



# LM-79-08 Test Report

For

# **ELEC-TECH INTERNATIONAL CO LTD**

No.1 Jinfeng Road, Tangjiawan Town, Xiangzhou District, Zhuhai City, Guangdong Province, P.R. China 519085

# LED Downlight

Model name(s): 538011##

Representative (Tested) Model: 53801101

Model Difference: Where "##" denotes color temperature, the CCT and input power are tunable, 01~10 identifies CCT tunable to 2700K, 3000K, 3500K, 4000K and 5000K, power tunable to 17W/14W/11W.

Prepare By:

/ solor

Engineer: Leo Liu Date: 2017-11-21

Review By:

incer Tven

Technical Lead: Vincent Yuan Date: 2017-11-23

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Laboratory: Dongguan New Testing Centre Co., Ltd Page 1/12 Address: 3F, No. 1 the 1<sup>st</sup> North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China Tel: 86-755-2344 3526 Website: http://www.ntc-cert.com



R NVLAP LAB CODE 600150-0

Client Name:	ELEC-TECH INTERNATIONAL CO LTD
Brand Name:	Commercial Electric
Model Number:	538011##(##=01-10)
Product type:	LED Down Light
Rating Input:	AC120V, 60Hz, 17W
Declared CCT:	2700K
Declared Light output:	1100lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX229A
LED Quantity:	42 pcs
Forward current of LED Chip:	100mA
Date of Receipt Samples:	2017-11-10
Quantity of Receipt Samples:	3
Sample Number:	171110001-S1
Laboratory Information:	
Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1st North Industry Road, Songshan Lake Science &
	Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_ntc@163.com
Report Information	
Issued Date of Test Report:	2017-11-23
Revised Date of Test Report:	N/A
Test Report No.:	NTCR17110076
Remark (If applicable)	Product may contain Black Decorative Ring.





<b>Test Specifications:</b>	
Date of Test	2017-11-10
Test item	1. Total Luminous Flux
	2. Luminous Distribution Intensity
	3. Luminous Efficacy
	4. Correlated Color Temperature
	5. Color Rendering Index
	6. Chromaticity Coordinate
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State
	Lighting Products
	ANSI C78.377-2008 Specifications for the Chromaticity of Solid State
	Lighting Products
	CIE 13.3-1995 Method of Measuring and Specifying Color Rendering
	Properties of Light Sources
	CIE 15-2004 Technical Report Colorimetry

### **Test Methods**

#### 1. Photometric and Electrical measurements – Light Distribution Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at  $25^{\circ}$  C  $\pm 1^{\circ}$  C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° Vertical intervals.

#### 2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C  $\pm$  1° C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at least 5 nm intervals over the range of 380 to 780 nm.





**Integrating Sphere Test Results** 

Test Co	Test Condition:								
Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time					
25.0 °C	51 %	Face Down	90 mins	25 mins					
Electric	al Data:								

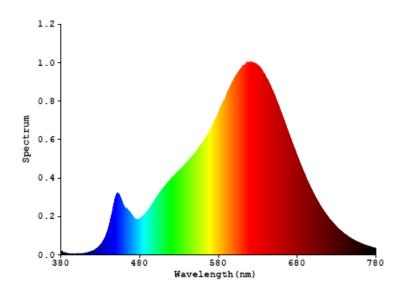
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	<b>Power Factor</b>
120.0	60	0.1408	16.54	0.9784

Color Data:

Parameter	Result
CCT(K)	2605
Color Rendering Index (CRI)	91.5
R9	51
Chromaticity, x	0.4660
Chromaticity, y	0.4091
Chromaticity u'	0.2672
Chromaticity v'	0.5277
Duv	-0.00101

Special Color Rendering									
R1	92	R9	51						
R2	97	R10	93						
R3	97	R11	93						
R4	91	R12	88						
R5	92	R13	93						
R6	97	R14	100						
R7	89	R15	86						
R8	76	-	-						

### Spectrum Diagram:





NVLAP LAB CODE 600150-0

Report No: NTCR17110076 Report Version: V1.1

**Goniophotemeter Test Results:** 

Test Co	Test Condition:									
Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time						
24.6 °C	45 %	Face Down	90 mins	25 mins						
Electric	al Data:									

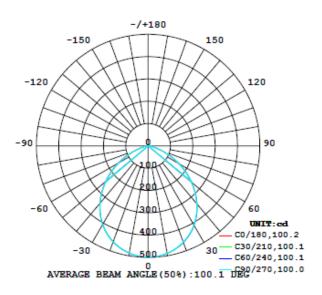
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	<b>Power Factor</b>
120.0	60	0.1408	16.54	0.9784

#### **Goniophotometer Data:**

Parameter	Result
Total Luminous (lm)	1177.74
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	71.22
Zonal Lumens Distribution (0-60°)	87.1%
Beam Angle (°)	100.1
Center Beam Candle Power (cd)	500

