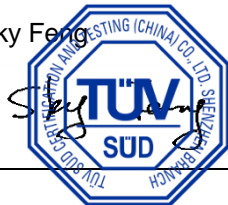



<p>TEST REPORT IES LM-79-08</p> <p>TÜV SÜD Test Report for Beyond LED Technology</p>	
Report reference No.	: 68.184.22.0286.01
Date of issue	: 2022-05-01
Project handler	: Sky Feng
Testing laboratory	: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Client	: Beyond LED Technology
Standard.....	: This TÜV SÜD test program is based on the following requirements: IES LM-79-08
TRF originated by.	: TÜV SÜD Product Service GmbH, Mr. Kenneth Lau
Copyright blank test report	: This test report is based on the content of the standard (see above). The test report considered selected clauses of the a.m. standard(s) and experience gained with product testing. It was prepared by TÜV SÜD Product Service GmbH. TUV SUD Group takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.
Test procedure	: <input type="checkbox"/> TÜV Mark <input checked="" type="checkbox"/> without certification
Non-standard test method	: N/A
National deviations.....	: N/A
Number of pages (Report)	: 22
Number of pages (Attachments)	: 1
Compiled by : Sky Feng (+ signature)	Approved by.....: Jake Xu (+ signature)



Test sample.....	LED Wall Pack		
Type of test object	Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires		
Trade mark			
Model and/or type reference.....	ZPS-MB421-60W.V1-T1-E11-P3 (“P” can be Blank or P3. Blank means without photocontrol switch; P3 means with photocontrol switch.)		
Rating(s).....	120-277VAC; 50/60Hz; 60W		
Manufacturer	Same as applicant		
Sub-contractors/ tests (clause).....	N/A		
Name	N/A		
Order description	<input checked="" type="checkbox"/>	Complete test according to TRF	
	<input type="checkbox"/>	Partial test according to manufacturer's specifications	
	<input type="checkbox"/>	Preliminary test	
	<input type="checkbox"/>	Spot check	
	<input type="checkbox"/>	Other:	
Date of order	2022-04-20		
Date of receipt of test item.....	2022-04-20		
Date(s) of performance of test.....	2022-04-20 to 2022-05-01		
Test item particulars (declared):			
Lamp type :	<input type="checkbox"/>	Bare lamp	
	<input type="checkbox"/>	Covered lamp, no reflector	
	<input type="checkbox"/>	Lamp with reflector	
	<input checked="" type="checkbox"/>	other: LED Wall Pack	
Lamp cap installed:	--		
Rated Voltage:	120-277VAC; 50/60Hz		
Rated Power:	60W		
Rated Power Factor:	> 0.9		
Rated Luminous Flux:	--		
Rated CCT:	3000K, 4000K, 5000K		
Rated CRI:	> 80		
Attachments:			
	1. Test Equipment List		

General remarks:

"(See remark #)" refers to a remark appended to the report.
 "(See appended table)" refers to a table appended to the report.
 Throughout this report a point is used as the decimal separator.
 The test results presented in this report relate only to the object tested.
 This report shall not be reproduced except in full without the written approval of the testing laboratory.
 Measurement uncertainty budgets have been determined for applicable test methods and are available upon request.

Measurement Uncertainty Budget (k=2)

Voltage	$U_{rel}=0.29\%, K=2$
Current	$U_{rel}=0.36\%, K=2$
Power	$U_{rel}=0.69\%, K=2$
Total Luminous Flux by integrated sphere	$U_{rel}=4.2\%, K=2$
Total Luminous Flux by goniophotometer	$U_{rel}=2.2\%, K=2$

Product information:

The product is White-Tunable product. The adjustable CCT is 3000K, 4000K and 5000K.
 Unless otherwise specified, 1pc **ZPS-MB421-60W.V1-T1-E11-P3** with all CCT were chosen to perform all tests.

TUV SUD Cert & Testing (China) Co., Ltd. Shenzhen Branch is an accredited Test Laboratory (NVLAP Lab Code: 500067-0) to IESNA LM-79-08 by NVLAP (National Voluntary Laboratory Accreditation Program).



The report must not be used by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

Summary of testing:

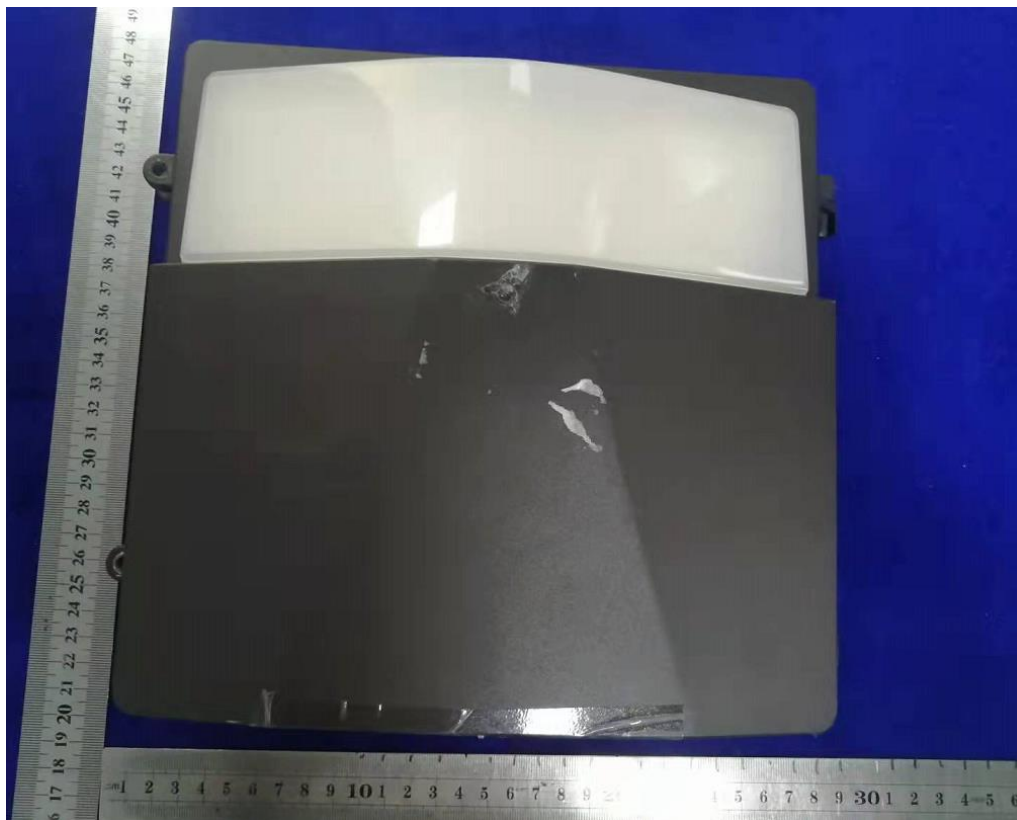
Model:	ZPS-MB421-60W.V1-T1-E11-P3		
CCT	3000K	4000K	5000K
Luminous Efficacy (Lumens/Watt)	98.8	103.6	100.8
Luminous Flux (Lumens) (Output in the 0-90° zone)	5932	6068	5898
Luminous Flux (Lumens) (Total)	6864	7905	6811
Input Voltage (Volt)	120	120	120
Input Power (Watts)	60.03	58.55	58.50
Power Factor	0.9907	0.9900	0.9904
A-THD	6.9%	6.9%	6.9%
CCT (K)	2915	3806	4965
SDCM (ANSI C78.377-2017)	<7	<7	<7
CRI	83.2	86.4	84.4
R9	9	23	14
Rf	85	86	85
Rg	97	97	96
Rcs, h1	-11%	-10%	-11%
BUG Ratings	B2-U4-G3	B2-U4-G3	B2-U4-G3
Zonal flux (80-90°)	9.2%	9.5%	9.2%
Stabilisation Time (Light Power) (mins)	90	90	90

