Photometric Test Report

Relevant Standards

☑IES LM-79-2008

☑ANSI C82.77:2017

Prepared For

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Project Number

DLF2208107

Report Number

DLF2208107-2a

Test Date

2022/8/16

Issue Date

2022/8/18

Prepared By	**Approved By**
Wangzun Zhu	Kevin Jia

1.0 Test Summary

DLC Technical Requirements v5.1

Linear Replacement Lamps - Replacement Lamps("Plug and Play") (UL Type A+B) (Type B mode)				
Requirement Category	**Test Method**	**Requirements**		**Test value**
Luminaire Output (lm)	IES LM-79-2008	2000		1658
Luminaire Efficacy (lm/W)	IES LM-79-2008	120		134.5
Beam Angle	IES LM-79-2008	⩾160		238.7
Total Harmonic Distortion (A%)	ANSI C82.77:2014	20%	120V	16.30%
			277V	16.53%
Power Factor	ANSI C82.77:2014	0.9	120V	0.986
			277V	0.942
Lamp light output (lm)	IES LM-79-2008 CIE 13.3-1995	1600		1631
				1707
Lamp Efficacy (lm/W)	IES LM-79-2008 CIE 13.3-1995	120		131.53
				133.36
Allowable CCTs* (K)	IES LM-79-2008	7 step	3045±175	3021
		7 step	3985±275	5144
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	⩾70		83
				85
Minimum R9	IES LM-79-2008 CIE 13.3-1995	⩾0		8
				15
Minimum Rf	ANSI/IES TM-30-18	⩾70		85
				85
Minimum Rg	ANSI/IES TM-30-18	⩾89		98
				97
IES Rcs,h1	ANSI/IES TM-30-18	-12%⩽IES Rcs,h1⩽+23%		-11%
				-12%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2022/8/16	L36T8/830/11G-AB	B1
			L36T8/850/11G-AB	B2
2	Goniophotometer Test	2022/8/16	L36T8/830/11G-AB	B1
3	THD and PF Test	2022/8/16	L36T8/830/11G-AB	B1
			L36T8/850/11G-AB	B2

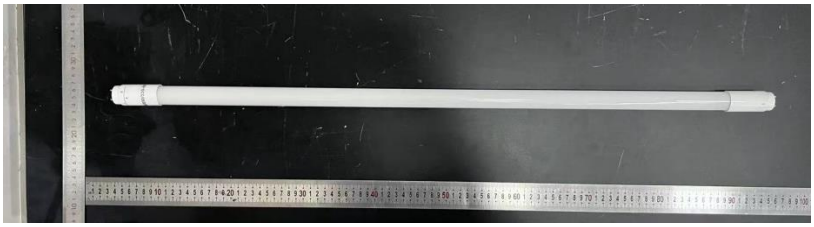
Remark(If any)
1、This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.
2、The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

3.0 Production Description

Luminaire Description: L36T8/830/11G-AB

Electrical Specification: 120-277V,60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3000K

Model No.	L36T8/830/11G-AB	Sample ID.	B1
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.
The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
277.04	60	0.048	12.4	0.942

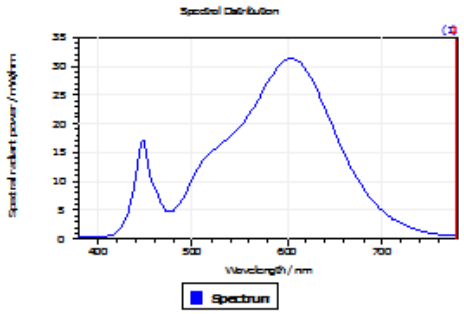
Test Result

CCT (K)	CRI	R9	Duv	THD
3021	83	8	0.00036	16.53%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
85	98	-11%	1631	131.53

4.1 Integrating Sphere Test

Results



Spectral Distribution

Spectral values

DominantWavelength	582.61 nm
Purity	0.523
PeakWavelength	604.00 nm
Radiant Power	4.734 W
Width50%:	