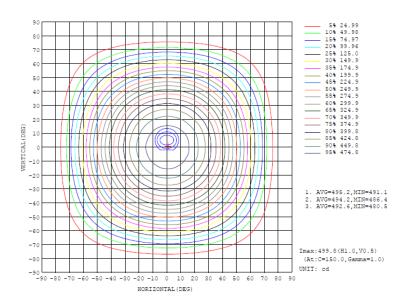
### **Luminous Intensity Distribution Diagram:**















#### ZONAL FLUX DIAGRAM:

۲	C0	C45	C90	C135	C180	C225	C270	C315	Y	• sone	<pre>   total </pre>	%lum, lamp
10	489.4	489.3	489.2	488.0	488.3	487.8	488.5	489.8	0- 10	47.15	47.15	4,4
20	460.2	460.7	458.9	457.7	458.0	457.0	458.6	460.4	10- 20	134.3	181.5	15.4,15.4
30	410.3	411.3	408.9	407.4	407.5	406.1	408.2	410.1	20- 30	201.0	282.5	32.5,32.5
40	338.8	341.0	228.2	336.9	336.5	222.5	335.5	338.2	30- 40	234.5	617.0	52.4,52.4
50	251.1	255.1	253.0	251.3	250.3	245.3	247.0	249.5	40- 50	227.3	844.3	71.7,71.7
60	155.9	160.4	159.6	157.8	156.5	150.8	150.8	153.5	50- 60	181.5	1026	87.1,87.1
70	64.54	69.26	68.89	67.70	66.26	61.34	61.28	62.72	60- 70	108.1	1134	96.2,96.3
80	15.45	17.52	17.84	17.55	16.73	14.67	14.43	14.53	70- 80	36.11	1170	99.2,99.3
90	0.0046	0.1169	0.2617	0.1897	0	0.0001	0	0	80- 90	7.821	1178	100,100
100	0	0	0	0	0	0	0	0	90-100	0.0040	1178	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1178	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1178	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1178	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1178	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1178	100,100
160	0	0	0	0	0	0	0	0	150-160	0	1178	100,100
170	0	0	0	0	0	0	0	0	160-170	0	1178	100,100
180	0	0	0	0	0	0	0	0	170-180	0	1178	100,100
DEG		LUM	INOUS INTE	NSITY:cd	Less than	35% Percent	5 = 10.7 %			UNI	T:lm	





