



# 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

# Wall Pack

Model name(s): 533043xx

Representative (Tested) Model: 53304361

Model Difference: XX=61-70 intends CCT is 5000K

Prepare By:

loston

Engineer: Leo Liu Date: 2017-06-22

Review By:

incer Tven

Technical Lead:Vincent Yuan Date: 2017-06-22

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 1/11 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





Client Name:	ELEC-TECH INTERNATIONAL CO LTD
Brand Name:	ETI
Model Number:	53304361
Product type:	Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area
	Luminaires
Rating Input:	AC120-277V, 50/ 60Hz, 74W
Declared CCT:	5000K
Declared Light Output:	8000lm
LED Manufacturer:	Samsung
LED Model:	2835 Series
LED Quantity:	156 pcs
Forward current of LED Chip:	200mA
Date of Receipt Samples:	2017-06-14
Quantity of Receipt Samples:	1
Sample Number:	170614007-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
<b>Report Information</b>	
Issued Date of Test Report:	2017-06-22
Revised Date of Test Report:	N/A
Test Report No.:	NTCR17060041
Remark (If applicable)	N/A





Test Specifications:	
Date of Test	2017-06-19
Test item	1. Total Luminous Flux
	2. Luminous Distribution Intensity
	3. Luminous Efficacy
	4. Correlated Color Temperature
	5. Color Rendering Index
	6. Chromaticity Coordinate
	7. THD and PF
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  $25^{\circ}$  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.

#### 3. THD and PF measurements

The sample was tested according to the ANSI C82.77-2002, the sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.





**Integrating Sphere Test Results** 

Test Co	Test Condition:									
Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time						
25.4	53	Face Down	90	25						
Electric	al Data:									

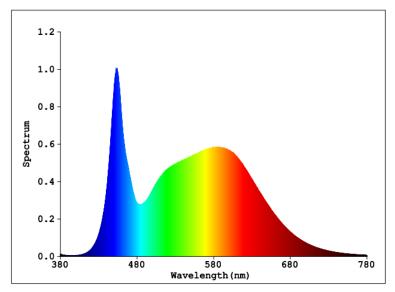
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	<b>Power Factor</b>
119.9	60	0.6195	73.95	0.9953

Color Data:

Result
5137
85.4
18
0.3413
0.3479
0.2103
0.4823
-0.00034

S	Special Color Rendering									
R1	84	R9	18							
R2	92	R10	79							
R3	94	R11	83							
R4	84	R12	65							
R5	85	R13	87							
R6	87	R14	97							
R7	87	R15	80							
R8	70	-	-							

# Spectrum Diagram:





NVLAP LAB CODE 600150-0

Report No: NTCR17060041 Report Version: V1.1

**Goniophotemeter Test Results:** 

Test Co	Test Condition:									
Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time						
25.4	53	Face Down	90	25						
Electric	al Data:									

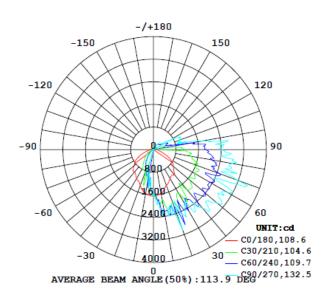
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	<b>Power Factor</b>
119.9	60	0.6195	73.95	0.9953

#### **Goniophotometer Data:**

Parameter	Result
Total Luminous (lm)	8350.6
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	112.9
Zonal Lumens (0-90°) (lm)	6933.7
Zonal Luminous Efficacy(0-90°) (lm/w)	93.8
Zonal Lumens Distribution (80-90°)	10.6%
Beam Angle (°)	113.9

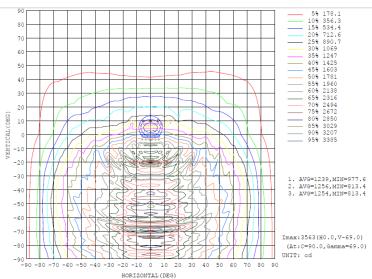
## **Luminous Intensity Distribution Diagram:**

#### LUMINOUS INTENSITY DISTRIBUTION DIAGRAM













#### ZONAL FLUX DIAGRAM:

Ŷ	CO	C45	C90	C135	C180	C225	C270	C315	Y	∲ zone		%lum,lamp
10	1576	2261	2269	2265	1576	1375	813.4	1191	0- 10	152.4	152.4	1.83,1.83
20	1347	2063	3036	2070	1342	822.9	711.4	853.5	10- 20	439.9	592.3	7.09,7.09
30	1191	2050	2315	2071	1178	609.7	450.8	628.0	20- 30	664.1	1256	15,15
40	1170	2004	2707	1923	1043	402.6	206.5	407.3	30- 40	805.5	2062	24.7,24.7
50	932.2	2090	2920	1994	882.5	239.9	86.01	253.4	40- 50	937.9	3000	35.9,35.9
60	693.9	2064	3020	2046	690.8	103.5	34.60	112.1	50- 60	1009	4009	48,48
70	384.9	1980	3134	1941	378.4	24.59	0.4567	29.86	60- 70	1043	5052	60.5,60.5
80	183.3	1737	2828	1784	189.7	10.54	0.6548	14.38	70- 80	993.0	6045	72.4,72.4
90	122.8	1549	2358	1454	125.3	3.777	0.4241	5.971	80- 90	888.6	6934	83,83
100	63.64	797.1	1716	658.6	61.34	1.681	4.569	2.556	90-100	685.0	7619	91.2,91.2
110	73.61	426.3	951.8	491.7	74.50	1.177	5.469	1.364	100-110	286.0	7905	94.7,94.7
120	50.80	234.8	654.8	239.2	51.46	0.9621	4.712	0.9421	110-120	212.7	8117	97.2,97.2
130	12.77	204.8	343.9	206.9	12.04	0.2066	3.070	0.4387	120-130	107.8	8225	98.5,98.5
140	8.858	176.4	298.6	179.3	1.579	0.1697	0.9350	0.2596	130-140	70.34	8295	99.3,99.3
150	0.1246	90.39	168.9	92.96	0.1122	0.1348	0.1874	0.1727	140-150	40.16	8336	99.8,99.8
160	0.1128	0.4249	90.29	4.636	0.1123	0.1343	0.1472	0.1564	150-160	13.51	8349	100,100
170	0.0774	0.4434	6.635	0.7808	0.1327	0.1049	0.1212	0.1233	160-170	1.471	8351	100,100
180	0.0857	0.0790	0.0828	0.1380	0.0840	0.0780	0.0809	0.1352	170-180	0.0273	8351	100,100
DEG		LUM	INOUS INTER	NSITY:cd	Less than	25% Percen	t = 10.5 %			UNI	T:lm	





