APPLICATION FOR ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

On Behalf of

Mid Ocean Brands B.V.

Book light

Model No.: MO9460

Prepared for	:	Mid Ocean Brands B.V.
Address	:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A2410069-C01-R01
Date of Receipt	:	October 16, 2024
Date of Test	:	October 16, 2024
Date of Report	:	November 1, 2024
Version Number	:	V0
Test Result	**:**	**Pass**

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TEST REPORT DECLARATION

Applicant	:	Mid Ocean Brands B.V.
Address	:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer	:	Mid Ocean Brands B.V.
Address	:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
EUT Description	:	Book light
		(A) Model No. : MO9460
		(B) Trademark : N/A

Measurement Standard Used:

EN IEC 55015:2019+A11:2020

EN IEC 61547:2023

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the EN IEC 55015, EN IEC 61547 requirements.

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Tested by (name + signature).....:	Lily Wang Project Engineer	Lily Wang
Approved by (name + signature).....:	Jack Xu Project Manager	
Date of issue.....:	November 1, 2024	

SHENZHEN ALPHA PRODUCT TESTING CO.,LTD
ALPHA PRODUCT TESTING

Revision History

Revision	Issue Date	Revisions	Revised By
V0	November 1, 2024	Initial released Issue	Lily Wang

1. Summary Of Standards And Results

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

EMISSION			
Description of Test Item	**Standard**	**Limits**	**Results**
Conducted disturbance voltages	EN IEC 55015:2019+A11:2020	Section 4.3	N/A
Radiated Disturbance (9KHz-30MHz)	EN IEC 55015:2019+A11:2020	Section 4.5	P
Radiated Disturbance (30MHz-1000MHz)	EN IEC 55015:2019+A11:2020	Section 4.5	P
Harmonic current emissions	EN IEC 61000-3-2:2019+A1:2021	Section 7	N/A
Voltage fluctuations & flicker	EN 61000-3-3:2013+A2:2021	Section 5	N/A

IMMUNITY (EN IEC 61547:2023)				
Description of Test Item	**Standard**	**Performance Criteria**	**Observation Criteria**	**Results**
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	B	A	P
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2020	A	A	P
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	A	N/A
Surge	IEC 61000-4-5:2014+A1:2017	C	A	N/A
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6:2013	A	A	N/A
Power frequency magnetic field	IEC 61000-4-8:2009	A	A	N/A
Voltage dips, 100% reduction	IEC 61000-4-11:2020	B	B	N/A
Voltage dips, 30% reduction		B	B	N/A

Note: 1. P is an abbreviation for Pass.

2. F is an abbreviation for Fail.

3. N/A is an abbreviation for Not Applicable.

4. Decision rules for the conclusion of this test report: decision by actual test data without considering measurement uncertainty.

2. General Information

2.1. Description of Device (EUT)

Description : Book light

Model Number : MO9460

Diff : N/A

Test Voltage : DC 3V From Battery

EUT Information : N/A

Trademark : N/A

:

Software version : N/A

Hardware version : N/A

2.2. Accessories of Device (EUT)

Power Source : Power from AC Mains

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number
N/A	N/A	N/A	N/A	N/A

2.4. Block Diagram of connection between EUT and simulators

For Test

AC Power Line: Flexible, unshielded three-core cable of 0.8 m length.

2.5. Test Mode Description

For EMI&EMS Test		
Mode No.	Test Mode	Test Voltage
Mode 1	Lighting	DC 3V From Battery

2.6. Test Facility

Shenzhen Alpha Product Testing Co., Ltd.

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

2.7. Measurement Uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	1.63dB
Uncertainty for Radiation Emission test (<1G)	3.74 dB (Distance: 3m Polarize: V)
	3.76 dB (Distance: 3m Polarize: H)
Radiated Electromagnetic Disturbance test	1.51dB
(95% confidence levels, k=2)	

2.8. Test Equipment List

For Power Line Conducted Emission Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal.Interval
1.	Test Receiver	Rohde&Schwarz	ESCI	101165	4.42 SP1	2024.08.08	1 Year
2.	L.I.S.N.#1	Schwarz beck	NSLK8126	8126-466	N/A	2024.08.08	1 Year
3.	L.I.S.N.#2	Rohde&Schwarz	ENV216	101043	N/A	2024.08.08	1 Year
4.	Pulse Limiter	Schwarz beck	9516F	9618	N/A	2024.08.08	1 Year
5.	ISN	SCHWARZBECK	NTFM 8131	00286	N/A	2024.03.20	1 Year

For Frequency Range 30MHz~1GHz Radiated Emission Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
1	Test Receiver	Rohde&Schwarz	ESR	1316.3003K03-102082-Wa	2.28 SP1	2024.08.08	1 Year
2	Bilog Antenna	Schwarz beck	VULB 9168	VULB 9168#627	N/A	2024.08.08	2 Year
3	6dB Fixed Attenuator	SKET	AP_DC01G-2W-N-6dB	N/A	N/A	2024.08.08	1 Year

