Ltd.**

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Date of Test : September 23,2018- September 29,2018
Date of Report : September 29,2018
Report Number : TMC180923101-S

Ecodesign requirement for LED module

Implementation measure EU 1194/2012 and EC 244/2009

Report	
Reference **Number. ..... :**	TMC180923101-S
Tested by (Engineer) ..... :	Bat Deng
Approved by (Manager) ..... :	Lemon Rao
Date of issue ..... :	September 29,2018
Contents ..... :	16 pages
Testing laboratory ..... :	
Name ..... :	TMC Testing Services(Shenzhen) Co., Ltd.
Address ..... :	1st Floor, Block A1, Zone A, Xinshidai Gongrong Industrial Park, No. 2, Shihuan Road, Shuitian, Shiyan Street, Baoan District, Shenzhen, China
Testing location..... :	Same as above
Applicant's name ..... :	Shenzhen Qinhan Lighting Co.,Limited
Address ..... :	A building, Chuangze Industrial City, Dalang Town, Dongguan, Guangdong, China.
Test specification:	
Standard ..... :	Test program is based on the following standards: (EU) 1194/2012:2012-12-12 (EC) 244/2009:2009-03-18
Test item description.....:	led high bay light
Trade Mark.....:	QINHAN LIGHTING
Manufacturer.....:	Shenzhen Qinhan Lighting Co.,Limited
Address ..... :	A building, Chuangze Industrial City, Dalang Town, Dongguan, Guangdong, China.
Model/Type reference.....:	QH-HBGKH-100W
Ratings.....:	230V ~ ,50/60Hz , 100W

Remark:

1. According to client's requirement, total 20 pcs were provided for all tests.
2. Sample no.11# to 20# were used for switching cycles test;
3. Sample no.1 # to 10# were used for other tests according the implementation measure EU 1194/2012 and EC244/2009.

Clause	Requirement – Test	Measuring result – Remark	Verdict
0	Measurement methods		P
	Recognized state of art measurement methods incl. the one published in the Official Journal taking into account the measurement methods of (EC) 244/2009, (EU) 1194/2012	Transitional test method acc. to OJ 2010/C 92/04)	P
1.	Sample		P
	Number of sample used for test ……:	See "General Remarks"	P
1.2	Energy efficiency requirements for lamp control gear		N/A
	Stage 1~2: No-load power ≤ 1.0W	P(no-load):	N/A
	Stage 3: No-load power ≤ 0.5W	P(no-load):	N/A
	Stage 3: Standby power≤ 0.5W	P(standby power):	N/A
2.	Energy efficiency requirements		N/A
2.1	**Non-directional** LED lamp (Annex II, cl.1 of EC 244/2009)		N/A
a	Lamp efficacy ((ηlamp)		N/A
	Evaluation : $P \leq P_{max}$		N/A
b	Limit definition:		N/A
	Clear lamps – Stage 1~5: $P_{max} = 0.8 * (0.88\sqrt{\Phi}+0.049\Phi)$		N/A
	Clear lamps – Stage 6: $P_{max} = 0.6 * (0.88\sqrt{\Phi}+0.049\Phi)$		N/A
	Non-clear lamps – Stage 1~6: $P_{max} = 0.24\sqrt{\Phi}+0.0103\Phi$		N/A
c	**Exceptions:**		N/A
	Clear lamps 60 lm ≤ Φ ≤ 950 lm in Stage 1 $P_{max} = 1.1 * (0.88\sqrt{\Phi}+0.049\Phi)$		N/A
	Clear lamps 60 lm ≤ Φ ≤ 725 lm in Stage 2 $P_{max} = 1.1 * (0.88\sqrt{\Phi}+0.049\Phi)$		N/A
	Clear lamps 60 lm ≤ Φ ≤ 450 lm in Stage 3 $P_{max} = 1.1 * (0.88\sqrt{\Phi}+0.049\Phi)$	P_{max}: (incl. corrections) Φ:	N/A
	Clear lamps with G9 or R7s cap in Stage 6 $P_{max} = 0.8 * (0.88\sqrt{\Phi}+0.049\Phi)$	P_{max}: (incl. corrections) Φ:	N/A
	Correction factors, which are cumulative where appropriate and also applicable to the products covered by the **Exceptions**:		N/A
	non-clear lamp with colour rendering index ≥ 90 and $P \leq 0.5 * (0.88\sqrt{\Phi}+0.049\Phi)$	$P_{max}/0.83$	N/A
	non-clear lamp with second envelope and $P \leq 0.5 * (0.88\sqrt{\Phi}+0.049\Phi)$	$P_{max}/0.94$	N/A
	LED lamp requiring external power supply	$P_{max}/1.14$	N/A
2.2	**Directional** LED lamp (Annex III, cl.1.1 of EU 1194/2012)		N/A
a	Energy efficiency (EEI)		N/A