## NVLAP LAB CODE 600150-0

**Luminous Distribution Intensity Data:** 

Table1 C (DEG)																	T: cd		
(DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	1658	1653	1656	1653	1656	1652	1655	1651	1657	1653	1658	1654	1658	1653	1656	1653	1656	1652	165
5	1633	1536	1831	2085	1845	1850	1829	1837	1850	2084	1813	1536	1626	1415	1449	1388	1248	1039	1029
10	1576	1795	1792	2261	2164	2221	2269	2218	2159	2265	1780	1791	1576	1381	1006	1375	975	965	813
15	1478	1781	2186	2144	2403	2242	2114	2249	2402	2143	2217	1775	1483	1254	1323	890	936	797	771
20	1347	1769	1977	2063	2165	2654	3036	2604	2212	2070	1985	1711	1342	1090	789	823	766	751	711
25	1283	1810	2205	2236	1982	2505	2549	2491	2019	2248	2232	1790	1227	884	796	688	627	614	645
30	1191	1673	1782	2050	2499	2223	2315	2210	2444	2071	1715	1746	1178	781	737	610	539	476	451
35	1122	1567	1970	2138	2148	2680	2555	2659	2155	2092	2122	1551	1088	718	632	491	399	333	304
40	1170	1720	1863	2004	2439	2615	2707	2572	2470	1923	1736	1643	1043	658	507	403	290	230	207
45	1023	1415	1929	2085	2254	2749	2594	2740	2185	2082	1878	1472	1019	595	416	315	203	142	124
50	932	1509	1654	2090	2375	2538	2920	2537	2404	1994	1709	1339	883	484	346	240	130	93.4	86.0
55	844	1372	_	1984	2418	2905	2817	2893	2389	1965	1707	1403	798	415	279	163	75.9	65.6	64.1
60	694 549	1328	1697	2064	2298	2877	3020	2811	2243		1675	1260	691	323	218	103	40.5	40.5	34.0
65 70	385	1243 1235	1786 1494	1860 1980	2033 2496	2454 2977	2392 3134	2445	2104	1832 1941	1644	1255 1176	546 378	252 196	151	59.9 24.6	15.2	7.56	0.58
75	261		1510	1958	2255	2658	2620		2148	1880	1478	1042			71.8		0.87		
80	183	1078 881	1338	1737	2255	2650	2828	2730	2140	1784	1515	877	272	153	56.1	15.7	0.95	0.72	0.54
85	136	699	1310	1733	2042	2383	2412	2344	2032	1787	1326	667	142	100	46.6	6.95	0.86	0.72	0.5
90	123	518	1150	1549	1851	2244	2358	2298	1835	1454	1078	493	125	90.0	37.3	3.78	0.46		0.42
95	110	346	919	1303	1849	2159	2197	2158	1751	1242	699	292	110	78.9	28.0	2.15	0.52	0.52	0.95
100	63.6	153	327	797	1336	1656	1716	1694	1202	659	308	115	61.3	26.1	8.52	1.68	2.06	3.64	4.5
105	56.9	136	410	283	668	900	846	964	530	303	504	76.1	62.1	2.66	12.7	1.14	2.56	4.38	5.23
110	73.6	117	323	426	472	837	952	845	467	492	332	57.3	74.5			1.18	2.80	4.65	5.4
115	60.5	94.6	210	356	554	912	1079	930	573	364	214	42.2	61.3			1.11	2.74	4.32	5.0
120	50.8	81.9	155	235	401	596	655	603	413	239	154	32.8	51.5	-	4.28	0.96	2.45	4.30	4.7
125	39.9	70.2	144	207	307	391	414	395	310	204	142	24.2		1.45	2.74	0.72	1.82	3.06	3.93
130	12.8	47.5	135	205	276	334	344	339	276	207	134			0.56	1.43		1.06	2.53	3.01
135	17.8	2.86	117	194	261	309	324	310	259	196	119	38.9	4.37	6.09	0.56		0.42	0.23	0.54
140	8.86	16.8	90.4	176	257	290	299	292	259	179	95.3	23.6	1.58	3.39	0.14	0.17	0.39	0.51	0.94
145	2.51	8.74	57.3	138	205	230	233	230	206	142	60.1	10.0	0.35	0.71	0.13	0.13	0.24	0.24	0.5
150	0.12	0.62	6.31	90.4	141	171	169	171	145	93.0	0.52	0.89	0.11	0.11	0.13	0.13	0.14	0.15	0.19
155	0.11	0.38	2.66	72.9	102	117	114	117	103	60.9	17.3	0.67	0.08	0.10	0.12	0.13	0.14	0.15	0.14
160	0.11	0.24	5.72	0.42	48.5	83.0	90.3	84.6	37.1	4.64	9.80	0.54	0.11	0.11	0.13	0.13	0.14	0.14	0.15
165	0.09	0.10	0.46	10.2	10.2	0.54	0.57	0.65	8.43	8.56	0.83	0.50	0.14	0.13	0.13	0.13	0.13	0.14	0.14
170		0.09	0.18	0.44	0.89	5.20	6.63	4.57	1.07	0.78	0.60	0.45	0.13	0.11	0.10	0.10	0.10	0.11	0.12
210	0.08	0.09														0.00			
175 180	0.08	0.07	0.09	0.13	0.16	0.19	0.23		0.31	0.33		0.35	0.10	0.08	0.08	0.08		0.07	
175 180 Table2 C (DEG)	0.06	0.07	0.09	0.08	0.08										_	0.08			
175 180 Table2 C (DEG) (DEG)	0.06 0.09 285	0.07	0.09 0.07 315	0.08	0.08 345										_	0.08	0.08		