For Frequency Range 9KHz~30MHz Radiated Emission Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
1	Test Receiver	Rohde&Schwarz	ESCI	101165	4.42 SP1	2024.08.08	1 Year
2	Triple-loop Antenna	EVERFINE	LLA-2	11050002	N/A	2024.08.08	1 Year

For Harmonic Current Test & Voltage Fluctuations & Flicker Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
2.	HARMINICS&FLICKER MEASUREMENT SYSTEM	EVERFINE	HFM300_V200	P630850TD1411113	N/A	2024.03.22	1Year

For Electrostatic Discharge Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQ	EDS 30V	ES031000423052	N/A	2024.01.08	1 Year.

For RF Field Strength Susceptibility Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
1.	vector Signal Generator	Agilent	E4438C	US44271917	US44271917	2024.08.08	1 Year
2.	Power meter	Agilent	E4419B	GB40202122	GB40202122	2024.08.08	1 Year
3.	Power Sensor	Agilent	E9300A	MY41496625s	MY41496625s	2024.08.08	1 Year
4.	RF power Amplifier	OPHIR	5225R	1045	N/A	N/A	NCR
5.	RF power Amplifier	OPHIR	5273R	1018	N/A	N/A	NCR
6	RF power Amplifier	Micotop	MPA-3000-6000-100	MPA1811348	N/A	N/A	NCR
7.	Antenna	SCHWARZBECK	STLP9128E-special	STLP9128Es#139	N/A	N/A	NCR
8.	Antenna	SCHWARZBECK	STLP 9149	STLP 9149 #456	N/A	N/A	NCR

For Electrical Fast Transient/Burst Immunity, Surge, Power Frequency Magnetic Field Immunity, Voltage dips and interruptions test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
1.	Multifunctional Compact Immunity Test system	3ctest	CCS 600	ES0801655	CCS V4.0.9	2024.08.08	1 Year
2.	Surge & EFT Coupling Decoupling Network	3ctest	SEPN 3832T	ES0951601	N/A	2024.08.08	1 Year
3.	Voltage variation and PF magnetic field regulating device	3ctest	VMT2216S	ES0441601	N/A	2024.08.08	1 Year
4.	Capacitive Coupling Clamp	3ctest	CCC 100	EC0441660	N/A	2024.08.08	1 Year

For Injected currents susceptibility test Equipment:

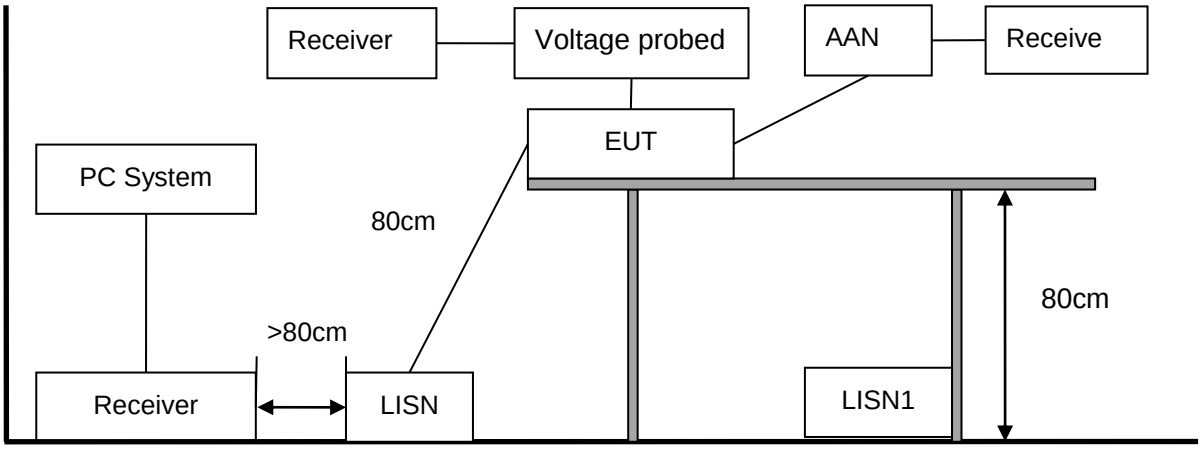
Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
1.	Conducted Immunity test System	SKET	CITS_150K230M	SK2019101001_CITS	N/A	2024.08.08	1 Year
2.	Fixed Coaxial Attenuator (6dB Attenuation)	CD	ATT-0675	120540086	N/A	2024.08.08	1 Year
3.	coupling-decoupling network (CDN)	CD	CDN M2/M3	2302	N/A	2024.08.08	1 Year
4.	Electromagnetic Injection Clamp (EMC-Clamp)	CD	EM-Clamp	0513A031201	N/A	2024.08.08	1 Year

ForTest Software Information

Item	Software Name	Manufacturer	Version
RE	EZ-EMC	Farad	Alpha-3A1
CE	EZ-EMC	Farad	Alpha-3A1

3. Conducted Disturbance Test

3.1. Block Diagram of Test Setup



3.2. Test Standard

EN IEC 55015:2019+A11:2020

3.3. Conducted Emission Test Limits

Electric power supply interface		
Frequency	Limits	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
9kHz ~ 50kHz	110	--
50kHz ~ 150kHz	90 ~ 80*	--
150kHz ~ 0.5MHz	66 ~ 56*	56 ~ 46*
0.5MHz ~ 5.0MHz	56	46
5.0MHz ~ 30MHz	60	50
Notes: 1. * Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.		