Model	CCT	Test Voltage(V)	Test Current(A)	Power(W)	PF	A-THD
ZPS-MB421-60W.V1-T1-E11-P3	3000K	277	0.222	59.72	0.973	10.86%
	4000K	277	0.221	59.65	0.973	10.89%
	5000K	277	0.221	59.71	0.973	10.89%

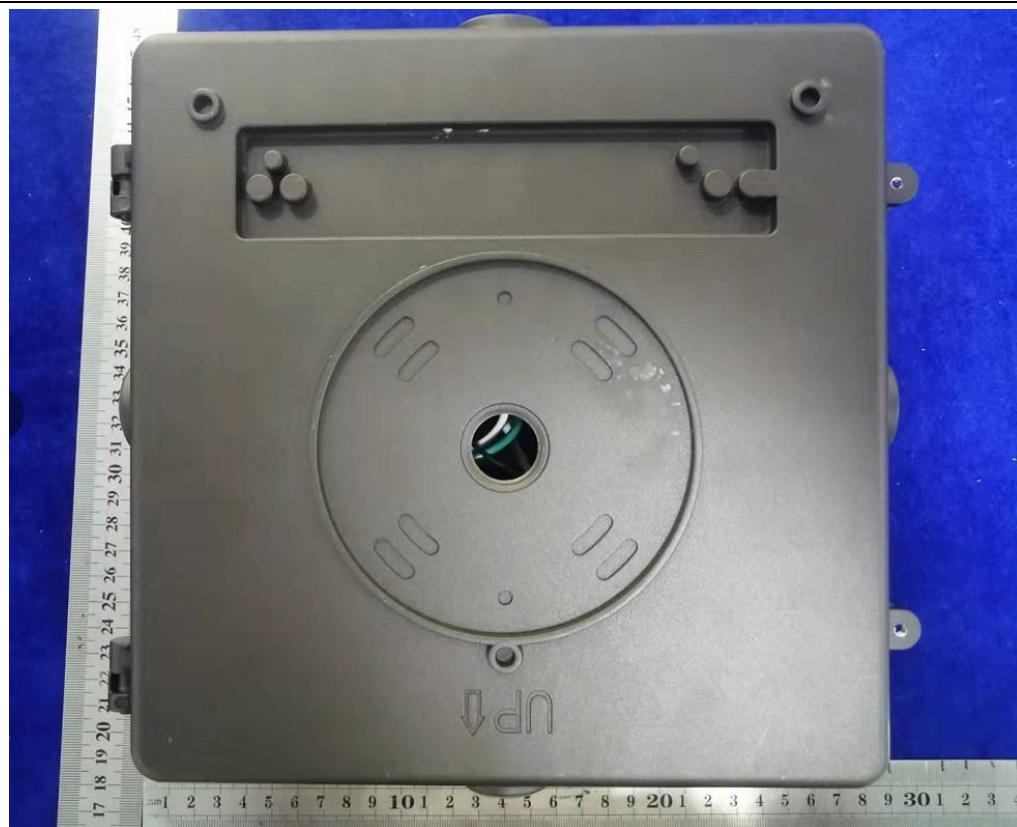
LED specification:

Model	Manufactory	Vf (V)	If (mA)	Viewing angle (°)	CCT (K)	Ra
L128-xx80RC3500xxx	Lumileds	8.6-9.6	100	120	3000K 4000K 5000K	>80

Picture of the product



1. Overview



2. Overview

Copy of marking plate: --
Characteristic data --
Purpose of the product LED Wall Pack for general lighting purpose.
Possible test case verdicts: - test case does not apply to the test object:: N/A - test object does meet the requirement.....: P(ass) - test object does not meet the requirement:: F(ail) Possible suffixes to the verdicts: - suffix for detailed information for the client.....:- C(comment) - suffix for important information for factory inspection...: - M(manufacturing)

IES LM-79-08			
Clause	Requirement – Test	Measuring result – Remark	Verdict
1.0	Introduction		--
2.0	Ambient Conditions		P
2.1	General		P
2.2	Air Temperature		P
2.3	Thermal Condition for Mounting SSL Products		P
2.4	Air Movement		P
3.0	Power Supply Characteristics		P
3.1	Wave shape of AC power supply		P
3.2	Voltage regulation		P
4.0	Seasoning of SSL Product	No seasoning of SSL product	N/A
5.0	Stabilization of SSL Product		P
	SSL product has sufficiently stabilized before measurement		P
6.0	Operation Orientation		P
	SSL product shall be stabilized and measured in intended operating orientation	As normal working	P
7.0	Electrical Settings		P
	SSL product shall be operated at rated voltage		P
	SSL product with dimming capability are tested at maximum input power condition		N/A
	SSL product with different modes are measured in all relevant modes		N/A
8.0	Electrical Instrumentations		P
8.1	Circuits		P
8.2	Uncertainties		P
9.0	Test methods for Luminous Flux measurement		P
9.1	Integrating sphere with a spectroradiometer (Sphere-spectroradiometer system)		P
9.2	Integrating sphere with a photometer head (Sphere-photometer system)		N/A
9.3	Goniophotometer		P
10.0	Luminous Intensity Distribution		P
	Reporting acc, to IEC LM-63		P
11.0	Luminous Efficacy		P
	Calculation	See table 1	P
12.0	Test Methods for Colour Characteristics of SSL Products		P
	Measurements	See table 1	P
13.0	Uncertainty statement		N/A
14.0	Test report		--

