



TEST REPORT

According to ANSI/IES LM-80-15

For

Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

Model: HL-C3535F15R3EA-ZW

Report Type: 9000 Hours Test Report		Product Type: LED Package	
Reviewed By:	Pote Wang <i>Pote Wang</i>		
Report Number:	RSZ190428535-10-9000-M1		
Test Date:	2020-01-09 to 2021-02-21		
Report Date:	2021-12-02		
Approved by:	Blake Zhang / EE Engineer		
Revised Note:	The previous report RSZ190428535-10-9000 is replaced by this report on 2021-12-02		
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1 st Road, Tangxia Town, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588		

TABLE OF CONTENTS

1 - General Information	3
1.1 Description of LED Light Sources	3
1.2 Standards and Reference Documentations	3
1.3 Testing Equipment	4
1.4 Drive Level	4
1.5 Ambient Conditions for Maintenance Test	4
1.6 Photometric Measurement Method and Uncertainty.....	4
1.7 Statement of Traceability	4
1.8 Sample Set.....	5
2 - Summary of Test Result	6
3 - Test Data	7
3.1 Data Set 1, 85°C, 700mA (400-700nm Photon Flux Maintenance)	7
3.2 Data Set 1, 85°C, 700mA (Forward Voltage).....	8
3.3 Data Set 1, 85°C, 700mA (Wavelength)	9
3.4 Data Set 2, 105°C, 700mA (400-700nm Photon Flux Maintenance)	10
3.5 Data Set 2, 105°C, 700mA (Forward Voltage).....	11
3.6 Data Set 2, 105°C, 700mA (Wavelength)	12
4 - DUT Photo	13
4.1 #Mechanical Dimensions.....	13
4.2 DUT Photo.....	13
5 - Report Revision	14
Directions	15

1 - General Information

1.1 Description of LED Light Sources

Sample Size:

60 PCS test samples were in good condition and received on 2019-04-28. The samples were numbered from 1 to 30 and 31 to 60.

#Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
#Part Number:	HL-C3535F15R3EA-ZW
#Part Type:	LED Package
#Drive Level:	DC 700mA
#Wavelength:	660nm
#Power:	1.75W
#Average Current Density per LED die:	529.3mA/mm ²
#Average Power Density per LED die:	1.323 W/mm ²
#CRI:	NA
#Die Spacing:	NA

Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.

These manufacturing lots are picked to represent a wide parametric distribution.

Family products covered by this report:

According to *ENERGY STAR® Requirements for the Use of LM-80 Data*, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of *ENERGY STAR® Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:

Model Name	Total Input Current (mA)	Power (W)	Wavelength (nm)	Number of dies	Driver current per die (mA)	Current Density per Die (mA/mm ²)	Power Density per PCB (W/mm ²)	Die Spacing (mm)
HL-C3535F15R3EA-ZW	700	1.75	660	1	700	529.3	0.147	/
HL-C3535F**R**A-ZW	700	1.75	660	1	700	529.3	0.147	/
HL-C3535K**R**A-ZW	700	1.75	660	1	700	358.7	0.147	/
HL-C3535F**R**A-ZW-**	700	1.75	660	1	700	301.4	0.147	/
HL-C3535K**R**A-ZW-**	700	1.75	660	1	700	529.3	0.147	/
HL-C3535F**R**A-****-ZW	700	1.75	660	1	700	529.3	0.147	/
HL-C3535K**R**A-****-ZW	700	1.75	660	1	700	358.7	0.147	/
HL-C3535F**R**A-****-ZW-**	700	1.75	660	1	700	301.4	0.147	/
HL-C3535K**R**A-****-ZW-**	700	1.75	660	1	700	529.3	0.147	/

Note: The model name begins with "HL", such as "HL-C3535F**R**A-****-ZW-**", " " is described in detail as follows:

1. The first "***" is a number from 1 to 99 which stands for the brightness level.
2. The second "**" is a number from 1 to 9 which stands for the power level.
3. The third "*" represents the molding equipment number "E" or "G".
4. The fourth "****" which stands for the Zener chip code or None, No impact on product performances, Zener chip code refers to the electrostatic capacity.
5. The fifth "**" is the letter, which stands for the customer code.

1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.

