



**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.(Shenzhen). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government.



## **TABLE OF CONTENTS**

<b>1 - General Information</b> .....	<b>3</b>
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
<b>2 - Summary of Test Result</b> .....	<b>6</b>
<b>3 - Test Data</b> .....	<b>7</b>
3.1 Data Set 1, 55°C, 700mA, 1600K (Lumen Maintenance).....	7
3.2 Data Set 1, 55°C, 700mA, 1600K (Forward Voltage).....	7
3.3 Data Set 1, 55°C, 700mA, 1600K (Chromaticity Shift).....	8
3.4 Data Set 2, 105°C, 700mA, 1600K (Lumen Maintenance).....	8
3.5 Data Set 2, 105°C, 700mA, 1600K (Forward Voltage).....	9
3.6 Data Set 2, 105°C, 700mA, 1600K (Chromaticity Shift).....	9
3.7 Data Set 3, 55°C, 700mA, 8000K (Lumen Maintenance).....	10
3.8 Data Set 3, 55°C, 700mA, 8000K (Forward Voltage).....	10
3.9 Data Set 3, 55°C, 700mA, 8000K (Chromaticity Shift).....	11
3.10 Data Set 4, 105°C, 700mA, 8000K (Lumen Maintenance).....	11
3.11 Data Set 4, 105°C, 700mA, 8000K (Forward Voltage).....	12
3.12 Data Set 4, 105°C, 700mA, 8000K (Chromaticity Shift).....	12
<b>4 - DUT Photo</b> .....	<b>13</b>
4.1 Mechanical Dimensions.....	13
4.2 DUT Photo.....	13
<b>Directions</b> .....	<b>14</b>



## Bay Area Compliance Laboratories Corp. (Shenzhen)

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
The NVLAP Lab Code is 200707-0

### 1 - General Information

---

#### 1.1 Description of LED Light Sources<sup>#</sup>

**Sample Size:**

60 PCS test samples were in good condition and received on 2022-04-07. The samples were numbered from 1 to 15, 16 to 30, 31 to



### 1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
High Accuracy Array Spectroradiometer	EVERFINE	HAAS 2000	P600674CM5391140	2022-11-18	2023-11-17
0.5M Integrating Sphere	EVERFINE	0.5m	NA	2022-11-18	2023-11-17
LED Test Source	EVERFINE	LTS-300	P185616CJ1391143	2022-11-18	2023-11-17
Standard Light Source	EVERFINE	D062	1011093	2021-09-15	2023-09-14
Multilayer aging machine	BACL	B2-270	20015	2022-10-19	2023-10-18
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090005	2022-10-20	2023-10-19
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090003	2022-10-20	2023-10-19

### 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 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

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 luminous flux and chromaticity coordinate  $u_v$ .  $2^{\circ}$  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.

The uncertainty of the light output measurements is  $U=1.59\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=21K$  ( $K=2$ ), at the 95% confidence level.

The uncertainty of the temperature is  $U=0.8671^{\circ}C$  ( $K=2$ ), at the 95% confidence level.

### 1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Shenzhen) 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: 55°C, 700mA(1600K)

Part Number: HL-LH1308F95W-6B4C6(Ra4)-S-FC-DS  
Number of Units: 15  
Case Temperature: >53°C  
Ambient Temperature: >50°C  
Life Test Drive Current: 700mA  
Measurement Current: 700mA

### Data Set 2: 105°C, 700mA(1600K)

Part Number: HL-LH1308F95W-6B4C6(Ra4)-S-FC-DS  
Number of Units: 15  
Case Temperature: >103°C  
Ambient Temperature: >100°C  
Life Test Drive Current: 700mA  
Measurement Current: 700mA

### Data Set 3: 55°C, 700mA(8000K)

Part Number: HL-LH1308F95W-6B4C6(Ra4)-S-FC-DS  
Number of Units: 15  
Case Temperature: >53°C  
Ambient Temperature: >50°C  
Life Test Drive Current: 700mA  
Measurement Current: 700mA

### Data Set 4: 105°C, 700mA(8000K)

Part Number: HL-LH1308F95W-6B4C6(Ra4)-S-FC-DS  
Number of Units: 15  
Case Temperature: >103°C  
Ambient Temperature: >100°C  
Life Test Drive Current: 700mA  
Measurement Current: 700mA

# Bay Area Compliance Laboratories Corp. (Shenzhen)

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
 Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
 The NVLAP Lab Code is 200707-0