Table 1	Test data		
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 3000K)		
Rated Voltage (V):	120-277VAC	Rated Power (W):	60
Rated luminous flux (lm):	--	Ambient temperature 25 ±1 (°C):	25.1
Test item	Measured Value		
	Integrating Sphere		Goniophotometer
Key Photometric Results			
Luminous Efficacy (Lumens/Watt)	--	98.8	
Total Luminous Flux (Lumens)	--	5932	
Correlated Color Temperature (CCT: K)	2915	--	
Color Rendering Index (CRI)	83.2	--	
Chromaticity (Chroma x / Chroma y)	0.3875 / 0.4017	--	
Chromaticity (Chroma u / Chroma v)	0.2542 / 0.3474	--	
Chromaticity (Chroma u' / Chroma v')	0.2542 / 0.5210	--	
Duv Value	-0.0015	--	
Colour Angular Uniformity (Max,du'v')	--	--	
Stabilization Time (Light and Power)	90	90	
Total Run Time – (Minutes)	100	100	
Zonal flux (0-90°)	--	--	
Zonal flux (80-90°)	--	9.2%	
Spacing Criteria (C/γ)	--	C:22.5° / γ:1.0°	
Electrical Input Results			
Input Power (Watts)	--	60.023	
Input Voltage (Volts AC)	--	120	
Input Current (Amps)	--	0.5197	
Input Frequency (Hertz)	--	60	
Power Factor	--	0.9907	
A-THD (Current – Total Harmonic Distortion)	--	6.9%	
Additional Information			
Ambient Temperature (°C):	25.1	25.1	
ISTMT (In-Situ Temperature Measurement) (°C):	--		
Photometric measurement condition	--	--	
Supplementary Information:			
<ul style="list-style-type: none"> - Absorbion Correction used: Yes - Stabilization was considered reached by: the variation (maximum-minimum) of at least 3 readings of the light output and electrical power over a period of 30 minutes is less than 0.5%. 			

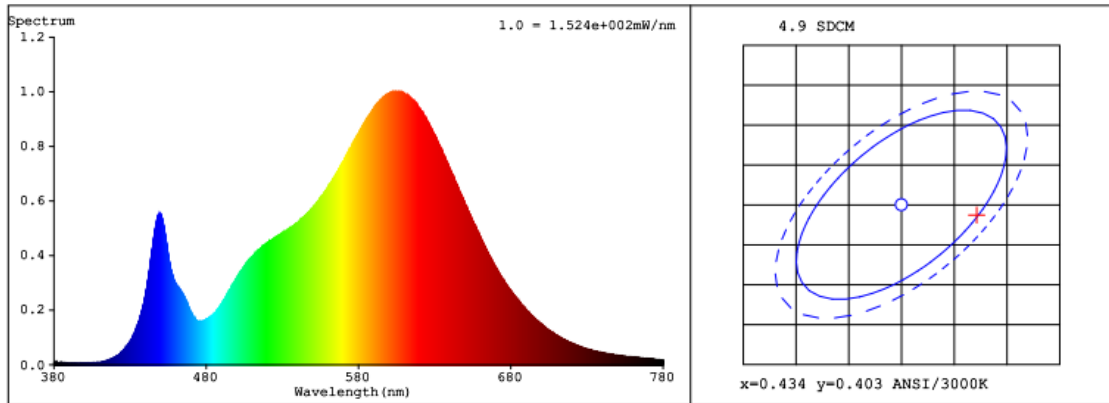
Table 2		Test data	
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 4000K)		
Rated Voltage (V):	120-277VAC	Rated Power (W):	60
Rated luminous flux (lm):	--	Ambient temperature 25 ±1 (°C):	25.1
Test item	Measured Value		
	Integrating Sphere		Goniophotometer
Key Photometric Results			
Luminous Efficacy (Lumens/Watt)	--		103.6
Total Luminous Flux (Lumens)	--		6068
Correlated Color Temperature (CCT: K)	3806		--
Color Rendering Index (CRI)	86.4		--
Chromaticity (Chroma x / Chroma y)	0.3875 / 0.3761		--
Chromaticity (Chroma u / Chroma v)	0.2300 / 0.3349		--
Chromaticity (Chroma u' / Chroma v')	0.2300 / 0.5024		--
Duv Value	-0.0024		--
Colour Angular Uniformity (Max,du'v')	--		--
Stabilization Time (Light and Power)	90		90
Total Run Time – (Minutes)	100		100
Zonal flux (0-90°)	--		--
Zonal flux (80-90°)	--		9.5%
Spacing Criteria (C/γ)	--		C:22.5° / γ:1.0°
Electrical Input Results			
Input Power (Watts)	--		9.5%
Input Voltage (Volts AC)	--		120
Input Current (Amps)	--		0.4938
Input Frequency (Hertz)	--		60
Power Factor	--		0.9900
A-THD (Current – Total Harmonic Distortion)	--		6.9%
Additional Information			
Ambient Temperature (°C):	25.1		25.1
ISTMT (In-Situ Temperature Measurement) (°C):	--		
Photometric measurement condition	--		--
Supplementary Information:			
<ul style="list-style-type: none"> - Absorbion Correction used: Yes - Stabilization was considered reached by: the variation (maximum-minimum) of at least 3 readings of the light output and electrical power over a period of 30 minutes is less than 0.5%. 			

Table 3		Test data	
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 5000K)		
Rated Voltage (V):	120-277VAC	Rated Power (W):	60
Rated luminous flux (lm):	--	Ambient temperature 25 ±1 (°C):	25.1
Test item	Measured Value		
	Integrating Sphere		Goniophotometer
Key Photometric Results			
Luminous Efficacy (Lumens/Watt)	--		100.8
Total Luminous Flux (Lumens)	--		5898
Correlated Color Temperature (CCT: K)	4965		--
Color Rendering Index (CRI)	84.4		--
Chromaticity (Chroma x / Chroma y)	0.3467 / 0.3590		--
Chromaticity (Chroma u / Chroma v)	0.2097 / 0.3256		--
Chromaticity (Chroma u' / Chroma v')	0.2097 / 0.4911		--
Duv Value	0.0030		--
Colour Angular Uniformity (Max,du'v')	--		--
Stabilization Time (Light and Power)	90		90
Total Run Time – (Minutes)	100		100
Zonal flux (0-90°)	--		--
Zonal flux (80-90°)	--		9.2%
Spacing Criteria (C/γ)	--		C:22.5° / γ:1.0°
Electrical Input Results			
Input Power (Watts)	--		58.50
Input Voltage (Volts AC)	--		120
Input Current (Amps)	--		0.510
Input Frequency (Hertz)	--		60
Power Factor	--		0.9904
A-THD (Current – Total Harmonic Distortion)	--		6.9%
Additional Information			
Ambient Temperature (°C):	25.1		25.1
ISTMT (In-Situ Temperature Measurement) (°C):	--		
Photometric measurement condition	--		--
Supplementary Information:			
<ul style="list-style-type: none"> - Absorbion Correction used: Yes - Stabilization was considered reached by: the variation (maximum-minimum) of at least 3 readings of the light output and electrical power over a period of 30 minutes is less than 0.5%. 			