Color Coordinates

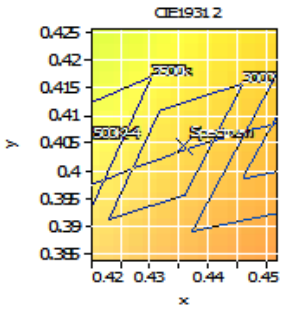
Correlated Color Temperat 3021 K

x: 0.4360 u: 0.2497 u': 0.2497

y: 0.4046 v: 0.3476 v': 0.5215

CRI01	80.8	CRI09	7.7
CRI02	89.8	CRI10	77.3
CRI03	96.9	CRI11	81.9
CRI04	81.8	CRI12	72.5
CRI05	81.3	CRI13	82.8
CRI06	88.1	CRI14	98.6
CRI07	83.3	CRI15	73.0
CRI08	59.6	CRI16	71.2

ResultsCRI 82.7

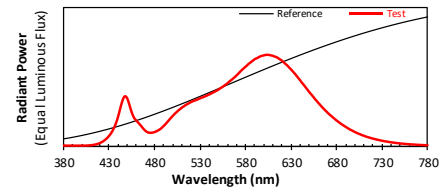


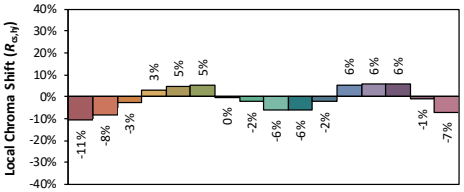
PlanckDistance 3.6E-004

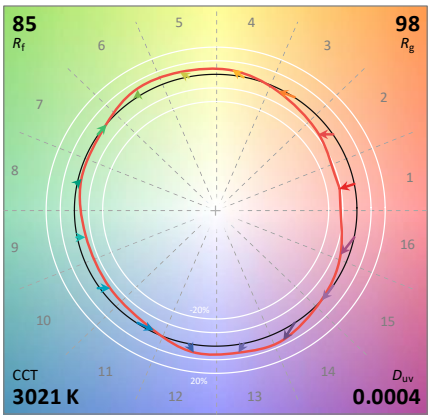
4.1 Integrating Sphere Test

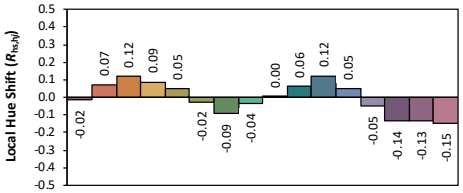
IES TM-30-18 Color Rendition Report

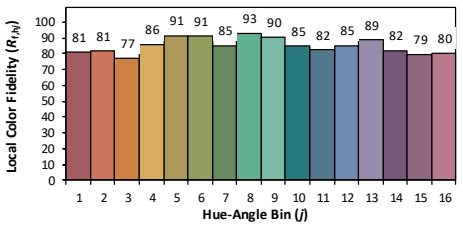
Source:	DLF2208107-2a	Manufacturer:	Espen Technology Inc.
Date:	2022/8/16	Model:	L36T8/830/11G-AB

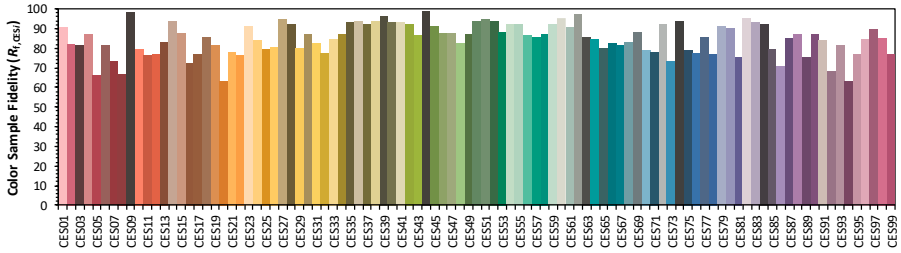












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4360
y	0.4046
u'	0.2497
v'	0.5215

CIE 13.3-1995 (CRI)

R_a	83
R_9	9

lors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 5000K

Model No.	L36T8/850/11G-AB	Sample ID.	B2
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.
The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
277.02	60	0.049	12.8	0.945