- CIE 127:2007: Measurement of LEDs
- ANSI/ASABE S640 JUL2017 Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms) (This standard was not accredited by IAS)
- ANSI/ASABE S642 SEP2018: Recommended Methods for Measurement and Testing of LED Products for Plant Growth and Development (This standard was not accredited by IAS)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
0.5m integrating sphere	EVERFINE	AIS-2	G185304TA1381172	2020-10-22	2021-10-21
LED Test Source	EVERFINE	LTS-300	P185616CD1371113	2020-10-21	2021-10-20
High Accuracy Array Spectroradiometer	EVERFINE	HAAS-2000	P600674CM1381123	2020-10-22	2021-10-21
Standard Light Source	EVERFINE	D062	1011093	2020-10-20	2021-10-19
Multilayer aging machine	BACL	B2-270	20013	2020-03-11	2021-03-10
Program-controlled D.C. Stabilized Voltage Supply	Hanshenpuyuan	HSPY-200-01	N/A	2020-07-01	2021-06-30

1.4 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within $\pm 3\%$ of the specified value of the manufacturer during maintenance test, and was within $\pm 0.5\%$ during photometric and electrical measurement test.

1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case (TMP_{LED}) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, TMP_{LED} of the coldest LEDs were maintained at a temperature that was greater than or equal to $2^{\circ}C$ below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to $5^{\circ}C$ below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within $\pm 3\%$ of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to $25^{\circ}C \pm 2^{\circ}C$, RH <65%.

1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure spectral power distribution and photon flux. 2π measurement was used and sample was driven by DC power supply. The forward current was regulated to within $\pm 0.5\%$ of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to $25^{\circ}C \pm 2^{\circ}C$, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).



1.8 Sample Set

Data Set 1: 85°C, 700mA

Part Number: HL-C3535F15R3EA-ZW

Number of Units: 30

Case Temperature: >83°C

Ambient Temperature: >80°C

Life Test Drive Current: 700mA

Measurement Current: 700mA

Data Set 2: 105°C, 700mA

Part Number: HL-C3535F15R3EA-ZW

Number of Units: 30

Case Temperature: >103°C

Ambient Temperature: >100°C

Life Test Drive Current: 700mA

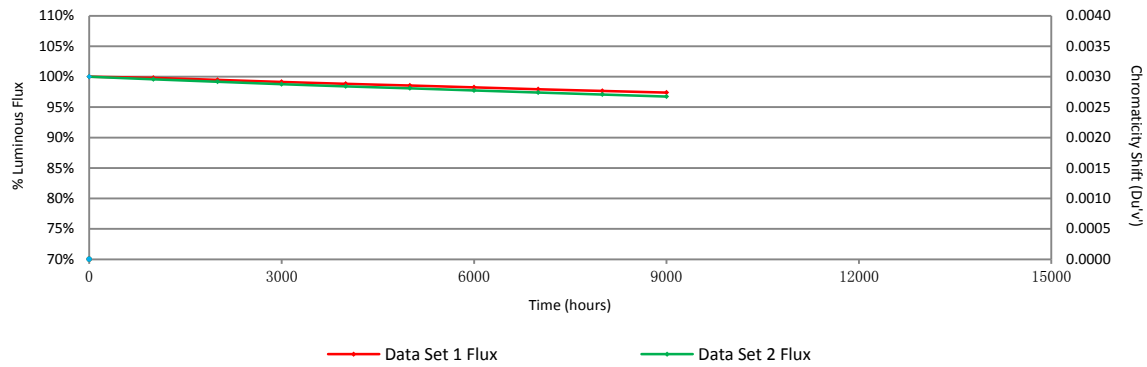
Measurement Current: 700mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 Q ₇₀ Lifetime	Reported TM-21 Q ₉₀ Lifetime
1	30	0	1000hrs	9000hrs	2.965E-06	1.000	>54000 hours	36,000 hours
2	30	0	1000hrs	9000hrs	3.441E-06	0.998	>54000 hours	30,000 hours

Average Photon Flux Maintenance, Photosynthetic 400-700nm (PFM_p) (Percentage of Initial)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	99.80%	99.48%	99.14%	98.83%	98.55%	98.25%	97.94%	97.66%	97.39%
2	99.57%	99.17%	98.77%	98.41%	98.09%	97.74%	97.40%	97.07%	96.74%