Table 4	Spectral Flux Graph
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 3000K)

The following graph shows the spectral response curve of the radiant flux for the sample:

Spectrum



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.4409$ $y = 0.4017$ / $u' = 0.2542$ $v' = 0.5210$ ($duv = -1.46e-03$)

CCT= 2915K Prcp WL: $L_d = 583.7nm$ Purity=52.9%

Peak WL: $L_p = 607nm$ FWHM: =122.1nm Ratio:R=23.7% G=73.9% B=2.5%

Render Index: $R_a = 83.2$

R1 =82 R2 =92 R3 =96 R4 =82 R5 =82 R6 =90 R7 =82

R8 =59 R9 =9 R10=81 R11=82 R12=76 R13=84 R14=98 R15=74

LEVEL:OUT WHITE:ANSI_3000K

Spectral response of the Radiant Flux

(380nm to 780nm – calibrated range of the Spectroradiometer)

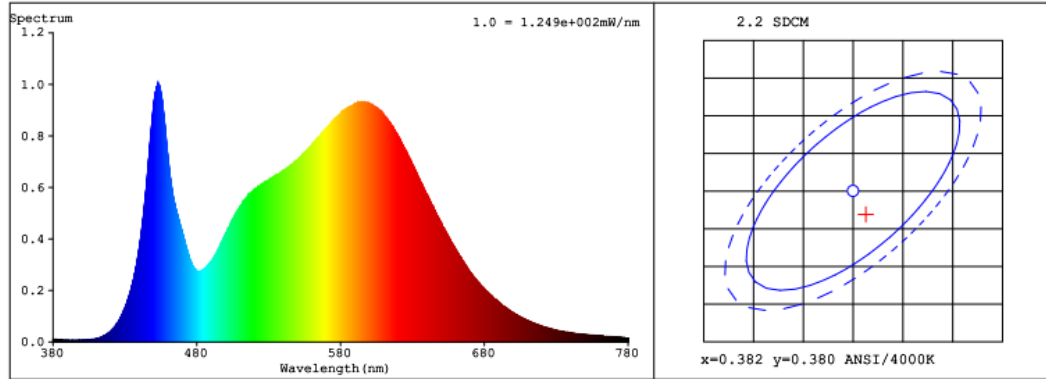


7-step quadrangle

Table 5	Spectral Flux Graph
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 4000K)

The following graph shows the spectral response curve of the radiant flux for the sample:

Spectrum



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3831$ $y = 0.3766$ / $u' = 0.2269$ $v' = 0.5019$ ($duv=-8.38e-04$)
 CCT= 3928K Prcp WL: Ld=579.8nm Purity=28.0%
 Peak WL: Lp=453nm FWHM: =23.1nm Ratio:R=18.7% G=77.7% B=3.7%

Render Index: Ra = 83.2 White Factor: 0.078977 $v'_{white} = 0.5042$
 R1 =82 R2 =91 R3 =96 R4 =81 R5 =82 R6 =87 R7 =85
 R8 =63 R9 =7 R10=77 R11=80 R12=63 R13=84 R14=98 R15=75
 LEVEL:OUT WHITE:ANSI_4000K

Spectral response of the Radiant Flux
 (380nm to 780nm – calibrated range of the Spectroradiometer)

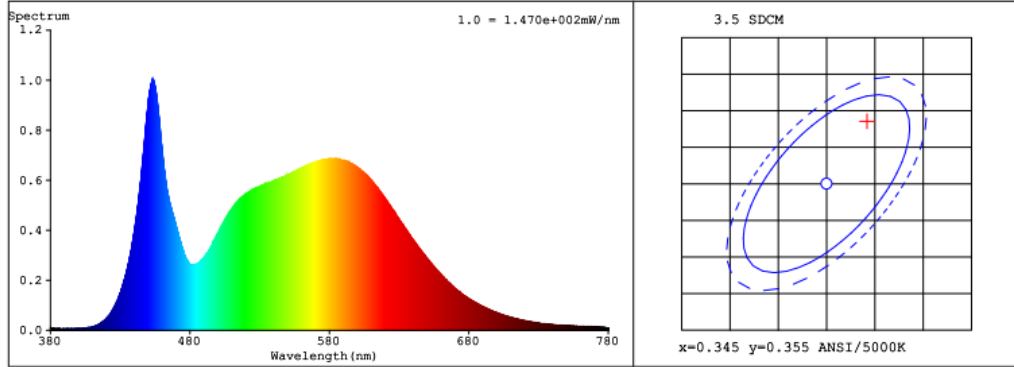


7-step quadrangle

Table 6	Spectral Flux Graph
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 5000K)

The following graph shows the spectral response curve of the radiant flux for the sample:

Spectrum

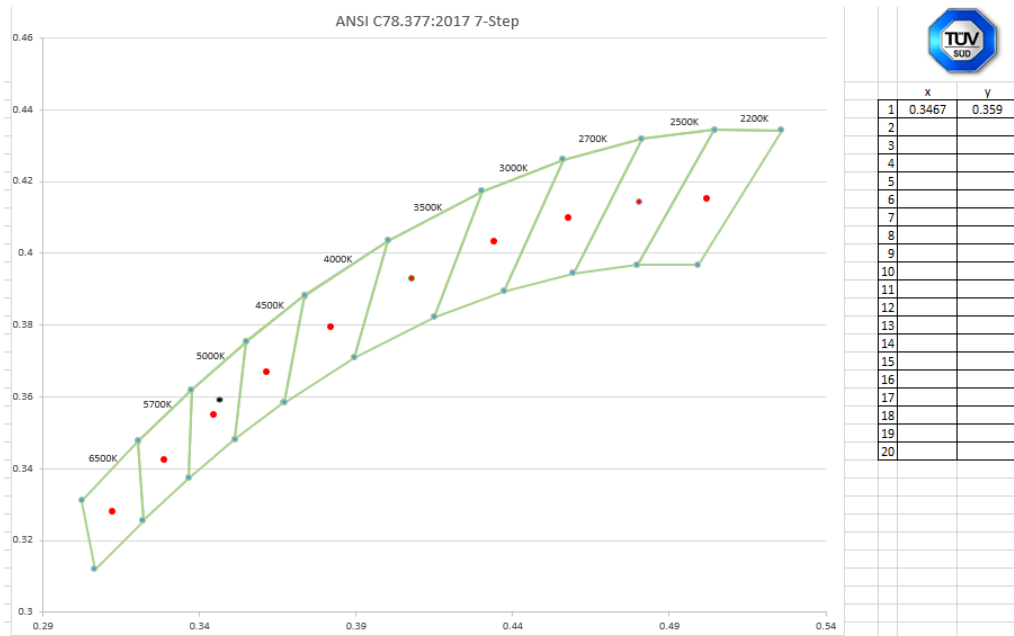


Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3489$ $y = 0.3638$ / $u' = 0.2093$ $v' = 0.4911$ ($duv=4.55e-03$)
 CCT= 4905K Prcp WL: $L_d=570.2nm$ Purity=13.9%
 Peak WL: $L_p=453nm$ FWHM: $\approx 23.2nm$ Ratio:R=15.4% G=80.3% B=4.4%