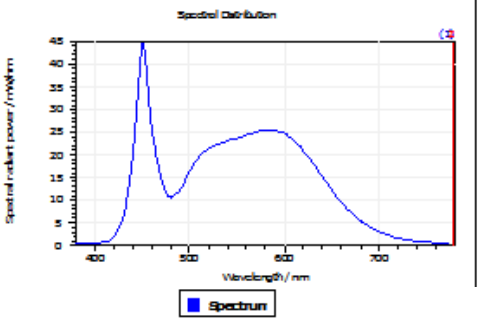
Test Result

CCT (K)	CRI	R9	Duv	THD
5144	85	15	0.0006	15.80%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
85	97	-12%	1707	133.36

4.1 Integrating Sphere Test

Results



Spectral Distribution

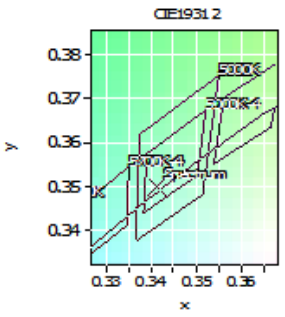
Spectral values

DominantWavelength	569.71 nm
Purity	0.073
PeakWavelength	450.86 nm
Radiant Power	5.148 W
Width50%:	

Color Coordinates

Correlated Color Temperat		5144 K			
x:	0.3413	u:	0.2096	u':	0.2096
y:	0.3497	v:	0.3221	v':	0.4832

CRI01	83.5	CRI09	14.7
CRI02	89.6	CRI10	74.8
CRI03	93.0	CRI11	84.3
CRI04	84.4	CRI12	65.0
CRI05	84.0	CRI13	85.3
CRI06	84.9	CRI14	96.4
CRI07	87.2	CRI15	78.3
CRI08	69.5	CRI16	76.6
ResultsCRI	84.5		