175 180 Table2 C (DEG) (DEG) 0	0.06 0.09 285 1651	0.07 0.08 300 1657	0.09 0.07 315 1653	0.08 330 1658	0.08 345 1654										_	0.08	0.08		
175 180 Table2 C(DEG) (DEG) 0 5	0.06 0.09 285 1651 1060	0.07 0.08 300 1657 1300	0.09 0.07 315 1653 1390	0.08 330 1658 1455	0.08 345 1654 1506										_	0.08	0.08		
175 180 Table2 C (DEG) (DEG) 0	0.06 0.09 285 1651	0.07 0.08 300 1657	0.09 0.07 315 1653	0.08 330 1658	0.08 345 1654										_	0.08	0.08		
175 180 Table2 C(DEG) (DEG) 0 5 10	0.06 0.09 285 1651 1060 982	0.07 0.08 300 1657 1300 1073	0.09 0.07 315 1653 1390 1191	0.08 330 1658 1455 1141	0.08 345 1654 1506 1372										_	0.08	0.08		
175 180 Table2 C (DEG) (DEG) 0 5 10 15	0.06 0.09 285 1651 1060 982 808	0.07 0.08 300 1657 1300 1073 947	0.09 0.07 315 1653 1390 1191 905	0.08 330 1658 1455 1141 1087	0.08 345 1654 1506 1372 1226										_	0.08	0.08		
175 180 Table2 C (DEG) 0 5 10 15 20	0.06 0.09 285 1651 1060 982 808 768	0.07 0.08 300 1657 1300 1073 947 749	0.09 0.07 315 1653 1390 1191 905 854	0.08 330 1658 1455 1141 1087 967	0.08 345 1654 1506 1372 1226 1162										_	0.08	0.08		
175 180 Table2 C (DEG) 0 5 10 15 20 25	0.06 0.09 285 1651 1060 982 808 768 621	0.07 0.08 300 1657 1300 1073 947 749 623	0.09 0.07 315 1653 1390 1191 905 854 680	0.08 330 1658 1455 1141 1087 967 712	0.08 345 1654 1506 1372 1226 1162 1055										_	0.08	0.08		
175 180 Table2 C(DEG) 0 5 10 15 20 25 30 35 40	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238	0.07 0.08 300 1657 1300 1073 947 749 623 543 415 310	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407	0.08 330 1658 1455 1141 1087 967 712 753 666 540	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746										_	0.08	0.08		
175 180 Table2 C(DEG) 0 5 10 15 20 25 30 35 40 45	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 151	0.07 0.08 300 1657 1300 1073 947 749 623 543 415 310 212	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330	0.08 330 1658 1455 1141 1087 967 712 753 666 540 442	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598										_	0.08	0.08		
175 180 Table2 C(DEG) (DEG) 0 5 10 15 20 25 30 35 40 45 50	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 151 96.2	0.07 0.08 300 1657 1300 1073 947 749 623 543 415 310 212 138	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253	0.08 330 1658 1455 1141 1087 967 712 753 666 540 442 363	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598 526										_	0.08	0.08		
175 180 Table2 C(DEG) 0 5 10 15 20 25 30 35 40 45 50 55	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 151 96.2 66.4	0.07 0.08 300 1657 1300 1073 947 749 623 543 415 310 212 138 79.9	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253 171	0.08 330 1658 1455 1141 1087 967 712 753 666 540 442 363 294	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598 526 421										_	0.08	0.08		
175 180 Table2 C(DEG) 0 5 5 10 15 20 25 30 45 50 45 55 60	0.06 0.09 285 1651 1060 982 808 808 808 808 808 808 808 808 808 8	0.07 0.08 300 1657 1300 1073 947 749 623 543 415 310 212 138 79.9 41.8	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253 171 112	0.08 330 1658 1455 1141 1087 712 753 666 540 442 363 294 223	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598 526 421 323										_	0.08	0.08		
175 180 Table2 C(DEG) 0 5 10 15 20 25 30 35 40 45 50 55 60 65	0.06 0.09 285 1651 1060 982 808 621 468 342 238 151 96.2 66.4 39.9 5.55	0.07 0.08 300 1657 1300 1073 947 749 623 543 310 212 138 79.9 41.8 15.0	0.09 0.07 1653 1390 1191 905 854 680 680 688 494 407 330 253 171 112 65.1	0.08 330 1658 1455 1141 1087 967 732 753 666 540 442 363 294 223 156	0.08 345 1654 1506 1372 1226 1162 1162 1055 935 825 746 598 526 421 323 260										_	0.08	0.08		