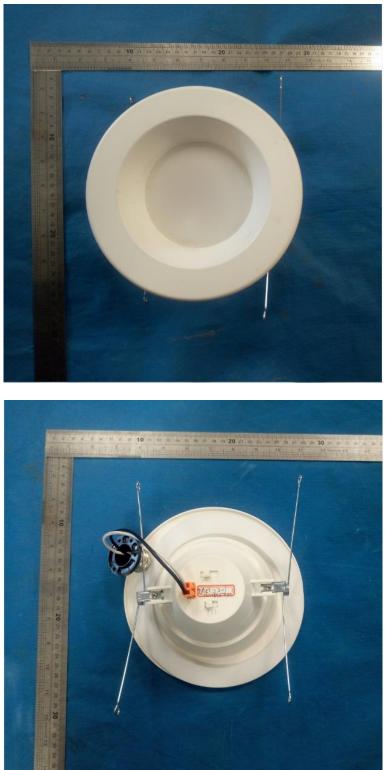
NVLAP LAB CODE 600150-0

**Luminous Distribution Intensity Data:** 

Table1																	T: ed		
· · · · · ·	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
(DEG)	-													_			-		
0	500	499	499	500	499	499	500	499	500	499	500	500	500	499	499	500	499	499	500
5	497	498	497	497	497	497	497	497	497	496	497	497	497	496	495	496	496	496	496
10	489	490	490	489	489	490	489	489	488	488	488	488	488	487	487	488	488	488	489
15	477	478	477	478	477	477	476	476	475	475	475	475	476	474	475	475	476	476	476
20	460	462	461	461	460	460	459	459	457	458	458	457	458	457	457	457	458	458	459
25	438	440	439	439	438	438	437	437	435	436	435	435	436	434	434	435	435	436	436
30	410	413	411	411	410	411	409	409	408	407	407	407	408	405	406	406	407	407	408
35	377	380	379	379	377	377	376	376	374	374	373	373	374	371	372	372	373	373	374
40	339	342	341	341	340	340	338	339	337	337	335	335	336	333	334	334	334	334	336
			_										_	_					_
45	296	300	299	300	298	299	297	297	295	295	294	294	295	291	292	291	292	291	293
50	251	255	254	255	254	254	253	253	251	251	250	250	250	246	247	245	246	245	247
55	204	207	207	208	207	208	207	207	205	205	203	203	204	200	200	198	199	198	199
60	156	159	160	160	160	160	160	160	158	158	157	156	156	153	152	151	151	150	151
65	109	112	113	113	113	114	113	113	112	111	110	109	110	106	106	104	104	104	104
70	64.5	68.0	68.1	69.3	69.0	69.7	68.9	69.2	67.8	67.7	66.2	65.9	66.3	63.0	62.8	61.3	61.5	60.6	61.3
75	29.8	32.1	32.1	33.0	32.8	33.5	33.0	33.1	32.2	32.1	31.1	30.8	31.2	29.0	28.8	27.9	27.9	27.3	27.1
80	15.5	16.8	16.9	17.5	17.4	18.0	17.8	18.1	17.5	17.5	16.7	16.7	16.7	15.5	15.4	14.7	14.8	14.2	14.4
85	6.39	7.26	7.54	8.02	8.02	8.38	8.21	8.36	8.00	7.99	7.57	7.45	7.44	6.58	6.33	5.94	5.80	5.51	5.5
90	0.00	_				-	0.21	0.36	_			-				_			
		0.00	0.02	0.12	0.16	0.32	_		0.24	0.19	0.04	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.0
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
135	0.00	_	0.00	0.00	_	_	0.00	0.00		_	0.00		_	0.00	0.00	0.00	0.00		_
		0.00		-	0.00					0.00		0.00	0.00				-	0.00	0.0
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
		0.00			0.00	0.00		0.00		0.00			0.00			0.00	0.00	0.00	0.0
175	0.00			-				_			0.00							0.00	
180	_			0.00			0.00	_		0.00				0.00		0.00	0.00	0.00	
180 Table2 C (DEG)	0.00	0.00	0.00	0.00	0.00			_								0.00	0.00	0.00	
180 Table2 C (DEG) (DEG)	0.00	0.00	315	0.00 330	0.00 345			_								0.00	0.00	0.00	
180 Table2 C (DEG) (DEG) 0	0.00 285 499	0.00 300 500	0.00 315 499	0.00 330 500	0.00 345 500			_								0.00	0.00	0.00	
180 Table2 C(DEG) (DEG) 0 5	0.00 285 499 496	0.00 300 500 497	0.00 315 499 496	0.00 330 500 497	0.00 345 500 497			_								0.00	0.00	0.00	
180 Table2 C (DEG) (DEG) 0	0.00 285 499	0.00 300 500	0.00 315 499	0.00 330 500	0.00 345 500			_								0.00	0.00	0.00	0.00
180 Table2 C(DEG) (DEG) 0 5	0.00 285 499 496	0.00 300 500 497	0.00 315 499 496	0.00 330 500 497	0.00 345 500 497			_								0.00	0.00	0.00	
180 Table2 C (DEG) (DEG) 0 5 10	0.00 285 499 496 489	0.00 300 500 497 490	0.00 315 499 496 490	0.00 330 500 497 491	0.00 345 500 497 490			_								0.00	0.00	0.00	
180 Table2 C (DEG) (DEG) 0 5 10 15 20	0.00 285 499 496 489 476 459	0.00 300 500 497 490 477 460	0.00 315 499 496 490 478	0.00 330 500 497 491 478 462	0.00 345 500 497 490 478 461			_								0.00	0.00	0.00	
180 Table2 C (DEG) (DEG) 0 5 10 15	0.00 285 499 496 489 476 459 437	300 500 497 490 477 460 438	0.00 315 499 496 490 478 460 438	0.00 330 500 497 491 478 462 439	0.00 345 500 497 490 478 461 439			_								0.00	0.00	0.00	
180 Table2 C (DEG) (DEG) 0 5 10 15 20 25 30	0.00 285 499 496 489 476 459 437 408	300 500 497 490 477 460 438 410	0.00 315 499 496 490 478 460 438 410	0.00 330 500 497 491 478 462 439 412	0.00 345 500 497 490 478 461 439 412			_								0.00	0.00	0.00	
180           Table2           C (DEG)           0           5           10           15           20           25           30           35	285 499 496 489 476 459 437 408 375	300 500 497 490 477 460 438 410 377	315 499 496 490 478 460 438 410 377	0.00 330 500 497 491 478 462 439 412 379	0.00 345 500 497 490 478 461 439 412 379			_								0.00	0.00	0.00	
180 Table2 C(DEG) (DEG) 0 5 10 15 20 25 30 35 40	285 499 496 489 476 459 437 408 375 336	300 500 497 490 477 460 438 410 377 338	0.00 315 499 496 490 478 460 438 410 377 338	0.00 330 500 497 491 478 462 439 412 379 340	0.00 345 500 497 490 478 461 439 412 379 340			_								0.00	0.00	0.00	
180           Table2           C (DEG)           0           5           10           15           20           25           30           35           40           45	0.00 285 499 496 489 476 459 437 408 375 336 293	300 500 497 490 477 460 438 410 377 338 295	315 499 496 490 478 460 438 410 377 338 295	0.00 330 500 497 491 478 462 439 412 379 340 297	0.00 345 500 497 490 478 461 439 412 379 340 298			_								0.00	0.00	0.00	