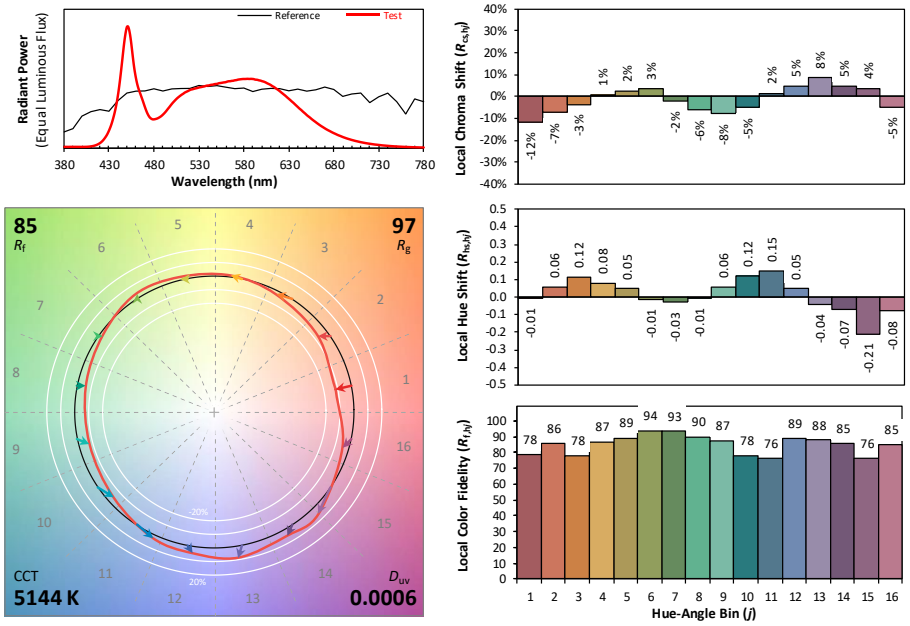


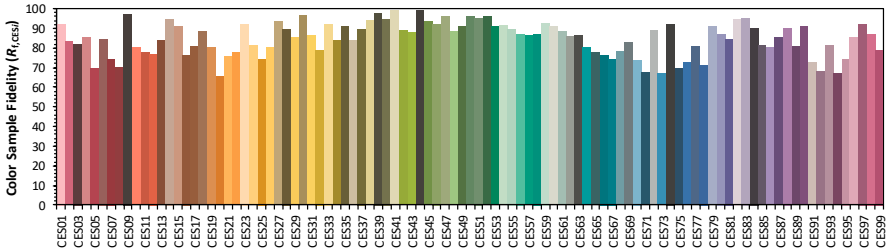
PlanckDistance	6.0E-004

4.1 Integrating Sphere Test

IES TM-30-18 Color Rendition Report

Source:	DLF2208107-2a	Manufacturer:	Espen Technology Inc.
Date:	2022/8/16	Model:	L36T8/850/11G-AB





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

x	0.3413
y	0.3497
u'	0.2096
v'	0.4832

CIE 13.3-1995 (CRI)

R_a	85
R_9	16

lors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test - 3000K

Model No.	L36T8/830/11G-AB	Sample ID.	B1
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using a type C goniophotometer and software.
The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample.
The voltage of an AC power supply (RMS voltage)or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.
The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5^{o} vertical intervals and 10^{o} horizontal intervals.

Test Conditions

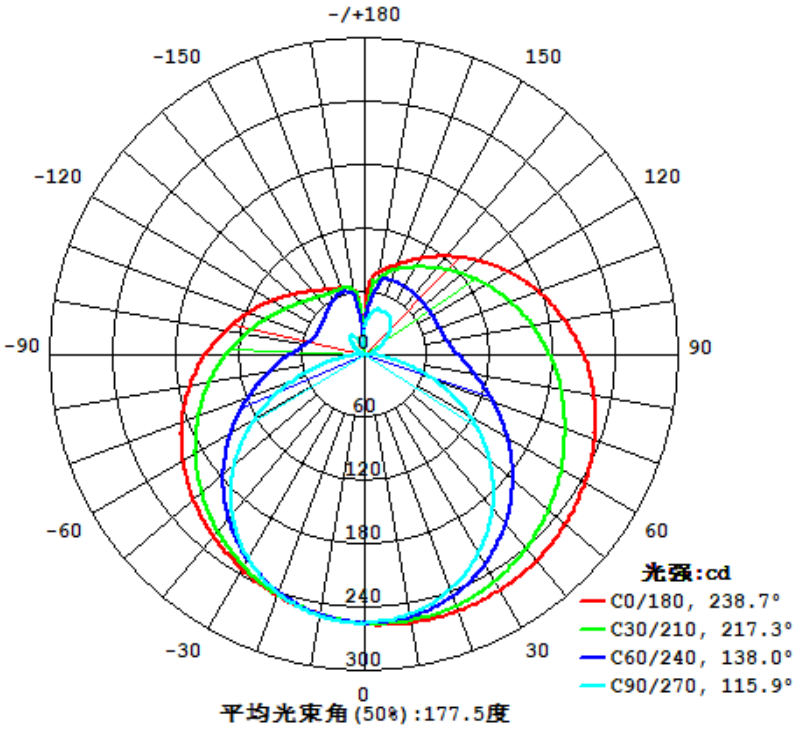
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	277.01	60	0.048	12.3	0.936