Render Index: $R_a = 80.7$ White Factor: 0.1026 $v'_{white} = 0.4932$
 $R1 = 78$ $R2 = 87$ $R3 = 94$ $R4 = 78$ $R5 = 78$ $R6 = 82$ $R7 = 86$
 $R8 = 62$ $R9 = 0$ $R10 = 70$ $R11 = 77$ $R12 = 54$ $R13 = 80$ $R14 = 97$ $R15 = 71$
 LEVEL:OUT WHITE:ANSI_5000K

Spectral response of the Radiant Flux
 (380nm to 780nm – calibrated range of the Spectroradiometer)



7-step quadrangle

Table 7	ANSI/IES TM-30-18 Full Report
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 3000K)

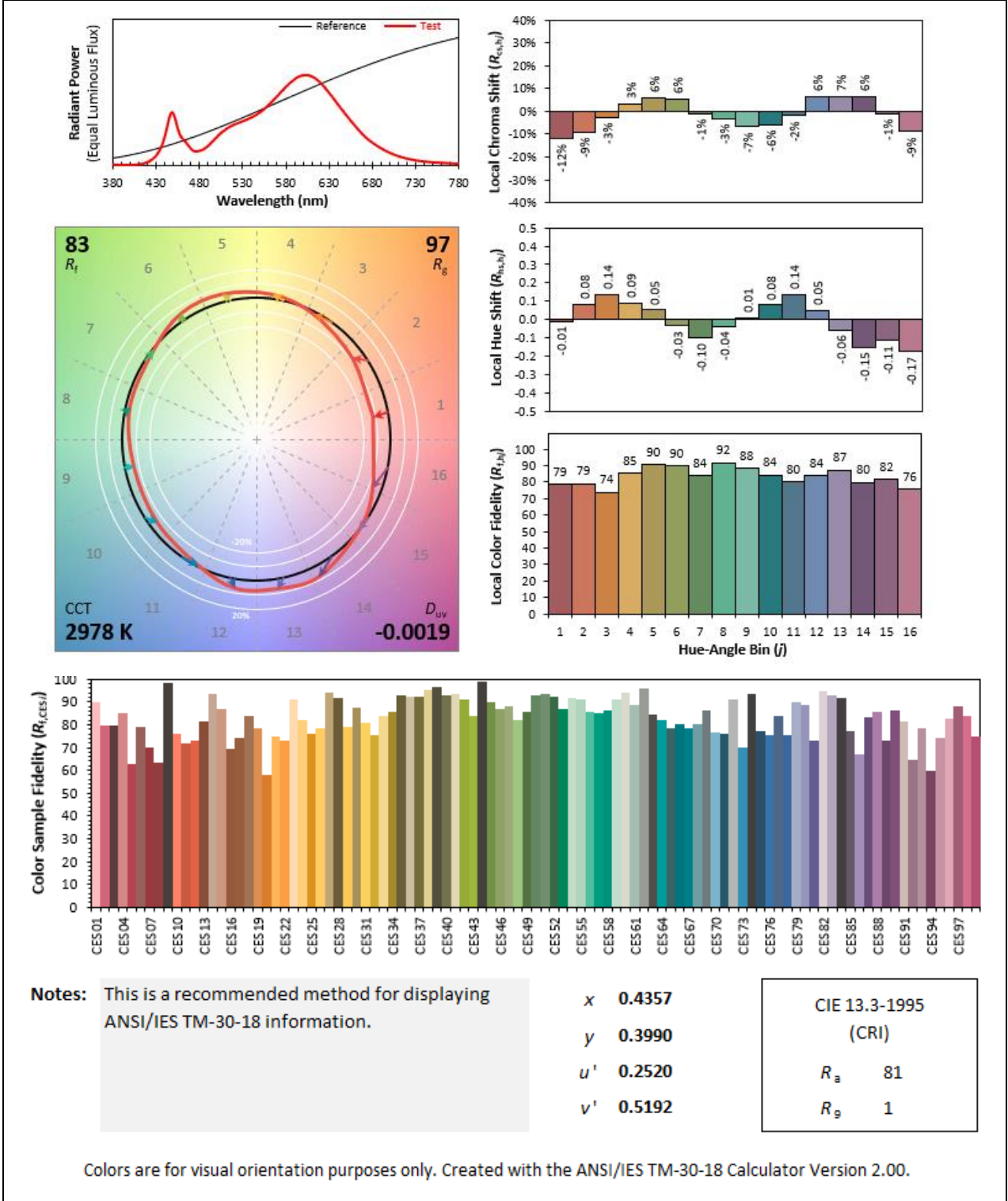
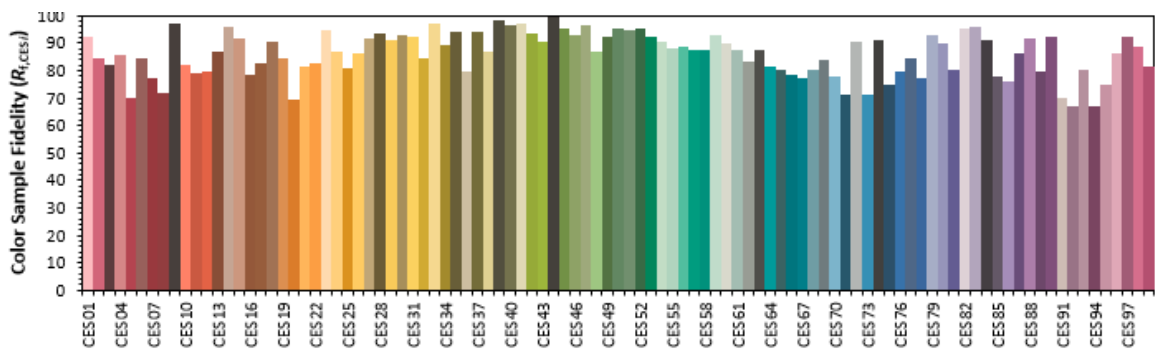
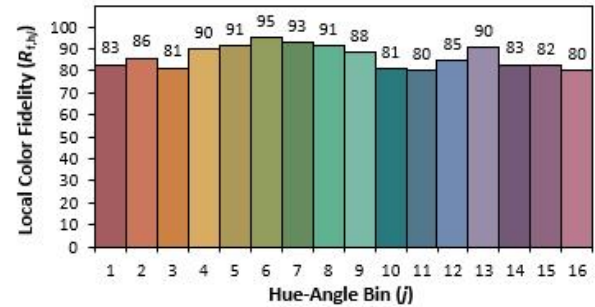
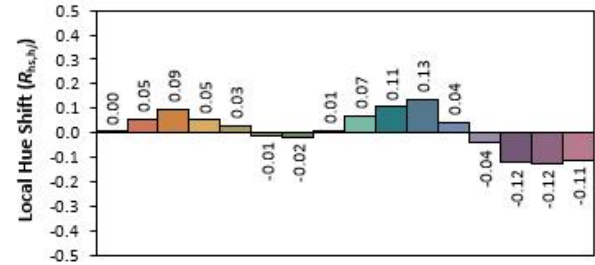
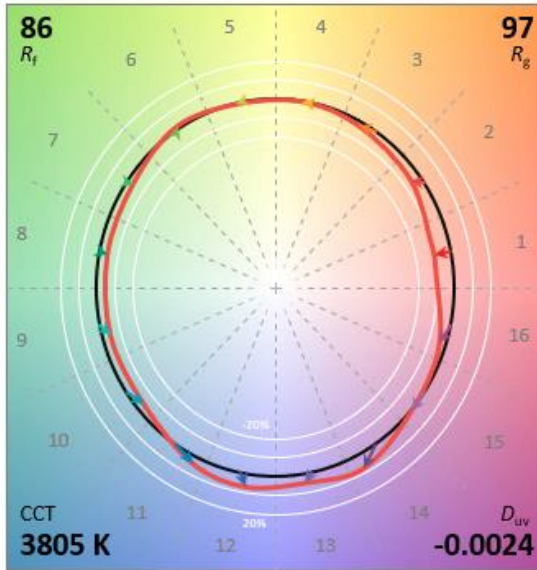
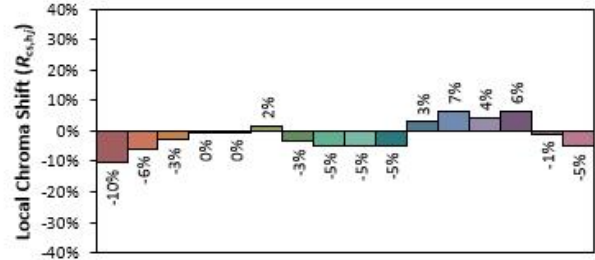
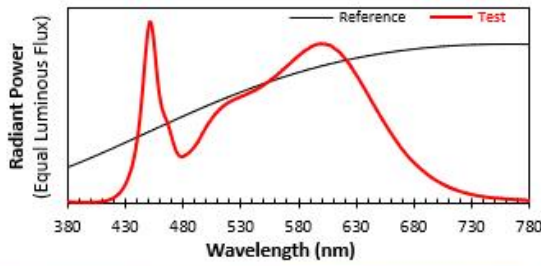