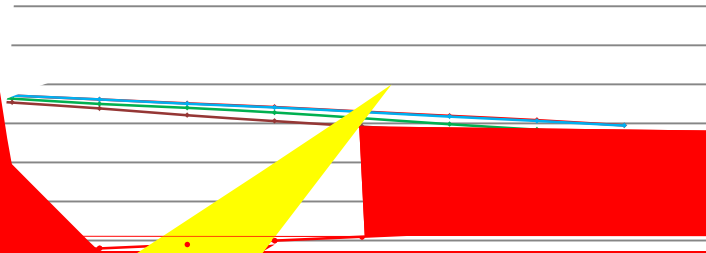
## ult

ires rved:	Test Interval	Test Duration			Reported TM-21 L <sub>70</sub> Lifetime	Reported TM-21 L <sub>90</sub> Lifetime
	1000hrs	10000hrs	2.286E-06	1.002	>55,000 hours	47,000 hours
	1000hrs	10000hrs	2.898E-06	1.003	>55,000 hours	37,000 hours
	1000hrs	10000hrs	2.295E-06	1.002	>55,000 hours	47,000 hours
	1000hrs	10000hrs	2.983E-06	0.999	>55,000 hours	35,000 hours

percentage of Initial Luminous Flux)

3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014	0.0016
0.0006	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013
0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014

aticity Shift VS. Time





# Bay Area Compliance Laboratories Corp. (Shenzhen)

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
The NVLAP Lab Code is 200707-0

371.23 53qBT0032575118.0612f2 792f2 72.024 54249.24 T8.0674 8.04F4 4 142.200159375 73.ETBT1 1 80.304 680.14 Tm63.28 ref31



## Bay Area Compliance Laboratories Corp. (Shenzhen)

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
 Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
 The NVLAP Lab Code is 200707-0

### 3.3 Data Set 1, 55°C, 700mA, 1600K (Chromaticity Shift)

No.				CCT(K)									
	Ohr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.3324	0.5439	1710	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
2	0.3369	0.5434	1669	0.0007	0.0008	0.0009	0.0011	0.0013	0.0014	0.0015	0.0016	0.0017	0.0019
3	0.3338	0.5441	1697	0.0002	0.0003	0.0004	0.0006	0.0007	0.0008	0.0010	0.0012	0.0013	0.0014
4	0.3365	0.5436	1673	0.0007	0.0009	0.0010	0.0011	0.0013	0.0014	0.0015	0.0016	0.0017	0.0017
5	0.3328	0.5439	1706	0.0008	0.0009	0.0008	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010	0.0011
6	0.3356	0.5437	1681	0.0005	0.0006	0.0008	0.0010	0.0011	0.0012	0.0013	0.0014	0.0014	0.0015
7	0.3361	0.5437	1677	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
8	0.3338	0.5437	1697	0.0002	0.0003	0.0004	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
9	0.3347	0.5437	1689	0.0006	0.0008	0.0009	0.0010	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017
10	0.3331	0.5437	1704	0.0003	0.0004	0.0005	0.0007	0.0008	0.0009	0.0011	0.0012	0.0014	0.0015
11	0.3351	0.5436	1686	0.0008	0.0009	0.0010	0.0010	0.0011	0.0011	0.0012	0.0014	0.0015	0.0016
12	0.3338	0.5439	1698	0.0004	0.0005	0.0006	0.0007	0.0008	0.0010	0.0012	0.0014	0.0015	0.0016
13	0.3356	0.5436	1681	0.0003	0.0005	0.0006	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0010
14	0.3345	0.5437	1691	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009
15	0.3384	0.5432	1656	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0012	0.0013
Avg.	0.3349	0.5437	1688	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
Med.	0.3347	0.5437	1689	0.0004	0.0005	0.0006	0.0007	0.0008	0.0010	0.0011	0.0012	0.0014	0.0015
st dev	0.0017	0.0002	15	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.	0.3324	0.5432	1656	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009
Max.	0.3384	0.5441	1710	0.0008	0.0009	0.0010	0.0011	0.0013	0.0014	0.0015	0.0016	0.0017	0.0019