3 - Test Data

3.1 Data Set 1, 85°C, 700mA (400-700nm Photon Flux Maintenance)

No.	Φ_p ($\mu\text{mol} \times \text{s}^{-1}$)	400-700nm Photon Flux Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	4.966	99.11	98.71	98.29	98.05	97.85	97.50	97.24	97.00	96.72
2	4.993	99.62	99.24	98.82	98.48	98.18	97.88	97.70	97.38	97.04
3	5.012	99.76	99.52	99.24	98.98	98.76	98.44	98.06	97.73	97.53
4	4.988	99.48	99.00	98.66	98.42	98.16	97.79	97.47	97.15	96.95
5	4.969	99.60	99.34	99.07	98.71	98.39	98.15	97.99	97.69	97.34
6	4.978	99.66	99.24	99.00	98.69	98.29	97.97	97.73	97.45	97.21
7	4.983	99.36	98.96	98.72	98.37	98.05	97.77	97.25	97.01	96.65
8	4.924	99.96	99.57	99.15	98.86	98.52	98.23	97.71	97.44	97.20
9	4.983	99.86	99.56	99.12	98.72	98.45	98.11	97.75	97.37	97.07
10	5.007	99.48	99.18	98.86	98.64	98.44	98.12	97.58	97.24	96.94
11	4.922	100.73	100.33	100.04	99.70	99.37	99.02	98.70	98.44	98.17
12	4.957	100.61	100.26	99.84	99.50	99.23	98.97	98.47	98.18	97.94
13	4.891	99.14	98.88	98.49	98.24	98.00	97.65	97.46	97.16	96.89
14	4.950	99.56	99.15	98.87	98.53	98.22	97.96	97.62	97.37	97.17
15	4.940	99.49	99.13	98.74	98.42	98.14	97.81	97.45	97.27	96.92
16	4.936	99.78	99.55	99.15	98.76	98.46	98.18	97.73	97.49	97.29
17	4.957	99.54	99.29	98.85	98.59	98.33	98.06	97.62	97.34	97.10
18	4.927	100.30	100.02	99.80	99.49	99.11	98.88	98.48	98.13	97.89
19	4.958	99.90	99.66	99.27	99.07	98.81	98.57	98.25	97.96	97.66
20	4.966	99.74	99.46	99.21	98.93	98.59	98.29	98.13	97.91	97.60
21	4.969	100.12	99.72	99.50	99.22	98.89	98.65	98.51	98.17	97.95
22	4.987	100.28	99.98	99.76	99.38	99.22	98.86	98.76	98.54	98.22
23	4.964	100.12	99.74	99.50	99.19	98.93	98.69	98.43	98.01	97.80
24	4.953	99.86	99.64	99.25	98.87	98.63	98.30	98.06	97.86	97.64
25	4.972	99.66	99.38	99.03	98.67	98.35	97.99	97.73	97.43	97.20
26	4.914	100.06	99.65	99.17	98.90	98.60	98.39	98.31	97.92	97.60
27	4.928	99.61	99.31	98.97	98.60	98.32	97.95	97.56	97.32	97.04
28	4.917	100.04	99.72	99.41	99.19	98.84	98.54	98.05	97.84	97.62
29	4.984	99.86	99.58	99.22	99.00	98.68	98.39	98.21	97.91	97.71
30	4.940	99.80	99.57	99.13	98.81	98.66	98.22	98.18	97.98	97.65
Avg.	4.958	99.80	99.48	99.14	98.83	98.55	98.25	97.94	97.66	97.39
Med.	4.961	99.77	99.54	99.14	98.78	98.49	98.20	97.87	97.59	97.31
st dev	0.029	0.37	0.38	0.40	0.39	0.38	0.40	0.42	0.42	0.43
Min.	4.891	99.11	98.71	98.29	98.05	97.85	97.50	97.24	97.00	96.65
Max.	5.012	100.73	100.33	100.04	99.70	99.37	99.02	98.76	98.54	98.22