180           Table2           C(DEG)           0           5           10           15           20           25           30           35           40           45           50	285 499 496 489 476 459 437 408 375 336 293 247	300 500 497 490 477 460 438 410 377 338 295 249	315 499 496 490 478 460 438 410 377 338 295 249	0.00 330 500 497 491 478 462 439 412 379 340 297 252	0.00 345 500 497 490 478 461 439 412 379 340 298 252			_								0.00	0.00	0.00	
180 Table2 C (DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 55 55	0.00 285 499 496 489 476 459 437 408 375 336 293 247 199	0.00 300 500 497 490 477 460 438 410 377 338 295 249 201	315 499 496 490 478 460 438 410 377 338 295 249 202	0.00 330 500 497 491 478 462 439 412 379 340 297 252 204	0.00 345 500 497 490 478 461 439 412 379 340 298 252 205			_								0.00	0.00	0.00	
180           Table2           C(DEG)           0           5           10           15           20           25           30           35           40           45           50	285 499 496 489 476 459 437 408 375 336 293 247	300 500 497 490 477 460 438 410 377 338 295 249	315 499 496 490 478 460 438 410 377 338 295 249	0.00 330 500 497 491 478 462 439 412 379 340 297 252	0.00 345 500 497 490 478 461 439 412 379 340 298 252			_								0.00	0.00		
180 Table 2 C (DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 55	0.00 285 499 496 489 476 459 437 408 375 336 293 247 199	0.00 300 500 497 490 477 460 438 410 377 338 295 249 201	315 499 496 490 478 460 438 410 377 338 295 249 202	0.00 330 500 497 491 478 462 439 412 379 340 297 252 204	0.00 345 500 497 490 478 461 439 412 379 340 298 252 205			_								0.00	0.00		
180 Table2 C (DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 55 60	0.00 285 499 496 489 476 459 437 408 375 336 293 247 199 151	0.00 300 500 497 490 477 460 438 410 377 338 295 249 201 153	315 499 496 490 478 460 438 410 377 338 295 249 202 154	0.00 330 500 497 491 478 462 439 412 379 340 297 252 204 156	0.00 345 500 497 490 478 461 439 412 379 340 298 252 205 157			_								0.00	0.00		
180 Table2 C (DEG) (DEE) 0 10 15 20 30 35 30 35 50 55 60 65	0.00 285 499 496 489 476 459 437 408 375 336 293 247 199 151 104 61.0	0.00 300 500 497 490 477 460 438 410 377 338 295 249 201 153 106 62.6	0.00 315 499 496 490 478 460 438 410 377 338 295 249 202 154 106 62.7	0.00 330 500 497 491 478 462 439 340 297 252 204 156 108 64.5	0.00 345 500 497 490 478 461 439 412 379 340 298 252 205 157 109 65.0			_								0.00	0.00		
180 Table-2 C (DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 55 60 55 65 70	0.00 285 499 496 489 476 459 437 408 375 336 293 247 199 151 104 61.0	0.00 300 500 497 490 477 460 438 410 377 338 295 249 201 153 106	0.00 315 499 496 490 478 460 438 410 377 338 295 295 202 154 106 62.7	0.00 330 500 497 491 478 462 439 412 379 340 297 252 204 156 108 64.5 29.8	0.00 345 500 497 490 478 461 439 412 379 340 298 252 205 157 109			_								0.00	0.00		
180 Table2 C (DEG) (DEG) 0 5 10 15 20 25 20 25 30 35 40 45 55 55 55 60 65 70 75 80	285 499 496 489 476 459 437 408 375 336 293 247 199 151 104 61.0 27.6 14.1	0.00 300 500 497 490 477 460 410 377 338 295 249 201 153 106 62.6 28.5 14.6	315 499 496 490 478 460 478 410 377 338 295 249 202 205 154 106 62.7 28.6 14.5	0.00 330 500 497 491 478 462 439 412 379 340 297 252 204 156 64.5 29.8 15.3	0.00 345 500 497 490 412 379 412 379 340 298 252 205 157 157 109 65.0 30.1 15.4			_								0.00	0.00		
180 Table2 (DEG) (DEG) 0 5 10 15 20 10 15 30 35 40 45 55 60 65 55 60 65 80 85	0.00 285 499 496 489 476 459 437 408 375 336 293 247 199 151 104 61.0 27.6 14.1 5.46	0.00 300 500 497 490 477 460 438 410 377 338 295 249 201 153 106 62.6 28.5 14.6 5.66	315 499 496 490 478 460 438 410 377 338 295 249 202 154 106 62.7 28.6 14.5 5.76	0.00 330 500 497 491 478 462 439 412 379 340 297 252 204 156 108 64.5 29.8 15.3 6.13	0.00 345 500 497 490 478 461 439 412 379 340 298 252 205 157 109 65.0 30.1 15.4 6.37			_								0.00	0.00		
180 Table2 (DEG) (DEG) (DEG) 10 15 20 25 30 40 45 55 50 55 50 65 60 65 80 85 80 85 90	0.00 285 499 496 476 459 476 459 437 408 375 336 293 247 199 151 104 61.0 27.6 14.1 5.46 0.00	0.00 300 500 497 490 477 460 438 410 377 338 295 249 201 153 106 62.6 52.65 5.66 0.00	0.00 315 499 496 478 460 478 460 438 410 377 338 295 249 202 154 106 62.7 28.6 14.5 5.76 0.00	0.00 330 500 497 491 478 462 379 340 297 252 204 156 108 64.5 29.8 15.3 6.13 0.00	0.00 345 500 497 490 478 461 439 412 379 340 298 252 205 157 109 65.0 30.1 15.4 6.37 0.00			_								0.00	0.00		