### 3.4 Data Set 2, 105°C, 700mA, 1600K (Lumen Maintenance)

No.	Lumen Maintenance (%)										
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
16	574.20	99.65	99.44	99.36	99.27	98.97	98.85	98.57	98.29	98.07	98.00
17	572.90	99.35	99.25	99.14	99.01	98.87	98.80	98.45	97.94	97.78	97.49
18	603.90	99.67	99.59	99.35	99.22	98.97	98.64	98.49	98.43	97.93	97.50
19	572.80	99.39	99.34	99.32	99.28	99.07	98.73	98.50	98.29	97.87	97.57
20	557.90	100.34	99.71	99.57	99.48	99.27	98.98	98.83	98.46	98.10	97.88
21	580.80	99.98	99.43	99.16	98.86	98.79	98.52	98.38	97.95	97.81	97.52
22	577.80	100.17	99.57	99.29	98.72	98.43	98.15	97.92	97.78	97.65	97.51
23	602.50	99.92	99.50	99.07	98.51	98.29	97.71	97.29	97.08	96.71	96.50
24	566.70	99.22	99.08	98.99	98.91	98.71	98.57	98.29	97.86	97.58	97.16
25	577.80	100.28	99.57	99.29	99.15	98.91	98.82	98.44	98.22	98.08	97.58





## Bay Area Compliance Laboratories Corp. (Shenzhen)

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
The NVLAP Lab Code is 200707-0

### 3.5 Data Set 2, 105°C, 700mA, 1600K (Forward Voltage)

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
16	17.29	17.29	17.20	17.40	17.36	17.22	17.39	17.36	17.38	17.23	17.39
17	17.28	17.29	17.27	17.29	17.26	17.22	17.35	17.38	17.40	17.39	17.32
18	17.27	17.29									

**Bay Area Compliance Laboratories Corp. (Shenzhen)**

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
The NVLAP Lab Code is 200707-0

Compliance Laboratories Corp. (Shenzhen)

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
 g D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
 The NVLAP Lab Code is 200707-0

t)

4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
0.0010	0.0008	0.0009	0.0010	0.0011	0.0012	0.0014
0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
0.0008	0.0010	0.0010	0.0011	0.0012	0.0013	0.0014
0.0004	0.0005	0.0007	0.0008	0.0009	0.0010	0.0011
0.0005	0.0006	0.0007	0.0008	0.0010	0.0011	0.0012
0.0005	0.0006	0.0008	0.0009	0.0009	0.0011	0.0013
0.0006	0.0007	0.0009	0.0010	0.0011	0.0012	0.0012
0.0004	0.0005	0.0007	0.0008	0.0009	0.0010	0.0011
0.0009	0.0011	0.0012	0.0013	0.0014	0.0014	0.0016
0.0008	0.0009	0.0010	0.0011	0.0011	0.0012	0.0013
0.0006	0.0008	0.0009	0.0011	0.0011	0.0012	0.0013
0.0007	0.0008	0.0010	0.0011	0.0011	0.0012	0.0013
0.0005	0.0006	0.0007	0.0008	0.0008	0.0009	0.0010
0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
0.0007	0.0008	0.0009	0.0010	0.0010	0.0011	0.0012
0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013
0.0006	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013
0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002
0.0004	0.0005	0.0007	0.0008	0.0008	0.0009	0.0010
0.0010	0.0011	0.0012	0.0013	0.0014	0.0014	0.0016

1 0 0 1 87ET070 g544.42 329.45 0.4791.4 reW.470 g -0.002

Lumen Maintenance (%)					
5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
98.44	97.94	97.59	97.23	96.81	96.52
98.51	98.15	97.80	97.51	97.23	97.08
98.50	98.07	97.71	97.57	97.36	97.07
98.36	98.08	97.86	97.58	97.22	



## Bay Area Compliance Laboratories Corp. (Shenzhen)

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
 Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
 The NVLAP Lab Code is 200707-0