3.2 Data Set 1, 85°C, 700mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2.571	2.568	2.573	2.597	2.575	2.573	2.571	2.569	2.583	2.580
2	2.445	2.441	2.470	2.460	2.447	2.443	2.449	2.447	2.462	2.461
3	2.397	2.399	2.400	2.400	2.399	2.399	2.403	2.393	2.411	2.410
4	2.486	2.484	2.485	2.504	2.489	2.490	2.496	2.485	2.500	2.508
5	2.551	2.547	2.544	2.571	2.548	2.549	2.554	2.547	2.561	2.560
6	2.453	2.453	2.450	2.466	2.455	2.455	2.462	2.451	2.467	2.467
7	2.575	2.571	2.592	2.594	2.576	2.574	2.592	2.574	2.588	2.587
8	2.598	2.606	2.591	2.598	2.593	2.593	2.600	2.593	2.610	2.606
9	2.483	2.472	2.482	2.499	2.479	2.479	2.489	2.474	2.494	2.509
10	2.485	2.476	2.475	2.491	2.478	2.480	2.493	2.478	2.488	2.492
11	2.549	2.428	2.538	2.545	2.545	2.542	2.554	2.539	2.562	2.552
12	2.462	2.585	2.464	2.468	2.468	2.460	2.482	2.490	2.482	2.473
13	2.624	2.617	2.622	2.632	2.633	2.620	2.640	2.618	2.636	2.631
14	2.593	2.591	2.592	2.596	2.661	2.590	2.597	2.588	2.603	2.601
15	2.491	2.501	2.492	2.496	2.500	2.492	2.512	2.489	2.523	2.503
16	2.548	2.533	2.536	2.538	2.540	2.543	2.539	2.534	2.546	2.540
17	2.597	2.596	2.597	2.615	2.605	2.601	2.604	2.598	2.616	2.607
18	2.559	2.539	2.543	2.554	2.549	2.545	2.547	2.542	2.558	2.554
19	2.493	2.493	2.489	2.502	2.500	2.491	2.500	2.493	2.509	2.507
20	2.584	2.582	2.585	2.595	2.593	2.585	2.595	2.586	2.599	2.596
21	2.434	2.431	2.439	2.451	2.452	2.431	2.445	2.434	2.452	2.441
22	2.598	2.581	2.583	2.603	2.590	2.587	2.586	2.585	2.599	2.593
23	2.481	2.477	2.485	2.497	2.499	2.486	2.491	2.479	2.500	2.509
24	2.599	2.595	2.599	2.619	2.608	2.599	2.605	2.598	2.615	2.611
25	2.590	2.580	2.586	2.597	2.607	2.589	2.589	2.582	2.608	2.596
26	2.620	2.613	2.615	2.627	2.661	2.622	2.622	2.616	2.625	2.622
27	2.532	2.543	2.534	2.532	2.583	2.605	2.536	2.529	2.536	2.537
28	2.625	2.621	2.625	2.628	2.626	2.634	2.646	2.622	2.643	2.637
29	2.428	2.424	2.428	2.427	2.598	2.437	2.450	2.422	2.438	2.435
30	2.538	2.533	2.538	2.548	2.595	2.547	2.546	2.534	2.546	2.545
Avg.	2.533	2.529	2.532	2.542	2.548	2.535	2.540	2.530	2.545	2.542
Med.	2.549	2.541	2.538	2.547	2.562	2.546	2.547	2.537	2.552	2.549
st dev	0.066	0.067	0.064	0.066	0.069	0.067	0.064	0.065	0.065	0.064
Min.	2.397	2.399	2.400	2.400	2.399	2.399	2.403	2.393	2.411	2.410
Max.	2.625	2.621	2.625	2.632	2.661	2.634	2.646	2.622	2.643	2.637