Clause	Requirement – Test	Measuring result – Remark	Verdict
	The energy efficiency index is calculated as follows and rounded to 2 decimal places: EEI = Pcor/ Pref	P_{ref}: P_{cor}: EEI:	N/A
	Stage 1~2: EEI max ≤ 0.5	EEI:	N/A
	Stage 3: EEI max ≤ 0.2	EEI:	N/A
b	Correction factors, which are cumulative where appropriate		N/A
	No correction appropriate : $P_{cor} = P_{rated}$	P_{rated}:	N/A
	Lamps operating on external LED lamp control gear : Pcor = Prated × 1.10	P_{rated}: P_{cor}:	N/A
	Lamps with anti-glare shield: Pcor = Prated ×0.80	P_{rated}: P_{cor}:	N/A
c	Pref is the reference power obtained from the useful luminous flux of the lamp (Φuse) by the following formula:		N/A
	For models with Φuse < 1 300 lumen: $P_{ref} = 0.88\sqrt{\Phi_{use}}+0.049\Phi_{use}$	Beam angel (°): Φ_{use}(lm): P_{ref}:	N/A
	For models with Φuse ≥ 1 300 lumen: $P_{ref} = 0.07341\ \Phi_{use}$	Beam angel (°): Φ_{use}(lm): $P_{ref:}$	N/A
3	Lamp functionality requirements for **non-directional** and **directional** LED lamp (Annex III, cl.2.2, table 5 of EU 1194/2012)		P
3.1	Lamp survival factor (LSF) at 6000h		P
	From March 1, 2014: LSF ≥ 0.90	LSF: 100%	P
3.2	Lumen maintenance (LLMF) at 6000h		P
	From March 1, 2014: LLMF ≥ 0.80	LLMF:84.2%	P
3.3	Number of switching cycles (n) before failure		P
	n ≥ 15 000 if rated lamp life ≥ 30 000 h	n: 15000	P
	otherwise: n ≥ half the rated lamp life expressed in hours		N/A
3.4	Starting time (t_{Start})		P
	t_{Start} <0.5 s	t_{Start} : 0.15s	P
3.5	Lamp warm-up time (t_{Warm}) to 95 % Φ		P
	t_{Warm} < 2 s	t_{Warm} : 0.18s	P
3.6	Premature failure rate (PFR)		P
	PFR ≤ 5.0 % at 1000 h	PFR: 0%	P
3.7	Colour rendering (Ra)		P
	Ra ≥ 80	Ra:	N/A