180 Table2 (DEG) 0 5 10 15 20 25 20 25 30 35 50 55 50 65 70 75 80 85 90 95	0.00 285 499 496 489 476 459 437 408 375 336 293 247 199 151 104 61.0 27.6 14.1 5.46 0.00 0.00	0.00 300 500 497 490 477 460 377 338 295 249 201 153 106 62.6 28.5 14.6 5.66 0.00 0.00	315 499 496 490 478 460 478 460 478 460 478 460 377 338 295 249 202 154 106 62.7 28.6 14.5 5.76 0.00 0.000	0.00 330 500 497 491 478 462 379 340 297 252 204 156 108 64.5 29.8 15.3 6.13 0.00 0.00	0.00 345 500 497 490 478 461 379 340 298 252 205 157 109 65.0 30.1 15.4 6.37 0.00 0.00			_								0.00	0.00		
180 Table2 (DEG) (DEG) 0 0 5 10 15 20 25 30 35 40 45 55 60 65 55 60 65 70 75 80 90 95 10 10 10 10 10 10 10 10 10 10	0.00 285 499 496 489 476 459 437 336 293 247 199 151 104 61.0 27.6 14.1 5.46 0.00 0.00 0.00	0.00 300 500 497 490 438 410 377 338 295 249 201 153 106 62.6 28.5 14.6 5.66 0.00 0.00 0.00	315 499 496 490 478 460 478 450 438 295 249 202 154 106 62.7 28.6 14.5 5.76 14.5 5.76 0.00 0.00 0.00	0.00 330 500 497 491 478 462 439 412 379 340 297 252 204 156 108 64.5 29.8 15.3 6.13 0.00 0.00 0.00	0.00 345 500 497 490 478 461 439 412 298 252 205 157 65.0 30.1 15.4 6.37 0.00 0.00 0.00			_								0.00	0.00		
180 Table2 (DEG) 0 5 10 15 20 25 20 25 30 35 30 35 55 55 55 60 65 70 75 80 85 90 95	0.00 285 499 496 489 476 459 437 408 375 336 293 293 293 293 293 104 61.0 27.6 14.1 5.46 0.00 0.00 0.00 0.00	0.00 300 500 497 490 477 460 377 338 295 249 201 153 106 62.6 28.5 14.6 5.66 0.00 0.00	315 499 496 490 478 460 478 460 478 460 478 460 377 338 295 249 202 154 106 62.7 28.6 14.5 5.76 0.00 0.000	0.00 330 500 497 491 478 478 478 478 478 478 478 478	0.00 345 500 497 490 478 461 379 340 298 252 205 157 109 65.0 30.1 15.4 6.37 0.00 0.00			_								0.00	0.00		
180 Table2 (DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 55 55 55 55 55 55 55 55 55	0.00 285 499 496 489 476 437 408 375 336 293 247 199 151 104 61.0 27.6 14.1 5.46 0.00 0.00 0.00 0.00	0.00 300 500 497 490 438 410 377 338 295 249 201 153 106 62.6 28.5 14.6 5.66 0.00 0.00 0.00	0.00 315 499 496 490 478 460 478 410 377 338 2295 2295 2295 202 154 106 62.7 28.6 14.5 5.76 0.00 0.000 0.000 0.000	0.00 330 500 497 491 478 462 439 412 379 340 297 252 204 156 108 64.5 29.8 15.3 6.13 0.00 0.00 0.00	0.00 345 500 497 490 478 461 439 412 298 252 205 157 65.0 30.1 15.4 6.37 0.00 0.00 0.00			_								0.00	0.00		
180 Table2 (DEG) (DEG) (DEG) 10 15 20 25 30 40 45 55 50 55 50 65 60 65 50 65 80 85 90 95 100 105 105 105 105 105 105 10	0.00 285 499 496 489 476 437 408 375 336 293 247 199 151 104 61.0 27.6 14.1 5.46 0.00 0.00 0.00 0.00 0.00	0.00 300 500 497 490 477 460 438 410 377 338 2295 2249 201 153 106 62.6 28.5 14.6 5.66 0.00 0.00 0.00 0.00	0.00 315 499 496 490 478 410 377 338 295 202 154 106 62.7 28.6 14.5 5.76 0.00 0.00 0.00 0.00 0.00	0.00 330 500 497 491 478 462 478 462 439 340 297 252 204 156 108 64.5 29.8 5.13 0.00 0.00 0.00 0.000	0.00 345 500 497 490 412 379 461 461 439 412 298 252 205 157 109 340 298 252 205 157 109 30.1 15.4 6.37 0.00 0.000 0.000			_								0.00	0.00		
180 Table2 (DEG) (DEG) 0 5 10 15 20 25 30 25 30 40 45 55 50 55 50 55 60 65 77 80 85 90 95 90 95 100 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 10 115 10 10 115 10 10 115 10 10 15 10 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 15 10 15 15 15 15 15 15 15 15 15 15	0.00 285 499 496 459 437 408 476 459 293 247 199 151 104 61.0 27.6 14.1 5.46 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 300 500 497 490 497 460 438 410 438 295 249 201 153 106 62.6 28.5 14.6 5.66 0.00 0.00 0.00 0.00 0.00	0.00 315 499 496 478 460 478 460 438 410 377 338 295 249 202 154 106 62.7 28.6 14.5 5.76 0.00 0.00 0.00 0.000 0.000 0.000	0.00 330 500 497 478 462 439 4491 478 462 379 340 297 252 204 156 108 64.5 29.8 15.3 6.13 6.13 0.00 0.00 0.000 0.000 0.000	0.00 345 500 497 412 4178 461 478 461 478 461 298 252 205 109 65.0 30.1 157 109 65.0 30.0 0.00 0.000 0.000 0.000			_								0.00	0.00		
180 Table2 (DEG) (DEG) 0 5 10 15 20 25 30 25 30 35 40 45 55 60 65 65 65 60 65 70 75 80 85 90 95 100 105 105 105 105 105 105 10	0.00 285 499 476 459 477 489 477 489 477 489 477 408 375 336 293 247 151 104 61.0 27.6 14.1 5.46 0.00 0.00 0.00 0.00 0.00 0.00	0.00 300 500 497 450 477 460 438 295 249 201 153 106 62.6 22.5 14.6 5.66 0.00 0.00 0.00 0.00 0.00 0.00	0.00 315 499 496 478 460 478 460 478 478 460 478 478 478 400 337 338 295 249 202 154 106 62.7 28.6 14.5 5.76 0.00 0.000 0.000 0.000 0.000 0.000	0.00 330 500 497 478 462 439 412 379 340 297 252 204 156 108 64.5 29.8 15.3 6.13 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 345 500 497 490 478 461 439 340 298 252 205 157 109 65.0 30.1 15.4 6.37 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0			_								0.00	0.00		