3.3 Data Set 1, 85°C, 700mA (Wavelength)

No.	Wavelength (nm)									
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	659.8	660.2	660.4	660.3	660.0	660.2	660.3	660.1	658.1	659.3
2	660.5	660.5	660.5	660.4	660.4	660.6	660.6	660.5	658.8	660.0
3	660.3	660.3	660.5	660.2	660.3	660.3	660.3	660.0	658.4	659.2
4	660.2	660.6	660.6	660.4	660.3	660.2	660.3	660.3	658.4	659.8
5	659.8	660.3	660.5	660.3	660.2	660.0	660.0	660.0	658.2	659.4
6	660.5	660.7	660.6	660.7	660.8	660.6	660.5	660.4	658.9	659.9
7	660.0	660.3	660.3	660.3	660.2	660.2	660.0	660.3	658.1	659.5
8	660.3	660.5	660.5	660.4	660.3	660.3	660.4	660.3	658.4	659.5
9	660.3	660.3	660.3	660.5	660.4	660.3	660.5	660.3	658.6	659.8
10	660.3	660.6	660.3	660.6	660.5	660.5	660.3	660.0	658.7	659.5
11	660.2	660.5	660.3	660.5	660.3	660.3	660.2	660.2	658.4	659.7
12	660.3	660.5	660.5	660.7	660.3	660.5	660.5	660.4	658.8	659.5
13	660.3	660.5	660.3	660.5	660.3	660.5	660.3	660.4	658.7	659.5
14	660.2	660.3	660.2	660.3	659.8	660.2	660.3	660.2	658.5	659.5
15	660.3	660.5	660.0	660.3	659.8	660.3	660.3	659.6	658.6	659.8
16	660.3	660.4	660.3	660.4	660.2	660.5	660.3	660.2	658.4	659.9
17	659.6	660.2	659.6	659.8	659.5	659.6	659.8	659.5	658.0	659.5
18	659.6	660.3	660.5	660.3	660.0	660.3	660.0	660.2	658.4	659.8
19	660.3	660.3	660.0	660.3	660.2	660.2	660.3	660.2	658.3	659.3
20	660.2	660.5	660.3	660.3	660.3	660.2	660.3	660.2	658.4	659.7
21	660.5	660.6	660.6	660.5	660.7	660.5	660.3	660.5	658.8	659.8
22	660.0	660.5	660.7	660.7	660.3	660.5	660.3	660.3	658.7	659.6
23	660.3	660.5	660.4	660.7	660.2	660.6	660.3	660.2	658.5	659.8
24	659.6	660.3	660.2	660.2	659.8	659.8	659.6	659.6	658.2	659.4
25	660.0	660.3	660.3	660.3	660.3	660.3	660.3	660.2	658.6	659.8
26	660.3	660.6	660.4	660.7	660.5	660.5	660.5	660.5	658.7	659.9
27	660.3	660.4	660.3	660.5	660.0	660.3	660.5	660.4	658.5	659.5
28	659.6	660.0	659.9	660.0	659.5	660.0	659.6	659.6	658.3	658.9
29	660.7	660.6	661.0	661.0	660.5	660.7	660.7	660.5	658.8	660.2
30	660.3	660.5	660.3	660.4	660.2	660.3	660.4	660.3	658.7	659.9
Avg.	660.2	660.4	660.4	660.4	660.2	660.3	660.3	660.2	658.5	659.6
Med.	660.3	660.5	660.3	660.4	660.3	660.3	660.3	660.2	658.5	659.7
st dev	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.2	0.3
Min.	659.6	660.0	659.6	659.8	659.5	659.6	659.6	659.5	658.0	658.9
Max.	660.7	660.7	661.0	661.0	660.8	660.7	660.7	660.5	658.9	660.2

3.4 Data Set 2, 105°C, 700mA (400-700nm Photon Flux Maintenance)