Table 8	ANSI/IES TM-30-18 Full Report
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 4000K)



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3875
y 0.3760
u' 0.2301
v' 0.5023

CIE 13.3-1995 (CRI)	
R _a	86
R _g	23

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Table 9	ANSI/IES TM-30-18 Full Report
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 5000K)

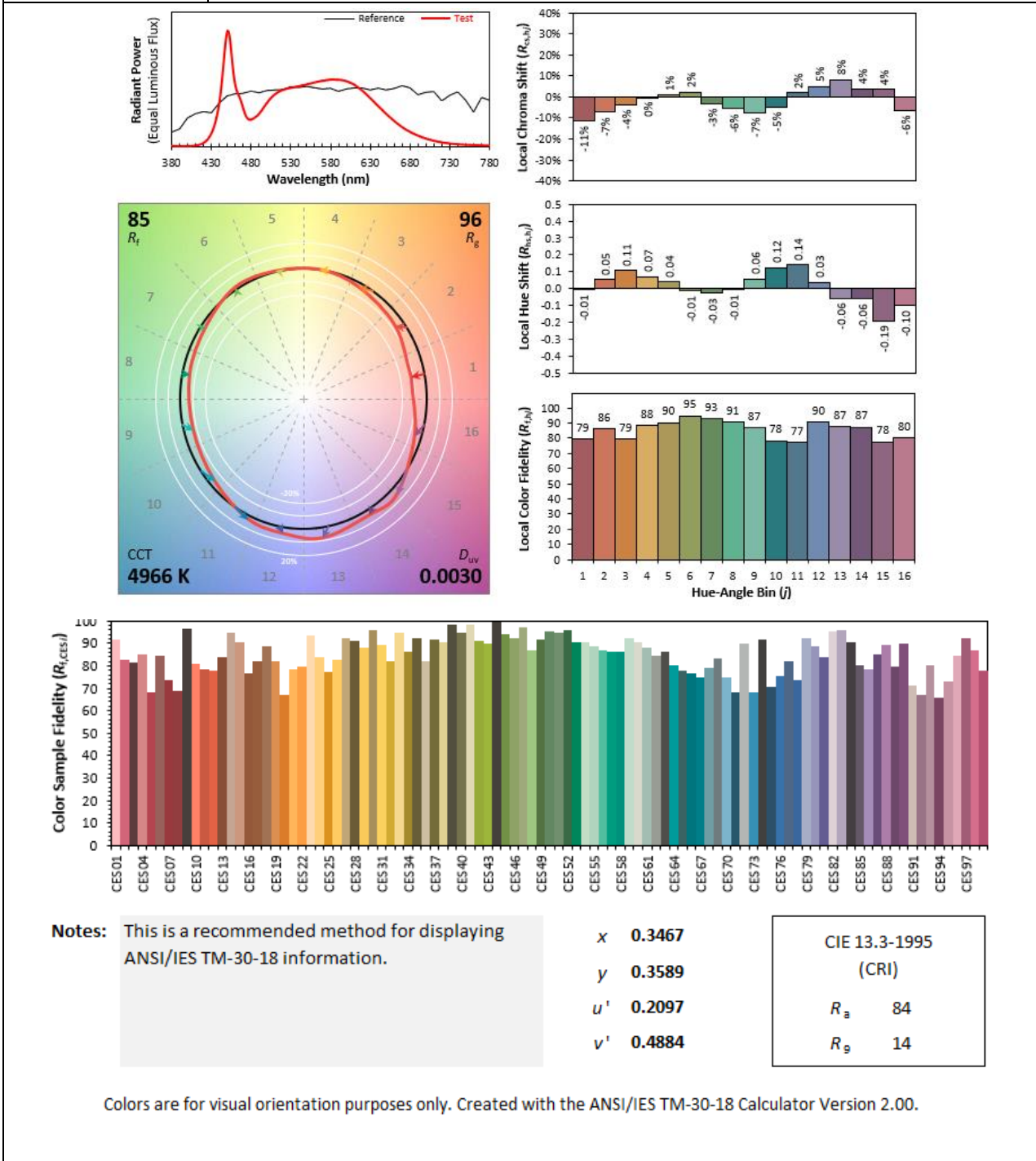
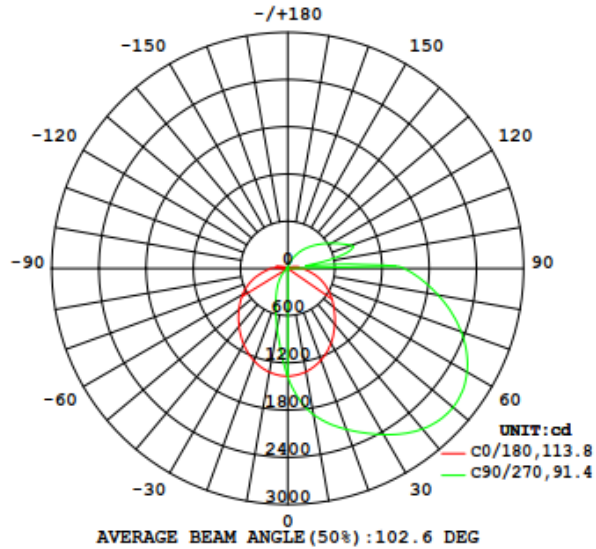