Wired network interfaces other than power supply			
Frequency	Limits		Method
	Quasi-Peak Level dB(μV)	Average Level dB(μV)	
150kHz ~ 0.5MHz	84~ 74*	74~ 64*	AAN
0.5MHz ~ 30MHz	74	64	
Notes: 1. * Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.			

Local Wired ports			
Frequency	Limits		Method
	Quasi-Peak Level dB(μV)	Average Level dB(μV)	Voltage probe method
150kHz ~ 0.5MHz	84	74	
0.5MHz ~ 30MHz	74	64	
Notes: 1. * Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.			

3.4. Configuration of EUT on Test

The following equipment are installed on conducted disturbance at mains terminals to meet the EN IEC 55015 requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.5. Operating Condition of EUT

(1) Setup the EUT as shown as Section 3.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

3.6. Test Procedure

(1) The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). The power line was checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN IEC 55015 on Conducted Disturbance at Mains Terminals test.

(2) The bandwidth of test receiver (R & S ESCI) is set: 200Hz at 9kHz to 150kHz, 9kHz at 150kHz to 30MHz.

(3) The frequency range from 9kHz to 30MHz is checked. The test result are reported on Section 3.7.

(4) If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.

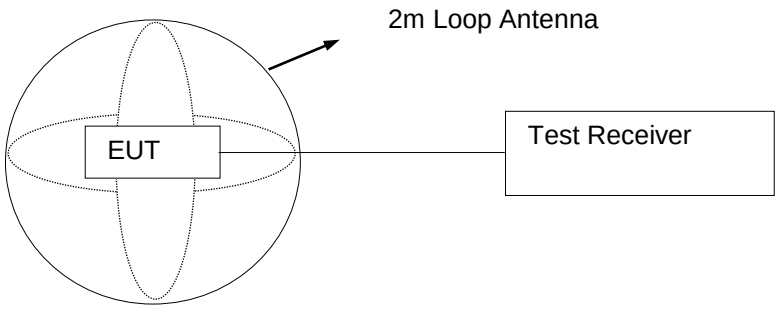
(5) If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

3.7. Conducted Disturbance Test Results

EUT	:	Book light	Test Date	:	N/A
M/N	:	MO9460	Temperature	:	N/A
Test Engineer	:	N/A	Humidity	:	N/A
Test Voltage	:	N/A	Pressure	:	N/A
Test Mode	:	N/A			
Test Results	:	N/A			
Note: 1. EUT is provided by Battery and has no interconnection wires, so this item is not applicable.					

4. Radiated Disturbance Test(9KHz-30MHz)

4.1. Block Diagram of Test Setup



4.2. Test Standard

EN IEC 55015:2019+A11:2020

4.3. Radiated Disturbance Limits

Frequency			Limits for loop diameter (dBμA)
			2m
9kHz	~	70kHz	88
70kHz	~	150kHz	88 ~ 58*
150kHz	~	3.0MHz	58 ~ 22*
3.0MHz	~	30MHz	22
Notes: 1. * Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.			

4.4. Configuration of EUT on Test

The following equipments are installed on Radiated Electromagnetic Disturbance Test to meet EN IEC 55015 requirement and operating in a manner that tends to maximize its emission characteristics in a normal application.

4.5. Operating Condition of EUT

(1) Setup the EUT and simulator as shown as Section 4.1.

(2) Turned on the power of all equipment.

(3) Let the EUT worked in test mode and 15 minutes after taking the test.

4.6. Test Procedure

The EUT was placed on a wood table in the center of a loop antenna. The induced current in the loop antenna is measured by means of a current probe and the test receiver. A three-field component was checked by means of a coaxial switch.

The frequency range from 9kHz to 30MHz was checked. The receiver was measured with the quasi-peak detector. For frequency band 9kHz to 150kHz.

The bandwidth of the field strength meter (R&S test receiver ESCI) is set at 200Hz.

For frequency band 150kHz to 30MHz, the bandwidth is set at 9kHz.The test result are reported on Section 4.7.