Clause	Requirement – Test	Measuring result – Remark	Verdict
	Ra ≥ 65 if the lamp is intended for outdoor or industrial applications	Ra:	N/A
3.8	Colour consistency		P
	Variation of chromaticity coordinates within a six-step Macadam ellipse or less.	SDCM:5.66	P
3.9	Lamp power factor (PF)		P
	P ≤ 2 W: no requirement		P
	2 W < P ≤ 5 W: PF > 0.4	PF:0.45	P
	5 W < P ≤ 25 W: PF > 0.5	PF:	P
	P > 25 W: PF > 0.9	PF:	P
3.10	Compatibility requirement for lamps using lamp caps also used with filament lamps		N/A
	Lamps shall comply from **stage 2** with state of art requirements for compatibility with equipment designed for installation between the mains and filament lamps (e.g. dimmer, …)		N/A
4	Product Information Requirements		N/A
4.1	Product information requirements for **directional lamps** (Annex III, cl.3.1 of EU 1194/2012)		N/A
	These information requirements do not apply to: LED modules when marketed as part of a luminaire from which they are not intended to be removed by the end-user.		N/A
	The following information shall be provided as from stage 1, except where otherwise stipulated.		N/A
	In all forms of product information, the term **'energy-saving lamp'** or any similar product related promotional statement about lamp efficacy may be used only if the energy efficiency index of the lamp (calculated in accordance with the method set out in point 1.1 of this Annex) is 0.40 or below.		N/A
4.1.1	Information to be displayed on the lamp itself		N/A
	For lamps other than high-intensity discharge lamps, the value and unit ('lm', 'K' and '° ') of the nominal useful luminous flux, of the colour temperature and of the nominal beam angle shall be displayed in a legible font on the surface of the lamp if, after the inclusion of safety-related information such as power and voltage, there is sufficient space available for it on the lamp without unduly obstructing the light coming from the lamp.		N/A
	If there is room for only one of the three values, the nominal useful luminous flux shall be provided. If there is room for two values, the nominal useful luminous flux and the colour temperature shall be provided.		N/A

Clause	Requirement – Test	Measuring result – Remark	Verdict
4.1.2	Information to be visibly displayed to end-users, prior to their purchase, on the packaging and on free access websites		N/A
	The information below shall be displayed on free access websites and in any other form the manufacturer deems appropriate.		N/A
	If the product is placed on the market in a packaging containing information to be visibly displayed to the end- users, prior to their purchase, the information shall also be clearly and prominently indicated on the packaging.		N/A
	The information does not need to use the exact wording on the list below. It may be displayed in the form of graphs, drawings or symbols rather than text.		N/A
(a)	Nominal useful luminous flux displayed in a font at least twice as large as any display of the nominal lamp power;		N/A
(b)	Nominal life time of the lamp in hours (not longer than the rated life time);		N/A
(c)	Colour temperature, as a value in Kelvins and also expressed graphically or in words;		N/A
(d)	Number of switching cycles before premature failure;		N/A
(e)	Warm-up time up to 60 % of the full light output (may be indicated as 'instant full light' if less than 1 second);		N/A
(f)	A warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers; in the latter case a list of compatible dimmers shall be also provided on the manufacturer's website;		N/A
(g)	If designed for optimum use in non-standard conditions (such as ambient temperature Ta ≠ 25 °C or specific thermal management is necessary), information on those conditions;		N/A
(h)	Lamp dimensions in millimeters (length and largest diameter);		N/A
(i)	Nominal beam angle in degrees;		N/A
(j)	If the lamp's beam angle is ≥ 90° and its useful luminous flux as defined in point 1.1 of this Annex is to be measured in a 120° cone, a warning that the lamp is not suitable for accent lighting;		N/A
(k)	If the lamp cap is a standardized type also used with filament lamps, but the lamp's dimensions are different from the dimensions of the filament lamp(s) that the lamp is meant to replace, a drawing comparing the lamp's dimensions to the dimensions of the filament lamp(s) it replaces;		N/A