No.	Φ_p ($\mu\text{mol} \times \text{s}^{-1}$)	400-700nm Photon Flux Maintenance (%)								
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	4.915	99.61	99.31	98.94	98.60	98.37	98.03	97.62	97.33	96.93
32	4.907	100.26	99.76	99.41	99.18	98.82	98.49	98.25	97.86	97.53
33	4.962	99.72	99.27	98.93	98.67	98.39	98.13	97.50	97.24	97.00
34	4.989	99.72	99.26	98.88	98.58	98.30	98.00	97.71	97.49	97.27
35	4.976	99.84	99.48	99.00	98.63	98.27	97.91	97.63	97.23	96.91
36	4.922	99.35	98.96	98.54	98.17	97.83	97.42	97.32	96.87	96.59
37	4.972	100.06	99.72	99.38	98.93	98.59	98.13	97.65	97.37	96.92
38	4.991	99.72	99.30	98.82	98.48	98.04	97.70	97.28	96.87	96.57
39	4.971	99.78	99.48	99.07	98.67	98.45	98.11	97.67	97.43	97.02
40	4.973	99.66	99.16	98.81	98.41	98.11	97.73	97.51	97.23	96.94
41	4.932	100.20	99.84	99.33	99.03	98.60	98.22	97.85	97.55	97.30
42	4.974	99.40	99.06	98.57	98.29	97.85	97.45	97.23	96.90	96.52
43	5.009	99.64	99.18	98.84	98.44	98.10	97.86	97.52	97.22	96.93
44	4.903	99.94	99.49	99.14	98.82	98.45	98.00	97.49	97.08	96.84
45	4.971	99.72	99.26	98.75	98.41	98.07	97.79	97.63	97.20	96.84
46	4.942	99.51	99.07	98.66	98.26	98.04	97.65	97.07	96.66	96.26
47	4.994	99.70	99.40	99.06	98.68	98.32	97.86	97.68	97.28	97.00
48	4.989	99.68	99.44	99.00	98.60	98.34	98.00	97.63	97.41	97.13
49	4.932	99.47	99.11	98.70	98.22	97.93	97.55	97.42	97.20	96.80
50	4.939	99.51	99.07	98.70	98.34	97.87	97.51	97.41	97.04	96.76
51	4.945	99.17	98.79	98.44	98.14	97.86	97.57	97.47	97.07	96.72
52	5.009	99.44	99.00	98.48	98.10	97.68	97.38	97.21	96.87	96.49
53	4.914	99.33	99.00	98.56	98.21	97.86	97.48	97.40	97.17	96.85
51	4.991	99.00	98.54	98.10	97.68	97.32	97.01	96.63	96.19	95.97
55	4.987	99.20	98.62	98.18	97.85	97.61	97.39	96.77	96.55	96.21
56	4.986	99.28	98.92	98.62	98.36	98.03	97.69	97.55	97.11	96.87
57	5.002	99.08	98.74	98.34	97.88	97.64	97.36	96.50	96.22	95.94
58	4.978	99.50	99.02	98.61	98.21	97.91	97.53	97.17	96.89	96.50
59	4.921	99.37	99.07	98.70	98.39	97.97	97.56	97.09	96.75	96.28
60	4.934	99.37	98.95	98.46	98.18	97.97	97.61	97.12	96.68	96.35
Avg.	4.961	99.57	99.17	98.77	98.41	98.09	97.74	97.40	97.07	96.74
Med.	4.972	99.56	99.13	98.73	98.40	98.04	97.69	97.48	97.14	96.84
st dev	0.032	0.31	0.32	0.33	0.34	0.33	0.32	0.36	0.37	0.38
Min.	4.903	99.00	98.54	98.10	97.68	97.32	97.01	96.50	96.19	95.94
Max.	5.009	100.26	99.84	99.41	99.18	98.82	98.49	98.25	97.86	97.53