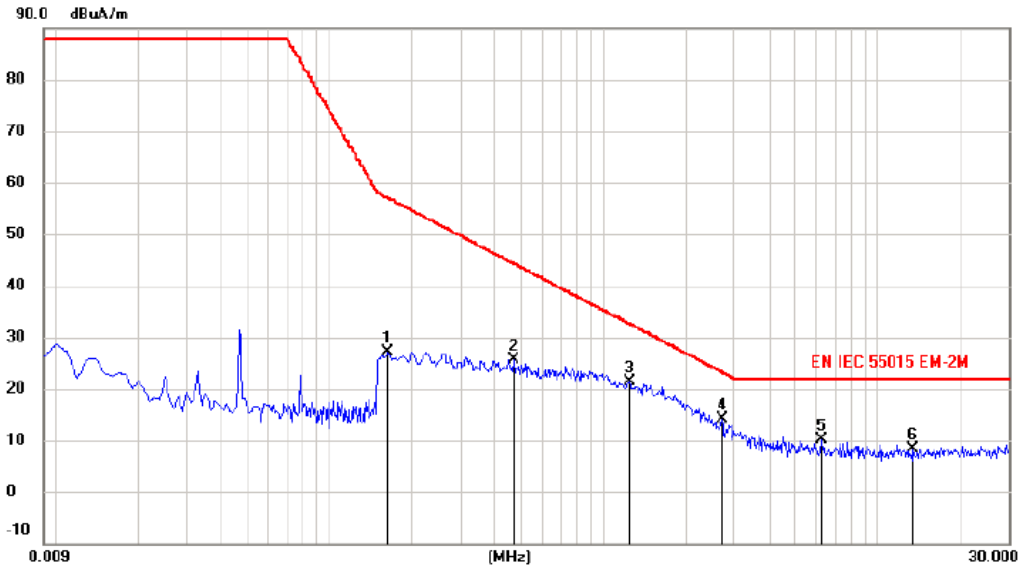
4.7. Radiated Electromagnetic Disturbance Test Results

EUT	:	Book light	Test Date	:	2024.10.16
M/N	:	MO9460	Temperature	:	23.5%
Test Engineer	:	Lily Wang	Humidity	:	56%
Test Voltage	:	DC 5V From Adapter	Pressure	:	101.6kPa
Test Mode	:	Charging& Lighting(Left)& Lighting(Right)			
Test Results	:	**PASS**			

Note: 1. The test results are listed in next pages.

2. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.

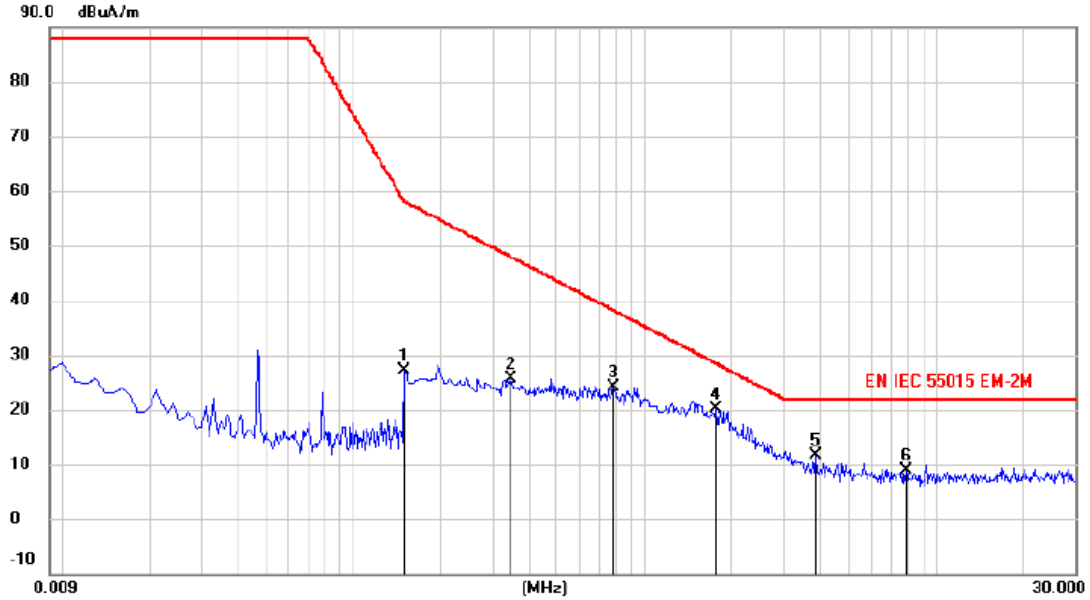
Antenna Polarity: X



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuA/m	dB	dBuA/m	dBuA/m	dB	Detector	cm	degree	Comment
1		0.1635	27.13	0.00	27.13	56.96	-29.83	peak			
2		0.4695	25.56	0.00	25.56	44.29	-18.73	peak			
3		1.2405	21.37	0.07	21.44	32.61	-11.17	peak			
4	*	2.7005	13.98	0.11	14.09	23.26	-9.17	peak			
5		6.2204	10.06	0.17	10.23	22.00	-11.77	peak			
6		13.5405	8.06	0.25	8.31	22.00	-13.69	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