Clause	Requirement – Test	Measuring result – Remark	Verdict
(l)	An indication that the lamp is of a type listed in the first column of Table 6 may be displayed only if the luminous flux of the lamp in a 90° cone ($\Phi_{90°}$) is not lower than the reference luminous flux indicated in Table 6 for the smallest wattage among the lamps of the type concerned. The reference luminous flux shall be multiplied by the correction factor in Table 7. For LED lamps, it shall be in addition multiplied by the correction factor in Table 8;	Claimed equivalent: Reference $\Phi_{90°}$ (lm): (incl. correction factor)	N/A
(m)	An equivalence claim involving the power of a replaced lamp type may be displayed only if the lamp type is listed in Table 6 and if the luminous flux of the lamp in a 90° cone ($\Phi_{90°}$) is not lower than the corresponding reference luminous flux in Table 6. The reference luminous flux shall be multiplied by the correction factor in Table 7. For LED lamps, it shall be in addition multiplied by the correction factor in Table 8. The intermediate values of both the luminous flux and the claimed equivalent lamp power (rounded to the nearest 1 W) shall be calculated by linear interpolation between the two adjacent values.	Claimed equivalent: Claimed P: Reference $\Phi_{90°}$ (lm): (incl. correction factor)	N/A
4.1.3	Information to be made publicly available on free-access websites and in any other form the manufacturer deems appropriate		N/A
(a)	The information specified in above point 4.1.2;		N/A
(b)	Rated power (0.1 W precision)		N/A
I	Rated useful luminous flux		N/A
(d)	Rated lamp life time		N/A
(e)	Lamp power factor		N/A
(f)	Lumen maintenance factor at the end of the nominal life (except for filament lamps)		N/A
(g)	Starting time (as X.X seconds)		N/A
(h)	Colour rendering		N/A
(i)	Colour consistency (only for LEDs)		N/A
(j)	Rated peak intensity in candela (cd)		N/A
(k)	Rated beam angle		N/A
(l)	If intended for use in outdoor or industrial applications, an indication to this effect;		N/A
(m)	Spectral power distribution in the range 180-800 nm		N/A
4.2	Product information requirements for **non-directional lamps** (Annex II, cl.3 of EC 244/2009)		N/A
4.2.1	Information to be visibly displayed prior to purchase to end-users on the packaging and on free access websites. (It may be displayed using graphs, figures or symbols rather than text.)		N/A

Clause	Requirement – Test	Measuring result – Remark	Verdict
(a)	When the nominal lamp power is displayed outside the energy label in accordance with Directive 98/11/EC, the nominal luminous flux of the lamp shall also be separately displayed in a font at least twice as large as the nominal lamp power display outside the label	Label acc. to (EU) 874/2012 LED modules used as part of a luminaire and not intended to be removed by the end-user.	N/A
(b)	Nominal life time of the lamp in hours (not higher than the rated life time)		N/A
I	Number of switching cycles before premature lamp failure;		N/A
(d)	Colour temperature (also expressed as a value in Kelvins);		N/A
(e)	Warm-up time up to 60 % of the full light output (may be indicated as 'instant full light' if less than 1 second);		N/A
(f)	A warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers;		N/A
(g)	If designed for optimal use in non-standard conditions (such as ambient temperature Ta ≠ 25 ° C), information on those conditions;		N/A
(h)	Lamp dimensions in millimeters (length and diameter);		N/A
(i)	If equivalence with an incandescent lamp is claimed on the packaging, the claimed equivalent incandescent lamp power (rounded to 1 W) shall be that corresponding in Table 6 to the luminous flux of the lamp contained in the packaging. The intermediate values of both the luminous flux and the claimed incandescent lamp power (rounded to 1W) shall be calculated by linear interpolation between the two adjacent values.		N/A

Rated lamp luminous flux ϕ[lm]			Claimed equivalent incandescent lamp power
CFL	Halogen	LED and other lamps	[W]
130	120	135	23
246	266	223	18
489	432	466	45
765	755	862	30
1000	962	1066	60
1365	1356	1562	86
2231	2654	2456	95
3156	3144	3545	100.3

	Requirement – Test	Measuring result – Remark	Verdict
j	The term **'energy saving lamp'** or any similar product related promotional statement about lamp efficacy may only be used if the lamp complies with the efficacy requirements applicable to non-clear lamps in Stage 1 according to Tables 1, 2 and 3.		N/A
4.2.2	Information to be made publicly available on free-access websites. (Information shall be expressed at least as values.)		N/A
(a)	The information specified in above point 4.2.1		N/A
(b)	Rated wattage (0.1 W precision);		N/A
I	Rated luminous flux;		N/A
(d)	Rated lamp life time;		N/A
(e)	Lamp power factor;		N/A
(f)	Lumen maintenance factor at the end of the nominal life;		N/A
(g)	Starting time (as X.X seconds);		N/A
(h)	Colour rendering.		N/A
5	Temperature reference point (IEC/PAS 62717:2011 clause 4.1)		N/A
	Measured temperature @ reference point t_P		N/A