175 180 <b>Table2</b> C(DEG) 0 5 10 15 20 25 30 40 45 55 60 65 70	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 342 238 151 96.2 66.4 39.9 5.55 0.63	0.07 0.08 300 1657 1300 1073 947 749 623 543 415 310 212 212 138 79.9 41.8 15.0 0.97	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253 171 112 65.1 29.9	0.08 330 1658 1455 1141 1087 712 753 666 540 442 363 294 223 156 111	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598 526 421 323 260 203										_	0.08	0.08		
175 180 Table2 C(DEG) (DEG) 0 5 10 0 5 20 25 20 25 30 35 50 55 50 55 50 55 50 55 70 75	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 515 151 96.2 66.4 39.9 5.55 0.63 0.72	0.07 0.08 300 1657 1300 1073 947 543 543 415 310 212 138 79.9 41.8 15.0 0.97 1.01	0.09 0.07 1653 1390 1191 905 854 680 628 494 407 330 253 171 112 25.9 90.8	0.08 330 1658 1455 1141 1087 712 753 666 540 442 23 363 294 223 156 111 79.9	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598 526 421 323 260 203 156										_	0.08	0.08		
175 180 Table2 C(DEG) (DEG) 0 5 5 10 0 5 5 30 35 40 45 55 60 65 70 75 80	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 151 96.2 66.4 39.9 5.55 0.63 0.72 0.85	0.07 0.08 300 1657 1300 1073 947 749 623 543 415 310 212 138 79.9 41.8 5.0 0.97 1.01	0.09 0.07 315 1653 1390 1191 905 854 680 688 494 407 330 253 171 112 253 171 112 29.9 20.8 14.4	0.08 330 1658 1455 1141 1087 967 712 753 666 540 442 363 294 223 156 540 1111 79.9 63.1	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598 526 421 323 260 203 156 125										_	0.08	0.08		
175 180 Table2 C(DEG) (DEG) 0 5 10 0 5 20 25 20 25 30 35 50 55 50 55 50 55 50 55 70 75	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 151 96.2 66.4 39.9 5.55 0.63 0.72 0.85 0.71	0.07 0.08 300 1657 1300 947 749 623 543 415 310 212 138 79.9 41.8 15.0 0.97 1.01 1.01 1.08	0.09 0.07 1653 1390 854 680 628 494 407 330 253 171 112 65.1 29.9 20.8 14.4 9.74	0.08 330 1658 1455 1141 1087 967 753 666 540 442 363 294 223 156 540 442 363 294 223 156 540 442 363 294 225	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598 526 421 323 260 203 156 125 107										_	0.08	0.08		
175 180 Table2 (DEG) 0 5 10 15 20 0 15 20 30 25 30 35 40 45 55 55 60 65 70 80 85 90	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 96.2 66.4 39.9 5.55 0.63 0.72 0.85 0.72 0.85	0.07 0.08 300 1657 1300 1073 947 749 623 415 310 212 138 415 310 212 138 15.0 0.97 1.01 1.08 0.84 0.84	0.09 0.07 1653 1390 854 680 628 494 407 253 171 112 65.1 29.9 20.8 14.4 9.74 5.97	0.08 330 1658 1455 1141 1087 712 753 666 540 294 223 156 111 79.9 63.1 52.5 42.3	0.08 345 1654 1506 1372 1226 1055 935 825 746 598 421 323 260 203 156 125 107 96.1										_	0.08	0.08		
175 180 Table2 C(DZG) 0 5 10 15 20 25 30 35 40 45 55 60 65 70 75 80 85	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 151 96.2 66.4 39.9 5.55 0.63 0.72 0.85 0.71	0.07 0.08 300 1657 1300 947 749 623 543 415 310 212 138 79.9 41.8 15.0 0.97 1.01 1.01 1.08	0.09 0.07 1653 1390 854 680 628 494 407 253 171 112 65.1 29.9 20.8 14.4 9.74 5.97	0.08 330 1658 1455 1141 1087 712 753 666 540 442 363 223 156 1111 79.9 63.1 52.5 42.3 32.1	0.08 345 1654 1506 1372 1226 1162 1055 935 825 746 598 526 421 323 260 203 156 125 107										_	0.08	0.08		
175 180 Table2 C(DZG) 0 5 10 15 20 15 20 10 15 20 35 30 35 55 60 55 70 75 80 85 90 95	0.06 0.09 285 1651 1060 982 808 768 621 468 342 238 151 96.2 66.4 39.9 5.55 0.63 0.72 0.85 0.71 0.71 0.71	0.07 0.08 300 1657 1300 1073 947 749 623 543 310 212 138 79.9 79.9 71.01 1.08 41.8 15.0 0.97 1.01 1.08 4 0.47 0.51	0.09 0.07 1653 1390 1191 905 854 680 628 494 407 330 253 171 112 29.9 20.8 14.4 9.74 5.97 2.56	0.08 330 1658 1455 1141 1141 1087 712 753 666 666 442 363 294 223 3540 442 363 294 223 156 111 79.9 63.1 52.5 42.3 32.1 8.34	0.08 345 1654 1506 1372 1226 1055 825 746 598 526 421 323 260 203 156 125 107 96.1 84.9										_	0.08	0.08		