3.5 Data Set 2, 105°C, 700mA (Forward Voltage)

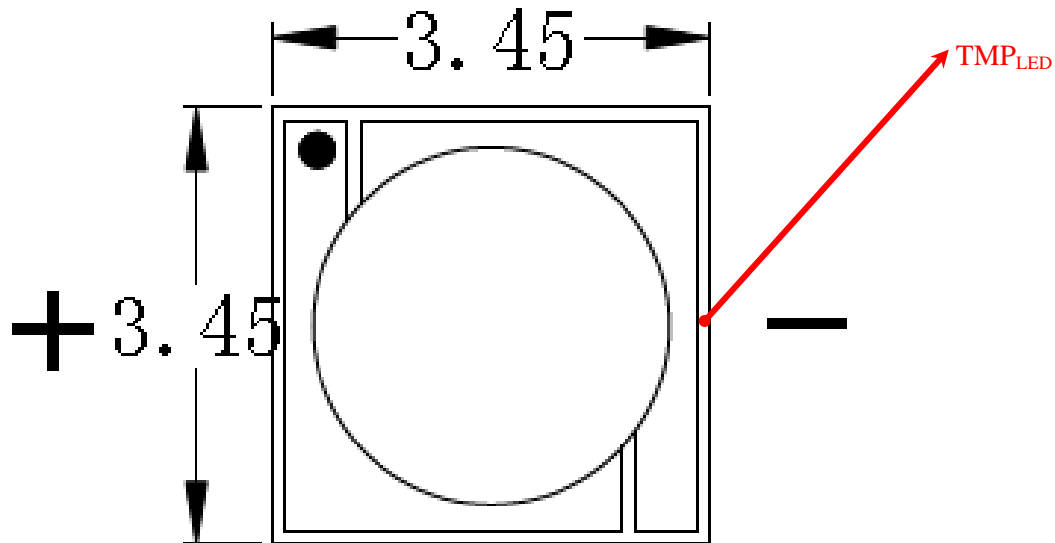
No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	2.575	2.583	2.577	2.600	2.608	2.579	2.601	2.582	2.606	2.623
32	2.571	2.576	2.571	2.580	2.598	2.569	2.584	2.578	2.588	2.599
33	2.493	2.494	2.495	2.502	2.517	2.522	2.530	2.494	2.513	2.508
34	2.427	2.443	2.431	2.438	2.440	2.426	2.473	2.428	2.447	2.440
35	2.449	2.464	2.451	2.460	2.464	2.449	2.492	2.457	2.468	2.462
36	2.560	2.563	2.565	2.571	2.570	2.559	2.576	2.562	2.579	2.574
37	2.464	2.445	2.447	2.460	2.451	2.444	2.468	2.446	2.465	2.458
38	2.444	2.428	2.433	2.455	2.446	2.430	2.443	2.431	2.456	2.440
39	2.564	2.558	2.557	2.572	2.567	2.556	2.571	2.561	2.595	2.572
40	2.431	2.420	2.421	2.430	2.426	2.423	2.427	2.423	2.444	2.431
41	2.582	2.570	2.577	2.582	2.577	2.571	2.602	2.576	2.605	2.588
42	2.583	2.560	2.565	2.575	2.574	2.580	2.609	2.569	2.609	2.580
43	2.497	2.485	2.488	2.525	2.495	2.491	2.522	2.491	2.506	2.499
44	2.547	2.535	2.539	2.544	2.546	2.539	2.556	2.539	2.558	2.548
45	2.596	2.593	2.591	2.594	2.603	2.591	2.615	2.596	2.605	2.604
46	2.562	2.572	2.566	2.593	2.569	2.561	2.588	2.569	2.581	2.575
47	2.461	2.465	2.467	2.497	2.474	2.462	2.475	2.465	2.487	2.474
48	2.425	2.426	2.426	2.456	2.439	2.429	2.443	2.427	2.443	2.436
49	2.587	2.575	2.573	2.600	2.580	2.579	2.590	2.576	2.592	2.581
50	2.556	2.559	2.554	2.578	2.560	2.554	2.571	2.558	2.571	2.565
51	2.527	2.531	2.527	2.544	2.535	2.524	2.558	2.524	2.541	2.533
52	2.451	2.456	2.448	2.461	2.461	2.446	2.470	2.447	2.491	2.456
53	2.552	2.552	2.547	2.528	2.521	2.514	2.546	2.517	2.534	2.525
51	2.435	2.431	2.425	2.438	2.445	2.450	2.447	2.430	2.448	2.437
55	2.520	2.516	2.513	2.571	2.576	2.550	2.559	2.548	2.563	2.555
56	2.442	2.438	2.439	2.459	2.455	2.445	2.532	2.438	2.449	2.441
57	2.517	2.512	2.508	2.519	2.525	2.514	2.535	2.508	2.524	2.514
58	2.461	2.456	2.456	2.474	2.477	2.471	2.481	2.456	2.472	2.459
59	2.512	2.510	2.511	2.524	2.538	2.513	2.544	2.510	2.522	2.513
60	2.516	2.512	2.516	2.523	2.537	2.523	2.544	2.513	2.542	2.515
Avg.	2.510	2.508	2.506	2.522	2.519	2.509	2.532	2.507	2.527	2.517
Med.	2.517	2.512	2.512	2.525	2.530	2.518	2.544	2.512	2.529	2.515
st dev	0.057	0.057	0.057	0.057	0.058	0.056	0.056	0.058	0.059	0.061
Min.	2.425	2.420	2.421	2.430	2.426	2.423	2.427	2.423	2.443	2.431
Max.	2.596	2.593	2.591	2.600	2.608	2.591	2.615	2.596	2.609	2.623