Table 1	**Test data**											
Model:	**IP20**											
Voltage (V):	**240V~**						**Frequency (Hz):**	**50Hz**				
Φ_{use} measured at:	**Total luminous flux**						**Ambient (T/rh) (°C / %)**	**24.9 / 52.2**				
Test item	**Measured Value**										**Average**	**Limit**
Sample:	1	2	3	4	5	6	7	8	9	10	-	-
U (V) [1)]	240	240	240	240	240	240	240	240	240	240	240	-
I (mA) [1)]	58	58	57	57	59	58	58	57	57	59	57.8	-
P (W) [1)]	5.05	5.02	5.02	5.05	5.05	4.98	4.97	5.02	5.02	5.02	5.04	-
PF [1)]	--	--	--	--	--	--	--	--	--	--	--	-
Φ_{use} (lm) 1)	118	119	119	118	117	117	118	122	125	125	120	-
CCT (K) 1)	1170	1171	1170	1169	1171	1173	1172	1173	1173	1176	1172	-
Ra [1)]	92.0	92.0	91.9	91.6	92.0	91.9	92.0	92.0	92.0	92.8	91.98	≥ 80 (indoor); ≥ 65 (other)
t_{warm} (s) [1)]	0.15	0.18	0.15	0.20	0.20	0.20	0.15	0.18	0.20	0.20	0.181	< 2s
t_{Start} (s) [1)]	0.10	0.12	0.13	0.10	0.12	0.13	0.15	0.10	0.12	0.15	0.122	< 0.5s
Color consistency	5.9	5.8	5.9	5.6	5.8	5.6	5.6	5.5	5.6	5.6	5.69	≤ 6-step
Φ_{use}, @ 500h (lm)	118	119	119	118	117	117	118	122	125	125	120	-
LLMF @ 500h	97.2	98.5	97.2	98.5	97.2	97.2	98.5	99.1	99.6	99.6	98.46%	-
PFR @ 1000h	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	0%	≤ 5 %

Φ_{use}, @ 1000h (lm)	453.7	465.4	449.2	464.4	457.2	459.2	462.0	467.1	472.8	461.8	461.3	-
LLMF @ 1000h	96.5%	96.7%	93.2%	96.5%	96.0%	96.4%	96.0%	96.9%	98.1%	96.0%	96.2%	-
LSF @ 6000h	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	LSF:100%	≥90%
Φ_{use}, @ 6000h (lm)	97.2	97.5	95.8	96.3	96.9	96.6	96.9	97	98.5	96.9	97.2	-
LLMF @ 6000h	81%	82.5%	80%	82.8%	81.6%	83.7%	83.3%	84%	85%	81%	81.4%	≥80%
Sample:	11	12	13	14	15	16	17	18	19	20	**Average**	**Limit**
Switch cycles	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	UT	≥ 15000

Supplementary information:

[1]) initial measurement value after aging of: 30 min

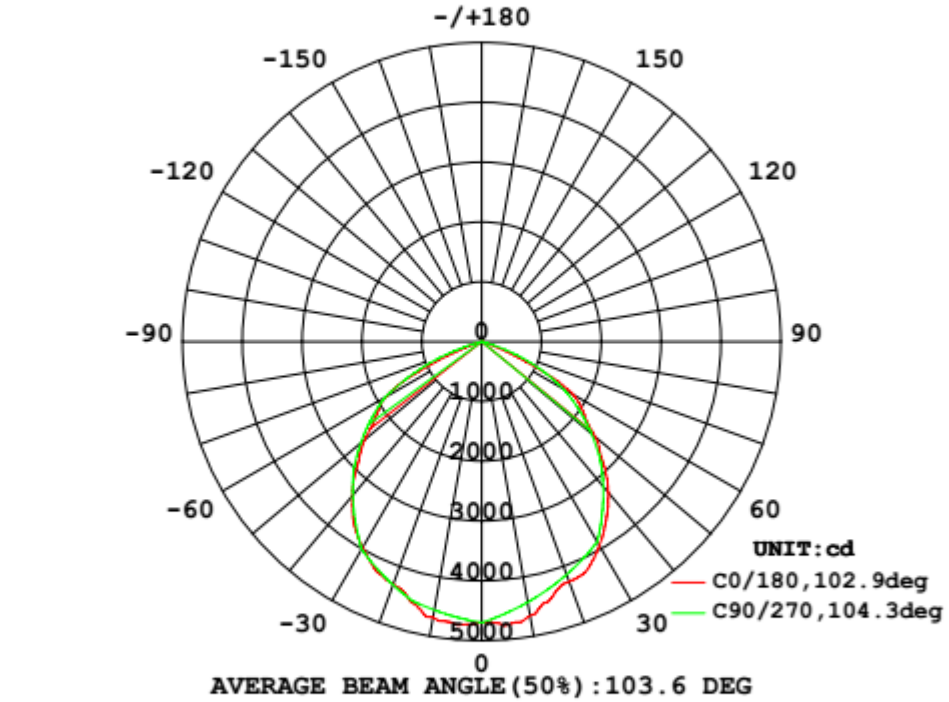
Chromaticity coordinates (x, y) [1]):x: 0.359, y: 0.242 [According to IEC60081_F5000]
Measured beam angel (˚):292.9°