Table 10	Luminous Intensity distribution diagram
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 3000K)

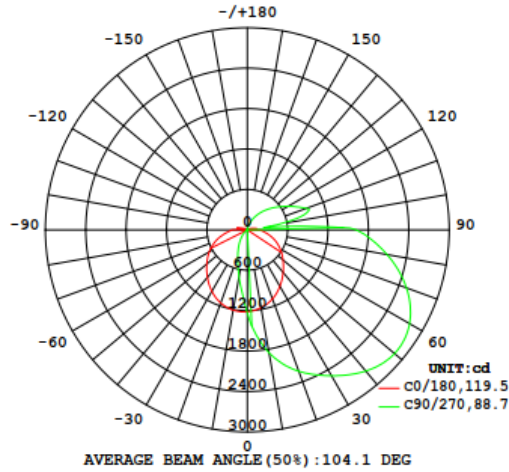
Luminous Intensity distribution diagram (Unit: cd)



y	C0	C45	C90	C135	C180	C225	C270	C315	y	Φ zone	Φ total	%lum,lamp
10	1333	1751	1886	1722	1339	911.4	780.8	898.2	0- 10	128.1	128.1	1.87,1.87
20	1239	1941	2176	1919	1250	574.3	443.1	573.2	10- 20	365.8	493.9	7.2,7.2
30	1099	2043	2438	2025	1118	357.2	260.9	360.6	20- 30	569.6	1064	15.5,15.5
40	931.5	2103	2663	2093	963.6	215.3	137.7	218.6	30- 40	741.6	1805	26.3,26.3
50	766.4	2092	2745	2085	810.8	112.4	52.35	113.3	40- 50	869.6	2675	39,39
60	614.1	1968	2633	1957	662.3	40.64	5.829	39.62	50- 60	929.3	3604	52.5,52.5
70	460.7	1721	2346	1704	503.9	10.63	1.924	7.747	60- 70	903.4	4507	65.7,65.7
80	302.4	1387	1941	1370	336.8	11.31	1.432	8.410	70- 80	794.0	5301	77.2,77.2
90	191.6	1036	1482	1028	218.2	9.457	0.8407	6.840	80- 90	630.2	5932	86.4,86.4
100	129.4	246.1	365.0	136.7	150.1	9.210	2.028	6.162	90-100	246.9	6179	90,90
110	60.54	307.4	860.3	300.0	71.53	5.048	2.492	4.216	100-110	212.3	6391	93.1,93.1
120	27.89	348.3	642.2	351.6	31.21	3.705	4.663	3.696	110-120	192.3	6583	95.9,95.9
130	7.212	274.8	465.8	287.7	15.65	3.213	4.861	3.414	120-130	139.3	6722	97.9,97.9
140	4.592	183.9	317.3	196.0	4.274	3.706	3.985	2.720	130-140	83.77	6806	99.2,99.2
150	3.950	52.37	183.7	101.9	6.357	4.563	2.665	3.581	140-150	43.08	6849	99.8,99.8
160	4.141	24.68	21.04	11.12	5.830	3.715	3.436	3.025	150-160	13.20	6862	100,100
170	4.400	4.205	3.591	3.355	4.465	4.060	2.037	1.649	160-170	1.610	6864	100,100
180	4.937	4.084	3.481	3.297	4.700	4.561	3.686	3.182	170-180	0.3305	6864	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Table 11	Luminous Intensity distribution diagram
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 4000K)

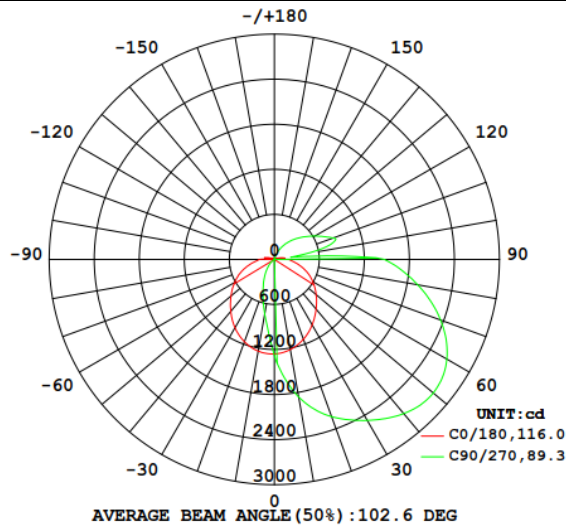
Luminous Intensity distribution diagram (Unit: cd)



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	1174	1662	1852	1669	1210	824.6	711.8	803.8	0- 10	117.7	117.7	1.66,1.66
20	1092	1932	2233	1946	1156	542.0	417.7	521.0	10- 20	350.2	468.0	6.6,6.6
30	968.9	2069	2501	2091	1054	345.7	243.8	329.8	20- 30	561.0	1029	14.5,14.5
40	828.3	2134	2736	2169	922.9	207.4	122.1	195.6	30- 40	739.7	1769	24.9,24.9
50	691.9	2132	2856	2179	787.6	103.6	40.89	96.15	40- 50	877.9	2647	37.3,37.3
60	563.6	2028	2783	2078	653.5	32.86	3.891	28.47	50- 60	953.4	3600	50.7,50.7
70	430.2	1797	2515	1842	507.0	9.983	2.198	7.566	60- 70	944.5	4544	64,64
80	288.8	1465	2108	1503	345.9	11.02	1.538	8.426	70- 80	844.7	5389	76,76
90	187.1	1090	1620	1134	228.6	9.214	0.8813	6.832	80- 90	679.3	6068	85.5,85.5
100	128.1	241.7	452.0	152.8	157.1	8.899	2.216	6.578	90-100	257.6	6326	89.2,89.2
110	61.19	327.4	936.1	364.2	73.97	5.315	2.735	4.274	100-110	233.3	6559	92.4,92.4
120	30.66	378.2	700.7	412.3	36.05	4.050	5.040	3.975	110-120	212.3	6772	95.4,95.4
130	7.249	307.9	515.0	334.9	21.95	3.621	5.280	3.998	120-130	155.9	6928	97.6,97.6
140	4.442	216.5	360.0	234.7	6.214	4.069	4.294	2.957	130-140	95.32	7023	99,99
150	3.634	78.51	220.7	132.0	6.311	4.252	2.691	3.817	140-150	51.52	7074	99.7,99.7
160	4.469	36.57	86.24	23.77	5.030	4.136	3.456	3.054	150-160	17.57	7092	100,100
170	4.686	4.561	6.277	3.832	4.793	4.385	2.025	1.670	160-170	3.039	7095	100,100
180	5.193	4.403	3.778	3.560	4.877	4.771	3.956	3.434	170-180	0.3537	7095	100,100
DEG	LUMINOUS INTENSITY:cd								UNIT:lm			