175 180 Table2 (DEG) 0 5 10 15 20 20 20 20 20 20 25 30 40 45 50 55 50 60 65 50 70 85 90 95 100	0.06 0.09 285 1651 1060 982 808 342 238 151 468 342 238 151 96.2 66.4 39.9 5.55 0.63 0.72 0.85 0.72 0.85 0.71 0.49	0.07 0.08 300 1657 1300 1073 947 749 543 415 310 212 212 138 79.9 41.8 15.0 0.97 1.01 1.01 1.08 0.84 0.47 1.38 1.41 2.25	0.09 0.07 1653 1390 1191 905 854 680 628 494 407 330 253 171 112 29.9 20.8 14.4 9.74 5.97 2.56	0.08 330 1658 11455 1141 1087 967 712 753 666 540 442 23 156 540 363 294 223 156 111 52.5 42.3 32.1 8.34 16.8	0.08 345 1654 1506 1162 1055 935 746 598 526 421 323 156 125 107 84.9 96.1 84.9 41.5										_	0.08	0.08		
175 180 Table2 C(DZG) 0 5 10 15 20 0 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 100 105 105 105 105 105 105 10	0.06 0.09 285 1651 1060 982 808 621 468 621 468 342 238 151 96.2 66.4 95.55 0.63 0.72 0.83 0.72 0.81 0.71 0.49 1.01 3.76 4.23 4.23	0.07 0.08 300 1657 1300 1073 947 749 543 415 310 212 212 138 79.9 41.8 15.0 0.97 1.01 1.01 1.08 0.84 0.47 1.38 1.41 2.25	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253 171 320 20.8 14.4 9.74 5.97 3.47 2.56 1.09 1.36	0.08 330 1658 1455 1455 1455 1455 1455 753 666 540 442 23 156 540 442 223 156 111 52.5 42.3 32.1 8.34 16.8 12.2	0.08 345 1654 1506 1162 1055 935 825 598 526 421 323 260 203 156 125 107 96.1 156 44.9 41.5 46.6										_	0.08	0.08		
175 180 Table2 C(DZG) 0 5 10 15 20 15 20 15 20 25 30 35 40 45 55 60 55 60 65 70 75 80 85 90 100 105 110	0.06 0.09 285 1651 1060 982 808 621 468 621 468 342 238 151 96.2 66.4 95.55 0.63 0.72 0.83 0.72 0.81 0.71 0.49 1.01 3.76 4.23 4.23	0.07 0.08 300 1657 1300 1073 947 749 623 543 310 212 212 310 212 1.38 79.9 41.8 15.0 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 2.2 36 0.97 2.30	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253 171 320 20.8 14.4 9.74 5.97 3.47 2.56 1.09 1.36	0.08 330 1658 1145 1145 1087 753 666 540 294 442 363 294 442 363 294 442 363 294 442 363 294 442 363 294 156 111 156 111 156 112 2 8 6 6 6 6 6 6 6 6 6 6 6 6 6	0.08 345 1654 1506 1372 1226 1055 825 746 598 526 746 598 203 156 421 323 260 203 156 125 107 96.1 84.9 46.4 46.4										_	0.08	0.08		
175 180 Table2 (DEG) 0 5 10 15 20 0 5 20 10 25 30 25 30 45 50 55 60 65 70 85 90 95 90 105 110 115 100 101 105 100 105 105	0.06 0.09 285 1651 1060 982 808 768 621 982 238 768 649 342 238 342 238 342 238 342 238 342 238 342 236 342 236 342 236 342 236 3.17	0.07 0.08 300 1657 1300 947 749 623 415 310 79.9 41.8 79.9 41.8 15.0 0.97 1.01 1.08 41.5 15.0 0.97 1.01 1.08 4 0.47 0.51 1.8 1.8 2.25 2.36 2.30 2.02	0.09 0.07 315 1653 1390 854 680 494 407 330 253 171 122 253 171 122 253 171 122 5.97 3.47 2.56 5.1 1.09 1.36 1.09 4.05	0.08 330 1658 1455 1141 1087 712 753 666 107 442 363 294 156 111 52.5 42.3 32.1 8.34 16.8 12.2 8.62 5.57 3.66	0.08 345 1654 1506 1372 1226 1055 935 825 526 421 203 156 203 156 107 96.1 84.9 941.5 46.6 46.2 35.1 26.3 19.1										_	0.08	0.08		
175 180 Table2 C(DZG) 0 5 10 15 20 0 15 20 30 35 40 45 55 60 55 60 65 70 75 80 85 80 95 100 115 110 115 120	0.06 0.09 285 1651 1060 982 808 768 621 982 238 768 649 342 238 342 238 342 238 342 238 342 238 342 236 342 236 342 236 342 236 3.17	0.07 0.08 300 1657 1300 1073 947 749 623 310 212 138 15.0 0.97 41.5 1.08 0.97 1.08 0.84 0.47 1.08 0.84 2.25 2.30 2.02	0.09 0.07 315 1653 1390 854 680 494 407 330 253 171 122 253 171 122 253 171 122 5.97 3.47 2.56 5.1 1.09 1.36 1.09 4.05	0.08 330 1658 1455 1141 1087 712 753 666 107 442 363 294 156 111 52.5 42.3 32.1 8.34 16.8 12.2 8.62 5.57 3.66	0.08 345 1654 1506 1372 1226 1055 935 825 526 421 203 156 203 156 107 96.1 84.9 941.5 46.6 46.2 35.1 26.3 19.1										_	0.08	0.08		