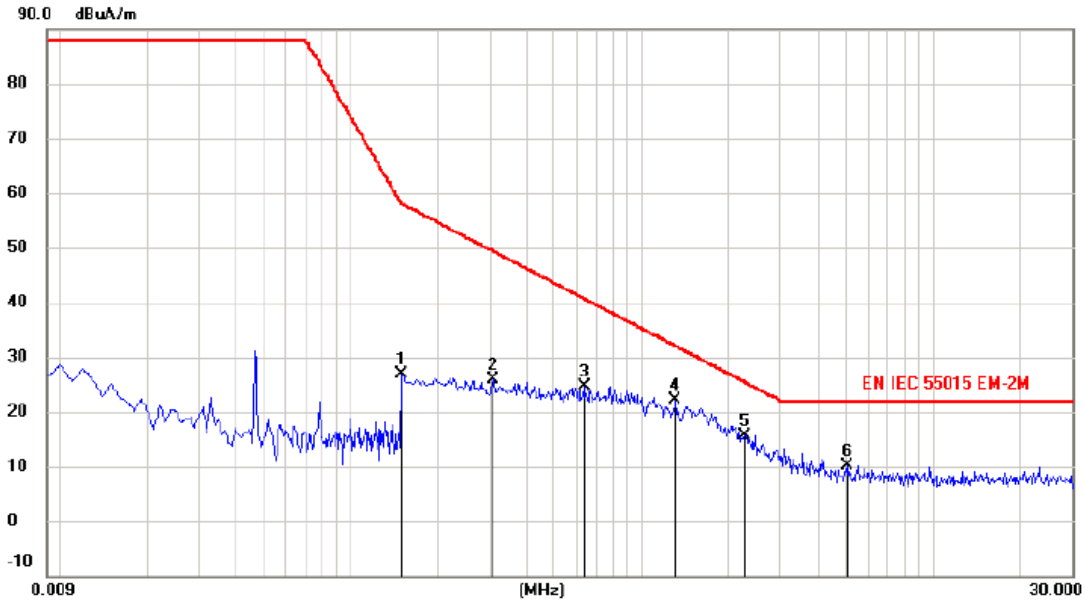
Antenna Polarity: Y



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuA/m	dB	dBuA/m	dBuA/m	dB	Detector	cm	degree	Comment
1		0.1500	27.02	0.00	27.02	58.00	-30.98	peak			
2		0.3480	25.51	0.00	25.51	47.89	-22.38	peak			
3		0.7799	24.22	0.00	24.22	38.19	-13.97	peak			
4	*	1.7605	19.93	0.08	20.01	28.41	-8.40	peak			
5		3.8805	11.54	0.13	11.67	22.00	-10.33	peak			
6		7.9005	8.79	0.19	8.98	22.00	-13.02	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Antenna Polarity: Z



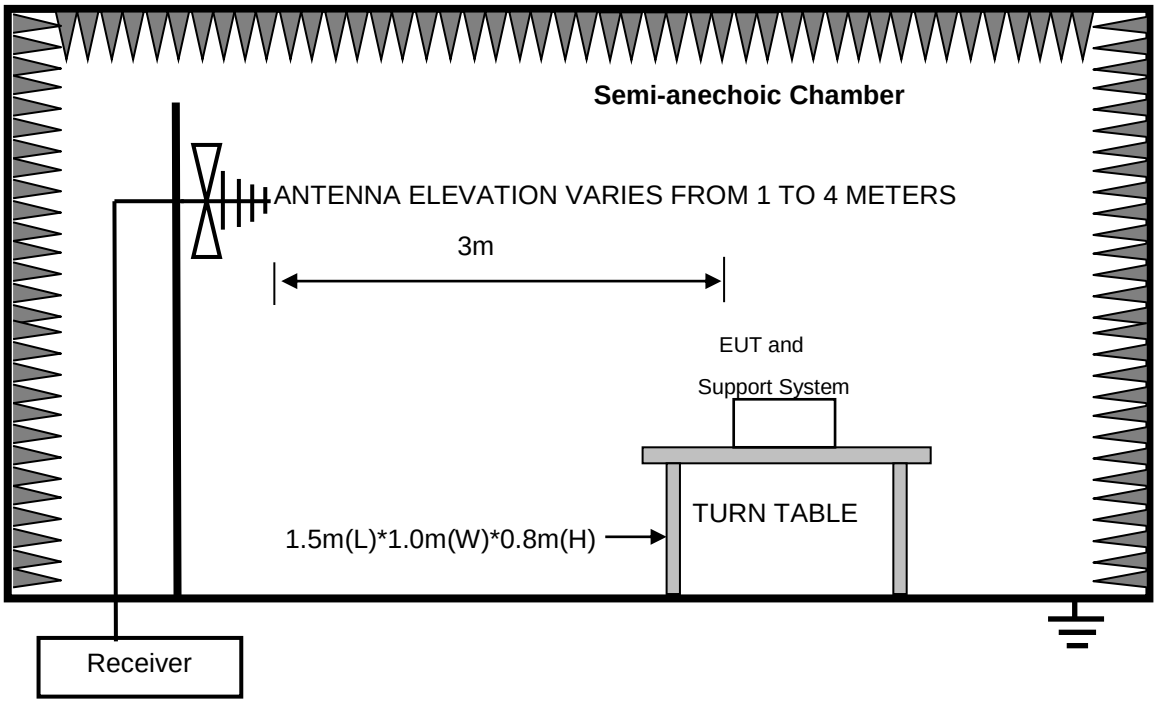
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuA/m	dB	dBuA/m	dBuA/m	dB	Detector	cm	degree	Comment
1		0.1500	26.83	0.00	26.83	58.00	-31.17	peak			
2		0.3075	25.95	0.00	25.95	49.37	-23.42	peak			
3		0.6315	24.51	0.00	24.51	40.73	-16.22	peak			
4		1.3005	21.95	0.07	22.02	32.04	-10.02	peak			
5	*	2.2405	15.62	0.10	15.72	25.51	-9.79	peak			
6		5.0805	9.99	0.15	10.14	22.00	-11.86	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