Table 12	Luminous Intensity distribution diagram
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 5000K)

Luminous Intensity distribution diagram (Unit: cd)



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	1220	1680	1860	1669	1240	853.2	742.2	831.8	0- 10	120.3	120.3	1.77,1.77
20	1132	1951	2227	1928	1167	571.5	444.0	549.3	10- 20	355.6	475.9	6.99,6.99
30	1007	2086	2475	2051	1050	366.7	262.4	348.2	20- 30	565.7	1042	15.3,15.3
40	866.1	2140	2681	2101	905.2	221.5	136.1	210.6	30- 40	739.1	1781	26.1,26.1
50	727.4	2123	2766	2084	755.3	112.7	50.83	108.6	40- 50	867.2	2648	38.9,38.9
60	592.5	1995	2654	1959	612.3	37.44	5.147	37.78	50- 60	928.6	3577	52.5,52.5
70	449.1	1738	2357	1706	464.3	7.922	2.117	8.322	60- 70	903.5	4480	65.8,65.8
80	299.1	1391	1940	1366	309.3	8.585	1.429	9.059	70- 80	792.5	5273	77.4,77.4
90	186.7	1006	1470	1018	200.3	7.248	0.9161	7.626	80- 90	625.5	5898	86.6,86.6
100	126.5	167.6	406.1	155.8	136.6	6.795	2.024	7.095	90-100	228.3	6126	90,90
110	58.12	320.2	838.0	318.0	64.34	4.363	2.399	4.484	100-110	211.6	6338	93.1,93.1
120	28.20	355.8	625.0	357.8	29.48	3.829	4.757	3.804	110-120	191.4	6529	95.9,95.9
130	10.58	280.8	456.7	287.1	12.11	3.455	5.025	3.847	120-130	138.8	6668	97.9,97.9
140	4.627	190.5	314.5	193.4	4.293	3.528	3.996	2.908	130-140	83.61	6752	99.1,99.1
150	3.468	90.99	184.4	98.56	4.466	3.876	2.645	3.633	140-150	43.45	6795	99.8,99.8
160	4.240	23.75	30.76	18.88	4.746	3.698	3.349	2.991	150-160	13.44	6809	100,100
170	4.461	4.187	3.514	3.396	4.533	4.191	1.846	1.553	160-170	1.637	6810	100,100
180	4.872	4.119	3.539	3.323	4.698	4.593	3.716	3.237	170-180	0.3304	6811	100,100
DEG	LUMINOUS INTENSITY:cd								UNIT:lm			

Table 13	BUG		
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 3000K)		
IES "BUG" RATING (BACK LIGHT, UPLIGHT, GLARE) PER IES TM-15-11			
IESNA Luminaire Flux Distribution Table:			
Zone	Lumens	Luminaire %	
FL - Front-Low(0-30)	602.44	8.8	
FM - Front-Medium(30-60)	1467.3	21.4	
FH - Front-High(60-80)	995.61	14.5	
FVH - Front-Very High(80-90)	372.86	5.4	
Total Forward Light	4003.1	58.3	
BL - Back-Low(0-30)	461.06	6.7	
BM - Back-Medium(30-60)	1073.2	15.6	
BH - Back-High(60-80)	701.73	10.2	
BVH - Back-Very High(80-90)	257.39	3.7	
Total Back Light	2861.3	41.7	
UL - Uplight-Low(90-100)	246.92	3.6	
UH - Uplight-High(100-180)	685.86	10.0	
Total Up Light	932.77	13.6	
BUG(Back,Up,Glare) Rating		B2-U4-G3	
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	2493.4	367.87	2861.3
Street Side	3438.2	564.9	4003.1

Table 14	BUG		
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 4000K)		
IES "BUG" RATING (BACK LIGHT, UPLIGHT, GLARE) PER IES TM-15-11			
IESNA Luminaire Flux Distribution Table:			
Zone	Lumens	Luminaire %	
FL - Front-Low(0-30)	602.44	8.8	
FM - Front-Medium(30-60)	1467.3	21.4	
FH - Front-High(60-80)	995.61	14.5	
FVH - Front-Very High(80-90)	372.86	5.4	
Total Forward Light	4003.1	58.3	
BL - Back-Low(0-30)	461.06	6.7	
BM - Back-Medium(30-60)	1073.2	15.6	
BH - Back-High(60-80)	701.73	10.2	
BVH - Back-Very High(80-90)	257.39	3.7	
Total Back Light	2861.3	41.7	
UL - Uplight-Low(90-100)	246.92	3.6	
UH - Uplight-High(100-180)	685.86	10.0	
Total Up Light	932.77	13.6	
BUG(Back,Up,Glare) Rating	B2-U4-G3		
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	2493.4	367.87	2861.3
Street Side	3438.2	564.9	4003.1

Table 15	BUG		
Model:	ZPS-MB421-60W.V1-T1-E11-P3 (CCT 5000K)		
IES "BUG" RATING (BACK LIGHT, UPLIGHT, GLARE) PER IES TM-15-11			
IESNA Luminaire Flux Distribution Table:			
Zone	Lumens	Luminaire %	
FL - Front-Low (0-30)	589.72	8.7	
FM - Front-Medium (30-60)	1469.8	21.6	
FH - Front-High (60-80)	1001.7	14.7	
FVH - Front-Very High (80-90)	372.25	5.5	
Total Forward Light	3988	58.6	
BL - Back-Low (0-30)	451.91	6.6	
BM - Back-Medium (30-60)	1065.1	15.6	
BH - Back-High (60-80)	694.35	10.2	
BVH - Back-Very High (80-90)	253.25	3.7	
Total Back Light	2822.6	41.4	
UL - Uplight-Low (90-100)	228.25	3.4	
UH - Uplight-High (100-180)	684.31	10.0	
Total Up Light	912.56	13.4	
BUG (Back, Up, Glare) Rating	B2-U4-G3		
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	2464.6	358.02	2822.6
Street Side	3433.5	554.54	3988

Attachment 1: Equipment List

Equipment	ID No.	Model	Brand/Manufacturer	Calibration due date
Digital Power Meter	13217	WT210	YOKOGAWA	2022-08-21
Anemometer	15798	Testo417	Testo	2022-10-20
Temperature and Humidity meter	13397	SK-L200TH	SATO	2022-08-12
Goniophotometer system	13345	GO-R5000-SML	Everfine	2023-03-23
Integrating sphere test system	13342	CSLMS-7621	Labsphere	2022-10-17

END OF TEST REPORT