175 180 Table2 (DEG) 0 5 10 15 20 20 20 20 20 20 20 20 20 20	0.06 0.09 285 1651 1060 982 808 768 646 342 238 342 238 342 238 342 238 0.63 0.63 0.63 0.63 0.63 0.72 0.85 0.71 1.01 3.76 4.23 4.35	0.07 0.08 300 1657 1300 947 749 623 415 310 79.9 41.8 79.9 41.8 15.0 0.97 1.01 1.08 41.5 15.0 0.97 1.01 1.08 4 0.47 0.51 1.8 1.8 2.25 2.36 2.30 2.02	0.09 0.07 315 1653 1390 1191 905 854 680 494 407 330 253 171 112 253 171 112 253 171 112 25,9 9 20.8 14.4 9,74 9,74 9,74 9,74 9,74 9,74 9,74 9,7	0.08 330 1658 1455 1141 1087 967 712 753 666 540 442 223 156 540 442 223 156 52.5 32.1 8.34 16.8 12.2 8.62 5.57 3.666 2.57 3.666 5.2.1 1111 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12.2 13.2 14.2 14.2 13.2 15.2 13.2 13.2 13.2 14.2 14.2 15.2 15.2 15.2 15.2 15.2 15.2 15.2 15.2 12.2 13.2 14.2 14.2 15.2	0.08 345 1654 1506 1372 935 935 925 746 598 526 421 323 156 125 107 421 323 156 125 107 421 323 156 125 107 421 323 156 125 105 105 105 105 105 105 105 10										_	0.08	0.08		
175 180 Table2 C(DZG) 0 5 10 15 20 15 20 15 20 30 35 40 45 50 55 50 55 60 65 70 75 80 85 100 105 105 105 105 105 105 10	0.06 0.09 285 1651 1060 982 808 768 468 342 238 66.4 39.9 266.4 39.9 266.2 66.4 39.9 266.2 66.4 39.9 151 96.2 66.4 39.9 26.2 66.4 39.2 238 0.71 0.49 1.01 0.71 0.49 1.01 0.71 0.71 0.71 0.71 0.71 0.71 0.71	0.07 0.08 300 1657 300 1073 947 749 543 415 30 212 138 543 310 212 138 543 415 10 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 2.25 2.36 2.30 0.45	0.09 0.07 1653 1390 854 680 253 171 112 20.8 65.1 29.9 20.8 14.4 5.97 3.47 5.97 3.47 1.09 1.36 1.09 1.36 1.09 1.36 0.94 0.94 0.37 0.25	0.08 330 1658 1455 1141 1087 967 712 967 753 666 540 442 233 654 9.9 43.1 79.9 63.1 79.9 63.1 152.5 42.3 32.1 8.34 16.8 12.2 8.62 8.557 3.66 0.86 0.86 0.82	0.08 345 1654 1506 1372 1226 11226 11226 935 825 746 598 421 323 156 421 323 156 421 325 107 96.1 84.9 107 96.1 84.9 107 26.3 197 26.3 197 26.3 197 26.3 197 26.3 197 203 156 203 156 203 156 203 156 203 156 203 156 203 156 203 156 203 156 203 156 203 156 203 156 203 156 203 156 107 203 156 107 203 156 107 203 156 107 203 156 107 203 156 107 203 156 107 203 156 107 203 156 107 203 156 107 203 156 107 203 156 107 96.1 84.9 107 95.1 84.9 107 95.1 84.9 107 95.1 84.9 107 95.1 84.9 107 95.1 84.9 107 95.1 84.9 107 95.1 84.9 107 95.1 84.9 107 95.1 84.9 107 95.1 84.9 107 107 95.1 84.9 107 107 107 107 107 107 107 107										_	0.08	0.08		
175 180 Table2 C(DZC) (DZC) 0 5 10 15 20 15 20 30 35 40 45 55 50 55 50 55 60 65 70 75 80 85 90 95 100 115 120 115 120 115 120 135 140 145 145 145 145 145 145 145 145	0.06 0.09 285 1651 1060 982 808 768 342 521 468 342 538 555 0.63 5.55 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.49 1.01 3.76 4.23 3.85 5.55 0.71 0.49 1.01 0.49 1.01 0.49 1.01 0.49 2.02 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.72 0.85 0.72 0.72 0.72 0.72 0.72 0.72 0.72 0.72	0.07 0.08 300 1657 1300 1073 947 749 543 543 543 543 543 15.0 0.212 138 15.0 0.97 1.01 1.08 0.84 2.36 2.30 2.02 0.49 0.34	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253 30 253 271 112 65.1 126 65.1 126 126 126 126 126 126 126 126 126 12	0.08 330 1656 1455 1455 540 712 23 666 540 363 223 156 111 52.5 42.3 32.1 8.34 16.8 32.1 8.34 16.2 5.57 9.9 9.0 32.1 8.34 16.2 5.57 9.2 12.2 8.62 5.57 9.66 2.10 0.86 0.21 0.017	0.08 345 1654 1506 1372 1226 1162 1055 746 598 825 746 421 323 260 125 126 125 125 125 125 125 125 125 125										_	0.08	0.08		