180 Table2 (DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 55 55 55 55 55 60 65 70 75 80 90 95 100 115 110 115 120 100 115 100 100	0.00 285 499 496 489 476 459 437 408 293 247 336 293 247 151 104 61.0 27.6 14.1 5.46 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 3000 5000 497 470 477 460 477 438 410 377 338 2295 249 201 153 306 62.6 62.6 62.6 10.6 62.6 0.00 0.00 0.00 0.00 0.00 0.00	0.00 315 499 496 478 460 478 460 478 460 478 478 460 478 400 106 62.7 202 154 106 62.7 5.76 0.00 0.00 0.00 0.00 0.000 0.000 0.000 0.000	0.00 3330 500 497 478 478 478 473 478 478 479 297 252 204 156 64.5 29.8 64.5 29.8 61.3 0.00 0.00 0.00 0.00 0.00	0.00 345 500 497 490 478 461 379 412 379 412 298 252 205 157 109 65.0 30.1 15.4 6.37 0.00 0.00 0.00 0.00 0.00 0.00			_								0.00	0.00		
180 Table2 (DEG) (DEG) (DEG) 10 15 20 25 30 40 45 55 50 55 50 65 60 65 60 65 60 65 70 75 80 85 100 105 110 115 120 105 105 105 105 105 105 105 10	0.00 285 499 476 477 489 477 408 375 336 293 247 199 151 104 61.0 27.6 14.1 5.46 0.00 0.00 0.00 0.00 0.00 0.00	0.00 300 500 497 450 477 460 477 460 477 460 477 400 377 338 205 249 201 153 106 62.6 28.5 14.6 5.66 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 315 499 496 478 460 478 460 478 460 478 460 377 338 205 249 202 154 106 62.7 28.6 14.5 5.76 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 330 500 497 491 478 462 439 412 379 412 297 252 204 156 108 64.5 29.8 15.3 6.13 0.00 0.00 0.00 0.00 0.000 0.00	0.00 345 500 497 490 478 461 379 340 288 252 205 157 109 65.0 30.1 15.4 6.37 0.00 0.00 0.00 0.00 0.00 0.00 0.00			_								0.00	0.00		
180 Table2 C(DEG) (DEG) 0 0 5 10 15 20 20 20 30 35 35 40 45 55 60 65 55 60 65 70 75 80 85 90 100 115 120 125 100 115 120 125 110 125 120 125 120 120 125 120 125 120 125 120 120 125 120 120 125 120 125 120 120 125 120 120 125 120 120 120 125 120 120 120 125 120 120 120 120 120 120 120 120	0.00 285 499 496 489 476 495 496 496 499 476 408 375 293 247 199 104 61.0 27.6 1151 104 61.0 0.00	0.00 300 500 497 490 477 460 477 460 377 249 201 338 225 249 201 338 225 249 201 338 566 5.66 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 315 499 496 496 496 496 496 496 496	0.00 330 500 497 491 478 462 379 412 379 412 379 252 204 108 64.55 29.8 156 108 64.55 29.8 15.1 50.00 0.00 0.00 0.0000 0.00000 0.0000 0.0000 0.00000 0.0000 0.00000 0.0000	345 500 497 490 417 490 412 379 412 298 255 205 109 65.0 30.1 157 109 65.0 0.00 0.00 0.000 0.000 0.000 0.000 0.000			_								0.00	0.00		
180 Table2 (DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 45 55 50 55 60 65 57 70 85 90 95 110 115 120 115 120 115 120 115 120 115 120 115 120 120 125 120 125 120 125 120 125 120 125 120 125 120 125 120 125 120 125 120 125 120 120 125 120 125 120 125 120 120 125 120 120 120 120 120 120 120 120	0.00 285 499 496 489 476 459 408 375 336 293 247 199 151 104 61.0 27.6 0.00 0.	0.00 300 500 497 490 497 490 438 400 438 410 338 295 249 201 153 106 62.6 28.5 14.6 5.66 28.5 14.6 0.00	0.00 315 499 496 490 478 400 478 410 377 338 249 202 205 249 205 249 205 249 205 5.76 0.00 0	0.00 330 500 497 491 478 439 412 297 340 297 252 204 156 108 6.13 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	345 500 497 490 478 461 439 412 298 252 205 157 109 340 298 252 205 157 109 30.1 15.4 65.0 30.1 15.4 0.00 0.00 0.000 0.000 0.000 0.000			_								0.00	0.00		
180 Table2 (DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 55 50 55 50 55 50 60 65 77 80 85 90 95 100 115 120 125 130 115 120 125 130 135 140 140 140 140 140 140 140 140	0.00 285 499 496 489 476 459 408 375 336 293 247 199 151 104 61.0 27.6 0.00 0.	0.00 300 500 497 490 497 490 438 400 438 410 338 295 249 201 153 106 62.6 28.5 14.6 5.66 28.5 14.6 0.00	0.00 315 499 496 490 478 400 478 410 377 338 249 202 205 249 205 249 205 249 205 5.76 0.00 0	0.00 330 500 497 491 478 462 379 412 379 412 379 252 204 108 64.55 29.8 156 108 64.55 29.8 15.1 50.00 0.00 0.00 0.0000 0.00000 0.0000 0.0000 0.00000 0.0000 0.00000 0.0000	345 500 497 490 478 461 439 412 298 252 205 157 109 340 298 252 205 157 109 30.1 15.4 65.0 30.1 15.4 0.00 0.00 0.000 0.000 0.000 0.000			_								0.00	0.00		
180 <b>Table2</b> C (DEG) (DEG) 0 5 10 15 20 25 35 40 45 55 55 55 60 65 70 75 80 85 90 105 110 115 120 125 100 135 100 135 100 135 100 135 100 135 100 135 100 135 100 135 100 135 100 135 100 135 100 100 100 100 100 100 100 10	0.00 285 499 496 489 476 489 437 408 293 247 199 151 104 61.0 0.27.6 14.1 5.46 61.0 0.00	0.00 300 500 497 490 497 490 438 497 490 437 338 295 249 201 153 106 62.6 228.5 14.6 5.66 62.6 0.00 0.0	0.00 315 499 496 496 496 496 490 478 490 173 377 338 2295 249 154 106 62.7 202 154 106 62.7 202 202 154 10.00 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.000000 0.00000000	0.00 330 500 497 491 478 439 412 297 340 297 252 204 156 108 6.13 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	345 500 497 490 478 497 490 478 497 490 478 497 490 298 252 205 157 109 65.0 30.1 15.4 6.37 0.00 0.000 0.000 0.000 0.000 0.000 0.000			_								0.00	0.00		