Peak intensity (cd) [1]): 4.9cd

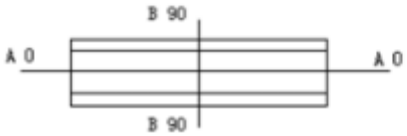
Φ_{use} @90° (lm): -

t_P (°C): -

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



AVERAGE BEAM ANGLE(50%):103.6 DEG



ZONAL FLUX DIAGRAM

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	187.5	186.8	187.1	188.3	188.8	188.7	187.6	187.6	0- 10	18.05	18.05	3.75,3.75
20	178.7	178.1	177.2	180.0	181.6	180.3	177.9	178.2	10- 20	52.02	70.07	14.6,14.6
30	162.2	160.5	160.0	164.5	168.1	165.1	160.6	161.5	20- 30	79.19	149.3	31,31
40	137.6	135.8	135.3	141.0	145.0	141.6	136.7	135.8	30- 40	94.82	244.1	50.7,50.7
50	96.08	103.6	105.1	109.0	108.7	109.8	106.3	103.2	40- 50	94.89	339.0	70.4,70.4
60	37.35	63.38	70.62	69.61	52.85	69.97	71.66	62.75	50- 60	74.80	413.8	85.9,85.9
70	15.56	27.14	37.96	32.52	20.88	32.70	38.59	27.25	60- 70	43.49	457.3	95,95
80	5.708	8.594	13.39	10.79	7.520	10.67	13.34	8.441	70- 80	19.58	476.8	99,99
90	0.4262	0.4049	0.1635	0.6270	0.6129	0.6541	0.0990	0.3325	80- 90	4.462	481.3	100,100
100	0.1718	0.1803	0.1619	0.1797	0.1085	0.1082	0.1260	0.1078	90-100	0.1817	481.5	100,100
110	0	0	0	0	0	0	0	0	100-110	0.0077	481.5	100,100
120	0	0	0	0	0	0	0	0	110-120	0	481.5	100,100
130	0	0	0	0	0	0	0	0	120-130	0	481.5	100,100
140	0	0	0	0	0	0	0	0	130-140	0	481.5	100,100
150	0	0	0	0	0	0	0	0	140-150	0	481.5	100,100
160	0	0	0	0	0	0	0	0	150-160	0	481.5	100,100
170	0	0	0	0	0	0	0	0	160-170	0	481.5	100,100
180	0	0	0	0	0	0	0	0	170-180	0	481.5	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Conical surface Flux(90deg): 292.65 lm

%lum = 60.8%
%lamp = 60.8%

Conical surface Flux(120deg): 413.76 lm

%lum = 85.9%
%lamp = 85.9%

Equipment List:

Equipment	ID No.	Model	Brand/Manufacturer	Calibration due date
Hygrothermograph	TMC-L2-017	HTC-2	MiEO	2019-02-09
Integrating sphere test system	TMC-L2-011	CSLMS-7621	Labsphere	2019-12-22
Oscilloscope	TMC-L1-015	DSO3202A	Agilent	2019-05-11
Oscilloscope probe 100:1	TMC-L1-017-T2	P4100	Agilent	2019-05-11
Stop watch	TMC-L2-018	JS-307	Timestar	2019-05-11
Goniophotometer system	TMC-L2-013	GO-R5000-SML	Everfine	2019-03-09