Test Result

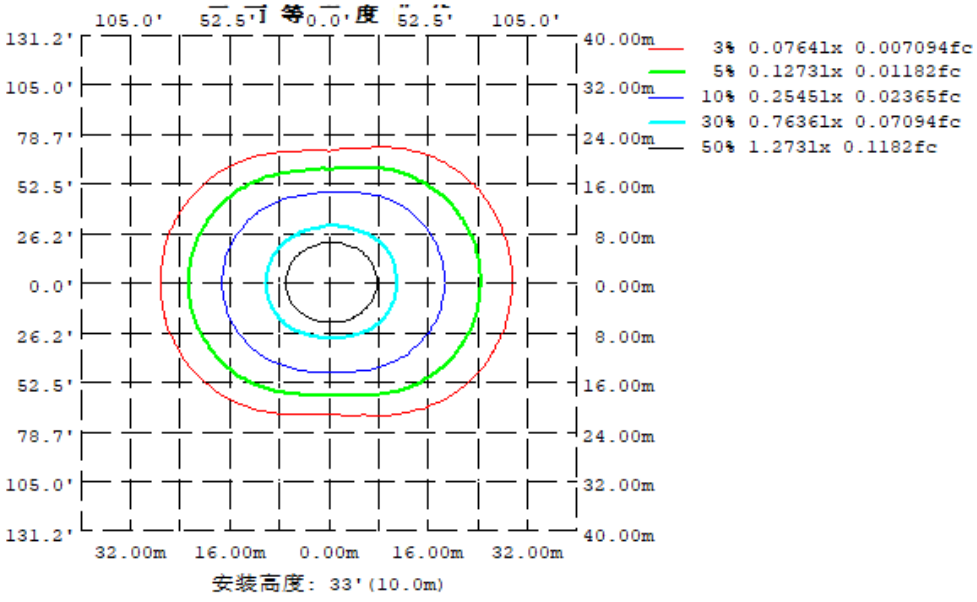
Flux (lm)	Luminous Efficacy (lm/W)	Beam Angle
1658	134.5	238.7

4.2 Goniophotometer Test

Zonal Lumen Summary



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	258.0	254.1	250.2	249.6	250.1	250.1	252.1	255.9
20	258.7	248.8	237.3	238.4	243.6	241.0	241.8	252.0
30	258.0	238.9	217.8	224.8	235.6	228.6	223.0	245.0
40	254.8	225.4	191.2	208.0	225.6	210.6	196.6	232.7
50	250.0	208.7	156.9	188.8	213.8	190.9	162.9	217.0
60	243.2	190.3	116.8	168.3	200.2	169.6	121.2	200.4
70	234.2	171.8	71.62	147.2	185.5	147.8	74.04	182.3
80	222.9	154.5	26.92	127.2	169.1	126.4	26.86	165.5
90	209.0	139.9	0.7058	109.0	152.7	107.5	0.1921	150.5
100	194.4	127.6	1.007	92.69	135.1	91.45	0.9092	136.6
110	177.7	117.2	6.713	80.59	118.8	79.24	8.011	124.9
120	158.9	108.4	18.43	71.78	103.3	70.69	4.605	114.3
130	140.7	100.0	30.66	66.11	89.95	65.66	13.54	104.2
140	122.2	93.00	40.87	63.60	79.35	63.80	22.57	96.28
150	105.5	86.86	45.65	63.13	71.82	64.11	20.98	87.90
160	91.45	79.14	45.94	64.62	67.91	65.84	10.88	80.01
170	79.35	73.30	40.21	54.38	63.16	60.86	9.125	63.47
180	0	17.40	26.92	16.50	9.203	10.84	24.94	23.10

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	L36T8/830/11G-AB	Sample ID.	B1
Model No.	L36T8/850/11G-AB	Sample ID.	B2
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the ANSI C82.77:2002.
The total harmonic distortion shall be measured to the 40th order.
The ambient temperature condition was maintained at 25º C ± 1º C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results					
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
3000K					
120.01	60	0.103	12.2	0.986	16.30%
277.04	60	0.048	12.4	0.942	16.53%
5000K					
119.94	60	0.106	12.5	0.987	15.92%
277.02	60	0.049	12.8	0.945	15.80%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2021/12/26	2022/12/25
DLF108	Auxiliary Lamp	2021/12/26	2022/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF116	AC Power Source	2021/12/26	2022/12/25
DLF113	Power Meter	2021/12/26	2022/12/25
DLF112	Temperature Recorder	2021/12/26	2022/12/25
DLF114	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF101	Goniophotometer	2021/12/26	2022/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF104	AC Power Source	2021/12/26	2022/12/25
DLF507	DC Power Source	2021/12/26	2022/12/25
DLF102	Power Meter	2021/12/26	2022/12/25
DLF111	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF119	Power Meter	2021/12/26	2022/12/25
DLF031	Temperature data logger	2021/12/26	2022/12/25
DLF022	Digital power meter	2021/12/26	2022/12/25
DLF003	Temperature & Humidity Datalogger	2021/12/26	2022/12/25

********** End of Test Report**********