### 3.11 Data Set 4, 105°C, 700mA, 8000K (Forward Voltage)

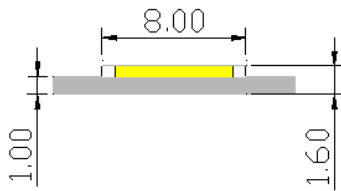
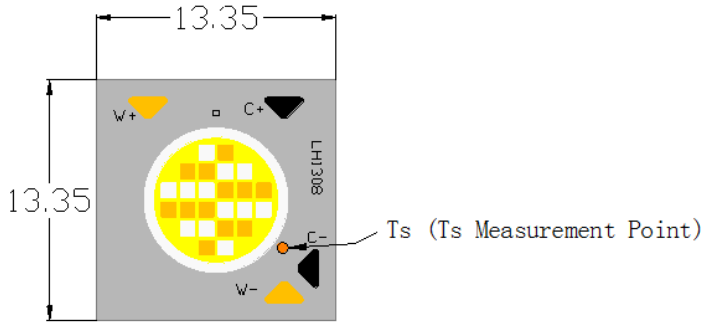
No.	Forward Voltage (V)										
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
46	17.42	17.45	17.45	17.30	17.36	17.36	17.58	17.35	17.38	17.37	17.54
47	17.31	17.34	17.29	17.31	17.36	17.38	17.40	17.33	17.36	17.37	17.37
48	17.35	17.31	17.27	17.35	17.30	17.36	17.38	17.31	17.22	17.35	17.39
49	17.28	17.32	17.30	17.31	17.39	17.31	17.38	17.41	17.35	17.31	17.31
50	17.35	17.39	17.47	17.38	17.30	17.48	17.39	17.38	17.39	17.47	17.31
51	17.40	17.38	17.31	17.39	17.31	17.37	17.39	17.39	17.30	17.39	17.30
52	17.32	17.33	17.28	17.35	17.28	17.31	17.38	17.37	17.43	17.39	17.40
53	17.35	17.34	17.48	17.39	17.37	17.49	17.56	17.36	17.45	17.33	17.51
54	17.37	17.49	17.38	17.40	17.46	17.37	17.47	17.37	17.39	17.35	17.44
55	17.34	17.33	17.30	17.36	17.31	17.26	17.52	17.40	17.29	17.47	17.50
56	17.34	17.36	17.44	17.40	17.43	17.28	17.31	17.31	17.31	17.23	17.36
57	17.33	17.37	17.36	17.45	17.36	17.27	17.40	17.39	17.31	17.37	17.43
58	17.36	17.38	17.38	17.36	17.35	17.38	17.32	17.36	17.35	17.51	17.50
59	17.34	17.42	17.36	17.31	17.23	17.26	17.39	17.29	17.42	17.31	17.36
60	17.37	17.39	17.39	17.36	17.36	17.42	17.38	17.31	17.31	17.31	17.36
Avg.	17.35	17.37	17.36	17.36	17.34	17.35	17.42	17.35	17.35	17.37	17.41
Med.	17.35	17.37	17.36	17.36	17.36	17.36	17.39	17.36	17.35	17.37	17.39
st dev	0.03	0.05	0.07	0.04	0.06	0.07	0.08	0.04	0.06	0.07	0.08
Min.	17.28	17.31	17.27	17.30	17.23	17.26	17.31	17.29	17.22	17.23	17.30
Max.	17.42	17.49	17.48	17.45	17.46	17.49	17.58	17.41	17.45	17.51	17.54

### 3.12 Data Set 4, 105°C, 700mA, 8000K (Chromaticity Shift)

No.	Ohr(Initial)	CCT(K)											
			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	

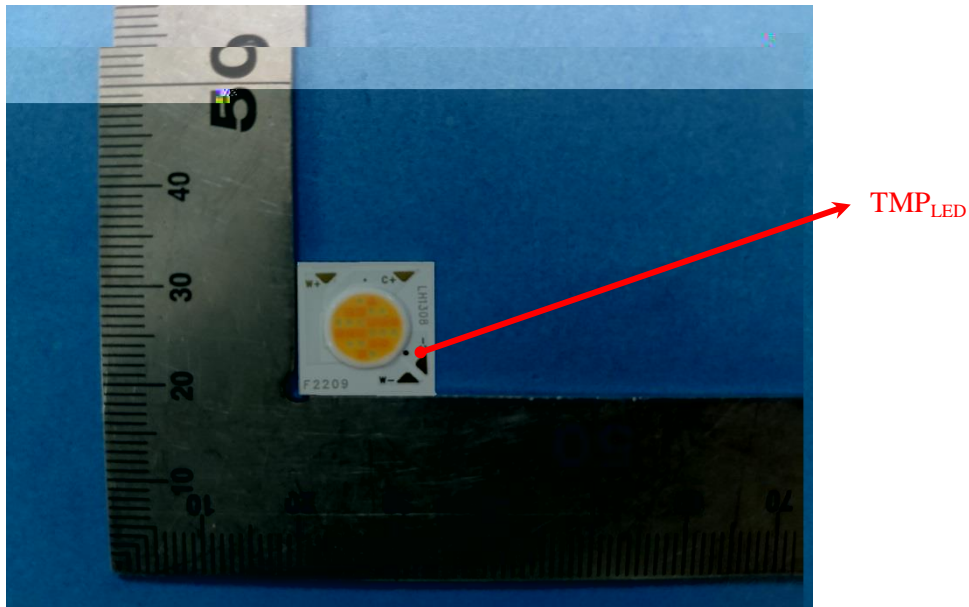
## 4 - DUT Photo

### 4.1 Mechanical Dimensions



All dimensions are in millimeter

### 4.2 DUT Photo





## Bay Area Compliance Laboratories Corp. (Shenzhen)

5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial  
Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.  
The NVLAP Lab Code is 200707-0

### Directions

---

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