5. Radiated Disturbance Test(30MHz-1000MHz)

5.1. Block Diagram of Test Setup

In Semi Anechoic Chamber (3m) Test Setup Diagram for 30MHz~1000MHz



5.2. Test Standard

EN IEC 55015:2019+A11:2020

5.3. Radiated Disturbance Limit

All emanations from computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47
Note: (1)Emission level = Read level + Antenna Factor-Preamp Factor +Cable Loss (2)The lower limit shall apply at the transition frequencies. (3)Distance refers to the distance in meters between the test antenna and the closed point of any part of the EUT.		

5.4. Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the EN IEC 55015 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal

application.

5.5. Operating Condition of EUT

(1) Setup the EUT as shown as Section 5.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

5.6. Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN IEC 55015 on Radiated Disturbance test.

The bandwidth setting on the test receiver (R&S TEST RECEIVER ESR) is 120 kHz.

The frequency range from 30MHz to 1000MHz is checked. Test results are reported in Section 5.7.

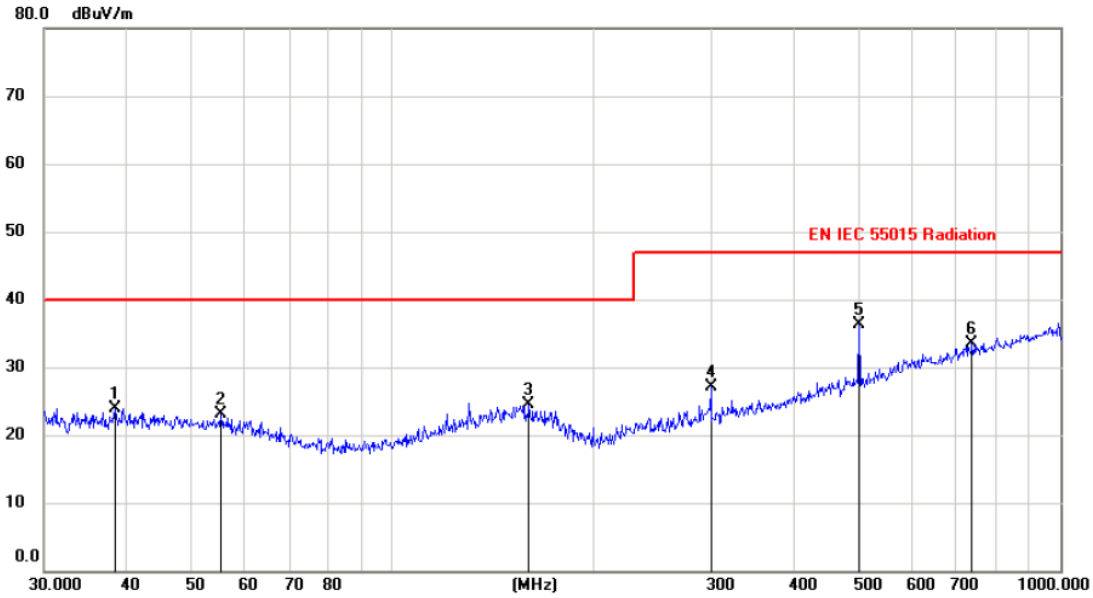
5.7. Radiated Disturbance Test Result

EUT	:	Book light	Test Date	:	2024.10.16
M/N	:	MO9460	Temperature	:	23.7℃
Test Engineer	:	Lily Wang	Humidity	:	53%
Test Voltage	:	DC 3V From Battery	Pressure	:	101.6kPa
Test Mode	:	Lighting			
Test Results	:	**PASS**			

Note: 1. The test results are listed in next pages.

2. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet limits and the measurement with the quasi-peak detector need not be carried out.

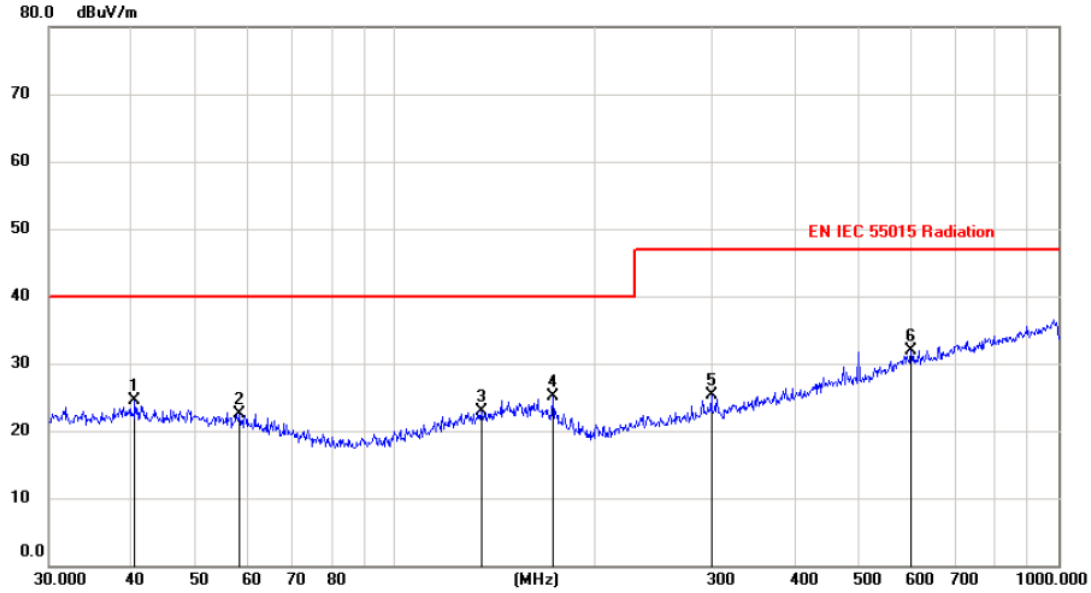
Antenna Polarity: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		38.4585	9.72	14.27	23.99	40.00	-16.01	peak			
2		55.2918	9.53	13.57	23.10	40.00	-16.90	peak			
3		160.0648	9.49	15.03	24.52	40.00	-15.48	peak			
4		299.9813	12.97	14.10	27.07	47.00	-19.93	peak			
5	*	500.0088	18.19	18.21	36.40	47.00	-10.60	peak			
6		737.7609	11.27	22.23	33.50	47.00	-13.50	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Antenna Polarity: Horizontal

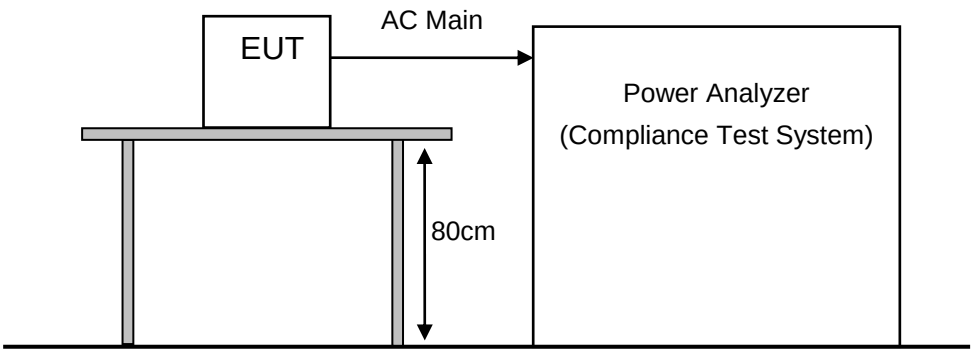


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		40.5307	10.15	14.41	24.56	40.00	-15.44	peak			
2		58.3256	9.20	13.36	22.56	40.00	-17.44	peak			
3		134.7323	9.04	13.93	22.97	40.00	-17.03	peak			
4	*	172.9219	11.40	13.67	25.07	40.00	-14.93	peak			
5		299.9813	11.28	14.10	25.38	47.00	-21.62	peak			
6		599.7417	11.67	20.21	31.88	47.00	-15.12	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

6. Harmonic Current Test

6.1. Block Diagram of Test Setup



6.2. Test Standard

EN IEC 61000-3-2:2019+A1:2021

6.3. Harmonic Current Test Limits

Limits for Class C equipment (Rated power > 25W)	
Harmonic order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	27
5	10
7	7
9	5
11≤n≤39 (odd harmonics only)	3

Limits for Class C equipment (5W≤Rated power≤25W)		
Lighting equipment having a rated power greater than or equal to 5W and less than or equal to 25W shall comply with one of the following three sets of requirements:		
Requirements 1	:	The THD shall not exceed 70 %. The third order harmonic current, expressed as apercentage of the fundamental current, shall not exceed 35 %, the fifth order current shallnot exceed 25 %, the seventh order current shall not exceed 30 %, the ninth and eleventhorder currents shall not exceed 20 % and the second order current shall not exceed 5 %.