180 Table2 C(DEG) (DEG) 0 5 10 15 20 25 30 35 30 35 40 45 50 55 60 65 57 80 75 80 90 95 90 95 910 115 125 110 115 125 125 125 125 125 125 125	0.00 285 499 496 476 459 476 459 437 408 293 336 293 247 199 151 104 61.0 27.6 14.1 5.46 0.00	0.00 300 500 497 490 477 460 438 410 438 410 537 338 295 249 201 153 153 162 62.6 249 201 153 16 62.6 0.00	0.00 315 499 496 478 460 478 460 478 478 460 438 410 576 62.7 249 202 154 62.7 28.6 62.7 28.6 0.00 0.00 0.00 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.00000 0.00000 0.00000 0.000000 0.00000000	0.00 330 500 497 462 478 462 439 204 150 64.5 29.8 61.5 36.13 0.00 0.	345 500 497 490 417 417 461 439 340 298 205 157 109 65.0 30.1 15.4 6.37 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0			_								0.00	0.00		
180 Table2 (DEG) (DEG) (DEG) 10 15 20 25 30 40 45 55 50 55 50 65 60 65 60 65 70 80 85 90 95 100 105 110 115 120 105 110 115 120 105 100 115 120 105 105	0.00 285 499 496 489 476 459 437 336 293 247 199 151 104 27.6 14.1 27.6 14.1 0.000 0.00	300 500 497 490 477 460 438 201 225 249 201 337 238 5 106 62.6 5.660 0.00 0.00 0.00 0.00 0.00 0.00 0	0.00 315 499 496 496 438 410 438 410 438 295 249 202 154 106 62.7 28.6 14.5 5.76 0.00 0.	0.00 330 500 497 491 478 462 439 297 252 204 108 64.5 15.3 6.13 0.000 0.00	345 500 497 490 478 461 478 478 478 478 478 478 478 478			_								0.00	0.00		
180 <b>Table2</b> C (DEG) (DEG) 0 20 20 25 30 35 40 20 25 55 55 55 55 55 55 55 55 55	0.00 285 499 496 459 437 336 293 247 199 151 151 151 151 151 151 151	0.00 300 500 497 460 477 460 438 295 249 201 153 153 153 153 153 153 153 15	0.00 315 499 496 478 460 478 460 438 205 249 202 202 205 249 202 205 5.76 0.00	0.00 330 500 497 491 478 462 379 412 379 297 252 204 156 108 5 29.8 15.3 0.000 0.00	345 500 497 490 478 461 412 379 340 252 205 205 252 205 252 205 30.1 15.4 6.37 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0											0.00	0.00		
180 Table2 (DEG) 0 5 10 15 20 25 30 35 40 45 55 55 55 60 65 55 70 75 80 85 90 95 110 115 120 115 120 115 120 115 120 115 120 115 120 115 120 115 120 125 125 120 125 125 125 125 125 125 125 125	0.00 285 499 496 476 476 476 476 477 476 477 199 151 151 151 151 151 151 151	0.00 300 500 497 490 477 460 438 249 201 339 249 201 153 153 153 153 166 628.5 14.6 5.66 0.00	0.00 315 499 496 497 478 460 377 338 229 229 202 154 154 154 154 165 5.760 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.000000 0.00000000	330 500 497 491 478 462 439 340 297 252 204 156 156 156 156 156 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	345 500 497 490 478 461 379 205 157 109 340 252 205 157 105 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0											0.00	0.00		
180 Table2 (DEG) (DEG) (DEG) 10 10 20 25 30 40 45 55 50 55 50 55 50 65 65 65 65 60 65 65 80 85 100 105 105	0.00 285 499 496 459 437 336 459 437 293 247 199 104 61.0 0.00	0.00 300 500 497 450 477 460 477 400 400 400 0.00 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.00000 0.00000 0.00000000	0.00 315 499 496 478 460 478 460 377 338 205 249 202 205 249 205 249 202 28.6 154 106 62.7 28.6 14.5 5.76 0.000 0.00	330 500 497 478 462 297 252 204 156 64.5 29.8 204 156.3 64.5 29.8 204 155.3 6.13 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	0.00 345 500 477 478 461 439 412 379 412 298 252 205 157 15.4 6.37 0.000 0.00											0.00	0.00		
180           Table2           CIDEG           0           5           10           15           20           30           35           40           45           50           55           60           65           90           90           90           90           90           110           115           120           130           140           145           150           160           165           160           165           170	285 499 496 489 476 476 476 479 151 104 293 247 151 104 27.6 14.1 293 247 151 104 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 300 500 497 490 477 460 438 295 249 201 153 106 28.5 14.6 28.5 14.6 0.00	0.00 315 499 496 478 460 478 460 377 280 202 154 106 202 154 106 0.00 0.0	330 500 497 491 478 462 439 340 297 252 204 156 156 156 156 156 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	0.00 345 500 497 407 412 379 412 298 205 157 157 157 109 0.000 0.00											0.00	0.00		