3.6 Data Set 2, 105°C, 700mA (Wavelength)

No.	Wavelength (nm)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	660.0	660.2	660.2	660.3	659.6	660.0	659.5	659.8	658.0	659.0
32	660.3	660.2	660.4	660.6	660.2	660.5	660.0	660.2	658.1	659.5
33	660.3	660.3	660.5	660.4	660.3	660.3	660.2	660.3	658.4	659.8
34	660.5	660.6	660.7	660.5	660.4	660.3	660.3	660.6	658.5	659.9
35	660.4	660.6	660.6	660.7	660.6	660.6	660.4	660.5	658.4	659.8
36	660.3	660.5	660.6	660.6	660.3	660.2	660.3	660.3	658.4	659.6
37	660.5	660.6	660.7	661.0	660.4	660.7	660.5	660.5	658.7	660.2
38	660.7	661.0	660.6	661.0	660.6	660.5	660.5	660.5	658.7	660.0
39	660.0	660.4	660.5	660.4	659.9	660.0	659.8	660.2	658.0	659.4
40	660.6	661.0	660.7	660.8	661.0	660.7	660.6	660.7	659.3	660.2
41	660.4	660.5	660.3	660.5	660.3	660.2	660.3	660.5	658.4	659.9
42	660.3	660.3	660.2	660.5	659.6	660.3	660.3	659.8	658.3	659.3
43	660.0	660.3	659.8	660.3	660.3	660.2	659.6	660.0	658.3	659.5
44	660.3	660.6	660.4	660.4	660.3	660.3	660.2	660.3	658.5	659.8
45	660.3	660.5	660.5	660.4	660.2	660.3	660.0	660.3	658.7	659.8
46	660.3	660.5	660.3	660.5	660.3	660.3	660.0	660.2	658.3	659.8
47	660.4	660.5	660.5	660.5	660.3	660.5	660.5	660.5	658.7	659.8
48	660.4	661.0	660.4	661.0	660.6	660.6	660.5	660.5	658.8	660.2
49	660.3	660.4	660.3	660.5	660.2	660.3	660.2	660.3	658.4	660.2
50	660.3	660.4	660.5	660.5	660.0	660.5	660.3	660.3	658.1	659.9
51	660.3	660.3	660.2	660.3	659.6	659.8	660.2	660.2	658.4	659.2
52	660.5	660.6	660.5	661.0	660.5	660.4	660.5	660.6	658.8	660.2
53	660.3	660.5	660.5	660.5	660.3	660.2	660.3	660.3	658.5	659.9
51	661.0	661.0	660.7	661.0	660.7	661.0	660.7	660.7	659.5	660.4
55	660.3	660.4	660.3	660.4	660.2	660.5	660.3	660.4	658.6	659.9
56	660.4	661.0	660.5	660.6	660.7	660.7	660.6	660.7	659.3	660.0
57	660.3	660.3	660.3	660.3	660.2	660.3	660.3	660.0	658.2	659.5
58	660.4	660.7	660.3	660.4	660.6	660.4	660.6	660.5	658.7	660.0
59	660.3	660.5	660.3	660.5	660.0	660.3	660.3	660.4	658.3	659.8
60	660.3	660.6	660.5	660.5	660.3	660.3	660.3	660.3	658.5	659.8
Avg.	660.4	660.5	660.4	660.6	660.3	660.4	660.3	660.3	658.5	659.8
Med.	660.3	660.5	660.5	660.5	660.3	660.3	660.3	660.3	658.5	659.8
st dev	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.4	0.3
Min.	660.0	660.2	659.8	660.3	659.6	659.8	659.5	659.8	658.0	659.0
Max.	661.0	661.0	660.7	661.0	661.0	661.0	660.7	660.7	659.5	660.4

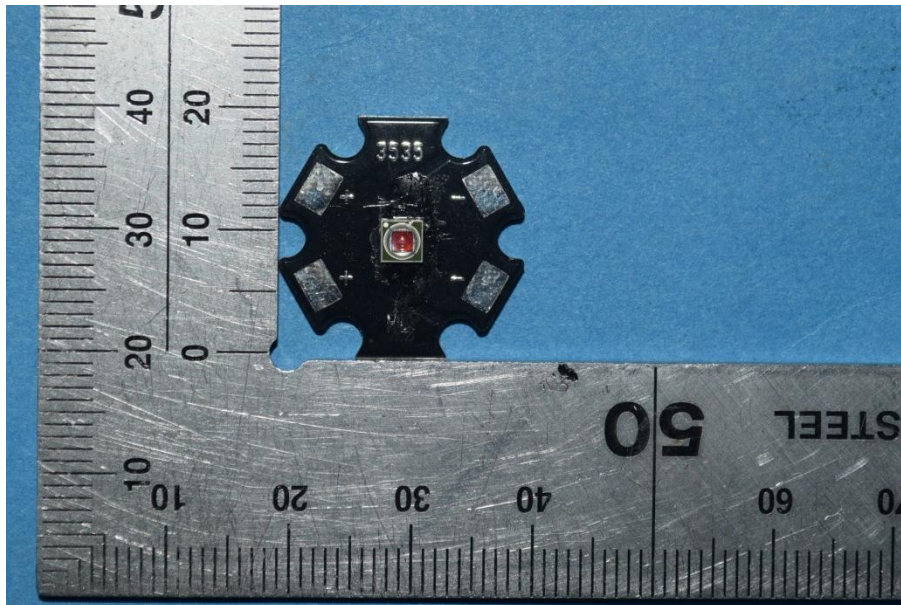
4 - DUT Photo

4.1 #Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo





5 - Report Revision

Report Number	Report Date	Contents
RSZ190428535-10-9000	2021-03-05	Original report.
RSZ190428535-10-9000-M1	2021-12-02	Update the Family products covered.

Directions

1. The information marked “superscript #” is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
6. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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