175 180 Table2 (DEG) 0 5 10 15 20 10 25 30 25 30 35 40 45 50 55 50 65 70 65 80 65 80 65 80 105 100 115 125 100 105 105 105 105 105 105 10	0.06 0.09 285 1651 0.60 982 808 621 468 621 468 62 342 238 151 96.2 66.4 39.9 5.55 5.063 0.63 0.63 0.72 0.83 0.71 0.49 1.01 0.49 3.85 3.17 2.30 0.25 0.88 0.54	0.07 0.08 300 1657 1300 1073 947 623 543 310 212 138 79.9 41.8 15.0 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.08 0.97 1.01 1.00 0.97 1.01 1.08 0.97 1.01 1.84 2.25 2.36 0.35 0.84 0.97 0.84 0.97 0.84 0.97 1.01 1.84 2.25 0.85 0.05 0	0.09 0.07 315 1653 1390 1191 905 854 680 628 407 330 253 171 112 29.9 20.8 14.4 5.97 3.47 5.97 5.97 5.97 5.97 5.97 5.97 5.97 5.9	0.08 330 1658 1455 1141 1087 967 712 753 666 442 233 156 442 234 152 540 442 234 152 540 442 234 152 540 442 294 223 155 111 115 209 432 332 116 8 209 432 332 116 8 209 422 332 116 8 209 422 332 116 8 209 422 322 322 322 322 326 6 6 0 209 402 209 402 209 402 209 402 209 402 209 402 209 402 209 402 209 402 209 40 209 40 209 40 209 40 205 507 3.66 0 0.866 0.862 0.862 0.862 0.862 0.866 0.862 0.866 0.862 0.866 0.168 0	0.08 345 1654 1506 1372 1226 1055 825 746 526 421 323 156 203 156 203 156 44.9 44.5 46.6 46.2 35.1 26.3 19.1 8.27 8.10 3.85 0.80 0.14										_	0.08	0.08		
175 180 Table2 C(DEG) 0 5 10 15 20 0 5 10 15 20 30 45 50 55 80 65 60 65 70 80 85 90 95 100 105 115 120 105 105 105 105 105 105 105 10	0.06 0.09 285 1651 0.60 982 808 621 468 342 238 151 96.2 238 151 96.2 238 151 96.2 0.63 0.63 0.63 0.63 0.49 1.01 3.76 4.23 3.85 3.85 3.85 3.85 2.38 5.317 2.30 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.2	0.07 0.08 300 1657 1300 1073 947 749 623 543 310 212 212 138 79.9 41.6 1.5 0.97 1.01 1.08 0.84 0.451 1.08 0.459 0.459 0.34 0.18	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253 20.8 141 29.9 20.8 14.4 9.74 9.74 9.74 9.74 1.09 1.36 1.09 1.36 0.94 0.94 0.94 0.94 0.95 0.97	0.08 330 1658 1455 1141 1087 967 712 753 666 442 363 294 4223 156 63.1 52.5 79.9 63.1 16.8 12.2 8.64 12.2 8.64 12.2 15.5 79.9 6.5 116 1.6 8.34 12.2 1.6 8.34 12.2 1.6 8.34 12.2 1.5 1.6 8.34 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6	0.08 345 1654 1506 1372 1226 1372 1255 935 825 935 825 1055 935 825 1055 935 825 1057 1055 105										_	0.08	0.08		
175 180 Table2 C(DZC) 0 5 10 15 20 15 20 15 20 30 35 50 55 60 55 50 55 60 65 70 75 75 75 80 85 100 115 120 125 100 115 120 125 100 100	0.06 0.09 285 1651 1060 982 238 6621 468 621 468 555 5.55 0.63 0.72 0.85 0.71 0.49 96.2 66.4 3.42 238 0.72 0.85 0.71 0.43 3.07 2.30 0.25 3.17 2.30 0.25 0.88 0.88 0.88 0.85 0.98 0.99 0.23 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95	0.07 0.08 300 1657 1300 1073 947 623 543 310 212 23 623 15.0 0.97 1.01 1.5.0 0.97 1.01 1.08 0.84 0.47 2.36 2.30 2.02 2.30 2.02 2.30 2.05 0.55 0.50 0.49 0.34 0.16	0.09 0.07 315 1653 1390 1191 905 854 680 628 494 407 330 253 171 112 29.9 20.8 65.1 29.9 20.8 65.1 29.9 20.8 65.1 25.9 9.74 0.44 0.347 2.56 1.08 0.94 0.04 0.20 0.20 0.20 0.17	0.08 330 1658 1455 1141 1087 712 753 3656 540 442 23 363 294 223 156 540 442 23 363 156 540 442 23 363 156 540 442 23 363 152 5 42.3 32.1 16.3 17.3 16.3 17.3 16.3 17.3 16.3 17.3 16.3 17.3 16.3 17.3 16.3 17.3 16.3 17.3 16.3 17.3 16.3 17.3 16.3 17	0.08 345 1654 1506 1162 1226 1162 125 1055 825 825 825 825 107 746 421 263 260 203 156 125 107 145 156 125 107 126 1372 126 1372 126 1372 126 1372 1276 1372 1376 1375										_	0.08	0.08		