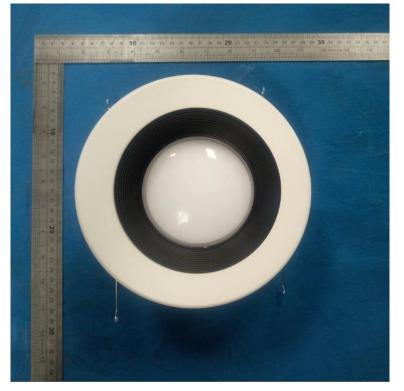
 Laboratory: Dongguan New Testing Centre Co., Ltd
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NVLAP LAB CODE 600150-0

Report No: NTCR17110076 Report Version: V1.1

Equipment ID	Last Cal.	Due Cal.	
NTC-F01-001	Goniophotometer System	2016-12-03	2017-12-02
NTC-F01-006	2.0 meter Integrating Sphere	2016-12-03	2017-12-02
NTC-F01-013	Standard Lamp	2016-12-27	2017-12-26
NTC-F01-031	Digital Power Meter	2016-12-05	2017-12-04
NTC-F01-019	Temperature & Humidity Meter	2016-11-28	2017-11-27



R NVLAP LAB CODE 600150-0

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\*\*\*\*\*END OF DATASHEET\*\*\*\*