Attachment - Photo Document

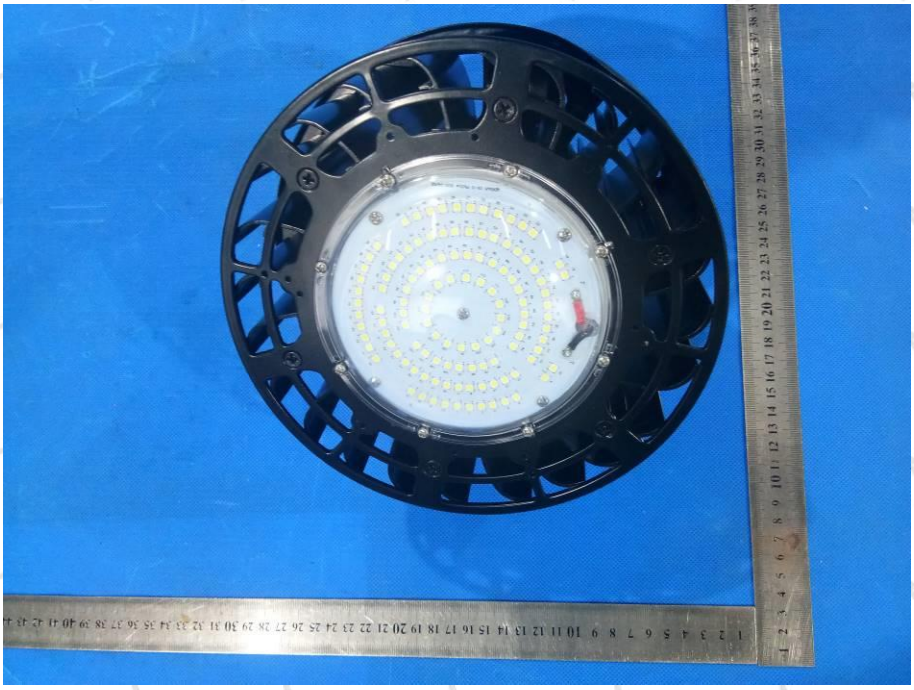


Fig. 1

Fig 2

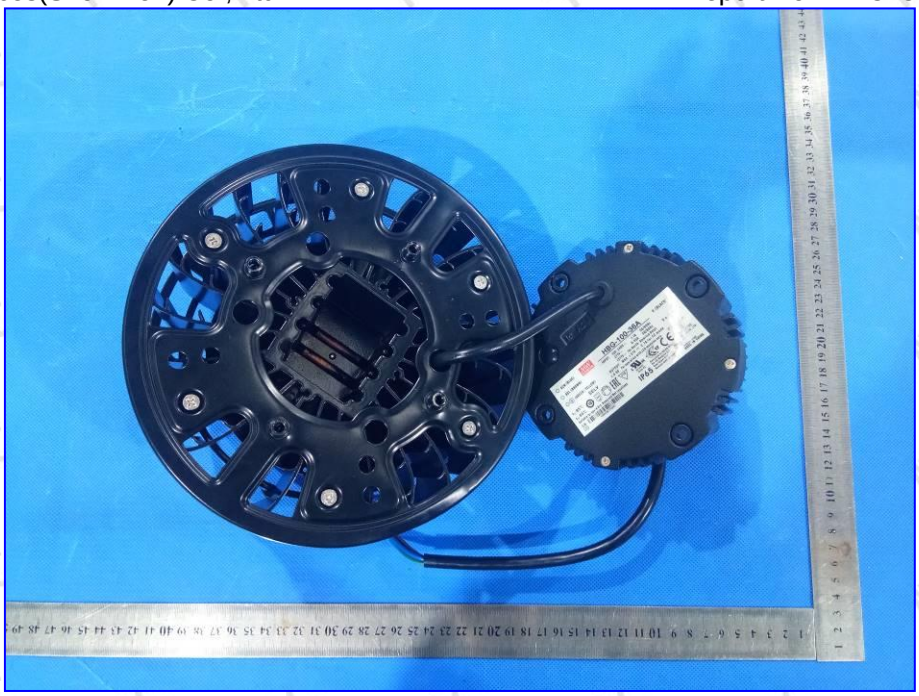


Fig 3

Fig 4

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