175 180 Table2 (DEG) 0 5 10 15 20 0 5 10 15 20 30 25 30 35 40 45 50 65 50 65 60 65 80 85 90 95 100 105 105 105 105 105 105 10	0.06 0.09 285 1651 1060 982 288 808 768 768 768 768 768 768 768 768 768 76	0.07 0.08 300 1073 415 310 417 749 623 415 310 212 138 79.9 41.8 15.0 0.97 2.12 2.12 2.138 15.0 0.97 2.25 2.36 2.30 0.47 0.51 1.89 0.85 1.59 0.45 0.50 0.49 0.34 0.155	0.09 0.07 315 1653 1390 1191 905 854 494 407 253 171 29.9 65.1 122 65.1 129.9 65.1 129.9 65.1 129.9 73.47 2.56 1.09 1.36 1.09 1.36 0.94 0.94 0.94 0.94 0.57 70.54 0.094 0.54 0.54 0.54 0.54 0.54 0.54 0.54 0.5	0.08 330 1658 1455 1411 1087 967 712 753 666 442 223 156 442 223 156 4223 158 42.3 32.1 111 79.9 63.1 122.5 42.3 32.1 10.8 8.34 16.8 12.2 5.57 3.666 0.21 0.86 0.21 0.16 0.15 0.14 0.15	0.08 345 1654 1506 1162 1226 935 935 935 935 935 935 946 526 526 528 528 528 528 528 528 528 528										_	0.08	0.08		
175 180 Table2 C(DZG) 0 5 10 15 20 15 20 15 20 30 35 40 45 55 50 55 80 65 60 65 70 75 80 85 100 105 115 120 105 105 105 105 105 105 105 10	0.06 0.09 285 1651 1060 982 808 342 238 342 238 342 238 342 238 342 345 0.63 342 345 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.85 0.72 0.72 0.72 0.72 0.72 0.72 0.72 0.72	0.07 0.08 300 1657 1300 212 543 415 543 415 0 212 138 543 415 0 212 138 0.947 7.9.9 41.6 15.0 0.97 1.01 1.08 4 0.97 1.01 1.84 2.36 2.30 2.02 2.02 2.03 2.03 2.03 2.03 0.85 0.59 0.85 0.59 0.49 0.49 0.34 0.15 5 0.51 0.12	0.09 0.07 315 1653 1390 1191 905 854 880 253 171 29.9 20.8 494 407 255 122 65.1 29.9 20.8 1.22 65.1 122 65.1 129.9 20.8 1.4.4 9.74 5.97 7.256 1.09 1.36 1.09 1.36 0.94 0.59 0.44 0.59 0.41 0.59 0.41 0.12	0.08 330 1658 1141 1087 712 753 666 540 442 23 363 294 4223 156 111 52.5 42.3 156 111 8.34 16.8 8.62 2.10 0.8 6.6 2.10 0.8 6.21 0.21 0.15 0.15	0.08 345 1654 1596 1372 1226 935 746 598 746 421 323 156 421 323 156 421 323 156 421 323 156 421 323 156 421 323 156 421 323 156 421 323 156 421 323 156 421 125 526 44.9 41.5 46.2 35.1 19.1 8.27 8.19 19.1 8.27 8.19 19.1 8.27 8.19 19.1 8.27 8.19 19.1 8.27 8.19 19.1 8.27 8.19 19.1 8.27 8.19 19.1 8.27 8.19 19.1 8.27 8.19 19.1 8.27 8.19 19.18 19.18										_	0.08	0.08		80.0 80.0
175 180 Table2 (DEG) 0 5 10 15 20 0 5 10 15 20 30 25 30 35 40 45 50 65 50 65 60 65 80 85 90 95 100 105 105 105 105 105 105 10	0.06 0.09 285 1651 1060 982 768 621 342 238 96.2 238 96.2 238 96.2 238 96.2 66.4 342 238 96.2 66.4 39.9 95.55 0.63 0.72 0.85 0.63 0.71 0.49 3.85 3.17 0.25 0.84 9.37 0.25 0.84 0.54 1.01 0.054	0.07 0.08 300 1073 415 310 417 749 623 415 310 212 138 79.9 41.8 15.0 0.97 2.12 2.12 2.138 15.0 0.97 2.25 2.36 2.30 0.47 0.51 1.89 0.85 1.59 0.45 0.50 0.49 0.34 0.155	0.09 0.07 115 1653 1390 1191 905 854 494 407 253 171 112 25.6 1.09 1.36 8.97 3.47 2.56 1.09 1.3.6 8.97 4.4 4.07 2.5 6 1.09 1.3.6 8.97 1.3.6 1.09 1.3.6 8.0.94 0.597 0.26 0.44 0.597 0.26 0.44 0.59 0.44 0.59 0.44 0.59 0.44 0.59 0.44 0.50 0.44 0.50 0.44 0.50 0.44 0.50 0.44 0.50 0.44 0.50 0.54 0.54	0.08 330 1658 11455 11411 1087 712 753 666 540 6540 223 156 111 52.5 79.9 63.1 52.5 79.9 63.1 152.5 79.9 63.1 16.8 12.2 8.62 5.57 3.66 0.21 0.86 0.21 0.16 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.15 0.08 0.08 0.15 0.08 0.15 0.08 0.08 0.08 0.15 0.08 0.08 0.08 0.08 0.08 0.15 0.08	0.08 345 1654 1596 1372 1226 265 746 538 526 421 323 260 107 96.1 107 96.1 107 96.1 107 96.1 107 96.1 107 96.1 107 105 105 105 105 105 105 105 105										_	0.08	0.08		

### **THD and PF Measurement Test Result:**

### **Electrical Measurement:**

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	<b>Power Factor</b>	iTHD
277.04	60	0.2835	73.2	0.9320	14.81









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 Website: http://www.ntc-cert.com
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NVLAP LAB CODE 600150-0

Report No: NTCR17060041 Report Version: V1.1

Equipment ID	Equipment Name	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





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