Requirements 2	:	The third harmonic current, expressed as a percentage of the fundamental current, shall not exceed 86% and the fifth harmonic current shall not exceed 61%. In addition, the waveform of the input current shall be such that it reaches the 5% current threshold before or at 60°, has its peak value before or at 65 and does not fall below the 5% current threshold before 90", referenced to any zero crossing of the fundamental supply voltage. The current threshold is 5% of the highest absolute peak value that occurs in themeasurement window, and the phase angle measurements are made on the cycle thatincludes this absolute peak value.	
Requirements 3	:	Harmonic order n	Maximum permissible harmonic current per watt mA/W
		3 5 7 9 11 13≤n≤39 (odd Harmonic only)	3.4 1.9 1.0 0.5 0.35 3.85/ n

6.4. Configuration of EUT on Test

The following equipment are installed on Harmonic Current Test to meet the EN IEC 61000-3-2 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

6.5. Operating Condition of EUT

(1) Setup the EUT as shown as Section 6.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

6.6. Test Procedure

(1) The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

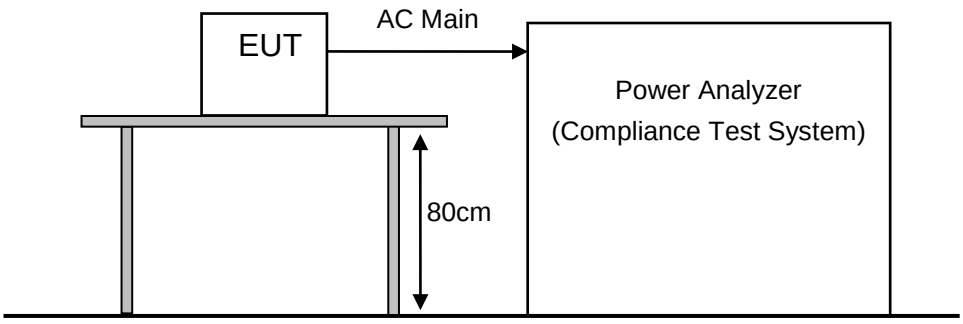
(2) The test results are reported on Section 6.7.

6.7. Harmonic Current Test Results

EUT	:	Book light	Test Date	:	N/A
M/N	:	MO9460	Temperature	:	N/A
Test Engineer	:	N/A	Humidity	:	N/A
Test Voltage	:	N/A	Pressure	:	N/A
Test Mode	:	N/A			
Test Results	:	N/A			
Note: Not applicable for equipment operated with battery or DC powered devices.					

7. Voltage Fluctuations & Flicker Test

7.1. Block Diagram of Test Setup



7.2. Test Standard

EN 61000-3-3:2013+A2:2021

7.3. Voltage Fluctuation and Flicker Test Limits

Test Item	Limit	Note
P_{st}	1.0	P_{st} means Short-term flicker indicator
P_{lt}	0.65	P_{lt} means long-term flicker indicator
T_{dt}	0.2	T_{dt} means maximum time that dt exceeds 3%
d_{max}(%)	4%	d_{max} means maximum relative voltage change.
d_c(%)	3.3%	d_c means relative steady-state voltage change.

7.4. Configuration of EUT on Test

The following equipment are installed on Harmonic Current Test to meet the EN61000-3-3 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

7.5. Operating Condition of EUT

(1) Setup the EUT as shown as Section 7.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

7.6. Test Procedure

(1) The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to

produce the most unfavorable sequence of voltage changes under normal conditions During the flick measurement; the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

(2) The test results are reported on Section 7.7.

7.7. Voltage Fluctuation and Flicker Test Results

EUT	:	Book light	Test Date	:	N/A
M/N	:	MO9460	Temperature	:	N/A
Test Engineer	:	N/A	Humidity	:	N/A
Test Voltage	:	N/A	Pressure	:	N/A
Test Mode	:	N/A			
Test Results	:	N/A			
Note: Not applicable for equipment operated with battery or DC powered devices.					

8. Immunity Performance Criteria

Performance Level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

Definition: normal performance within limits specified by the manufacturer, requestor and purchaser.

During the test no change of the luminous intensity shall be observed and the regulating control, if any shall operate during the test as intended.

Criterion B:

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention.

During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

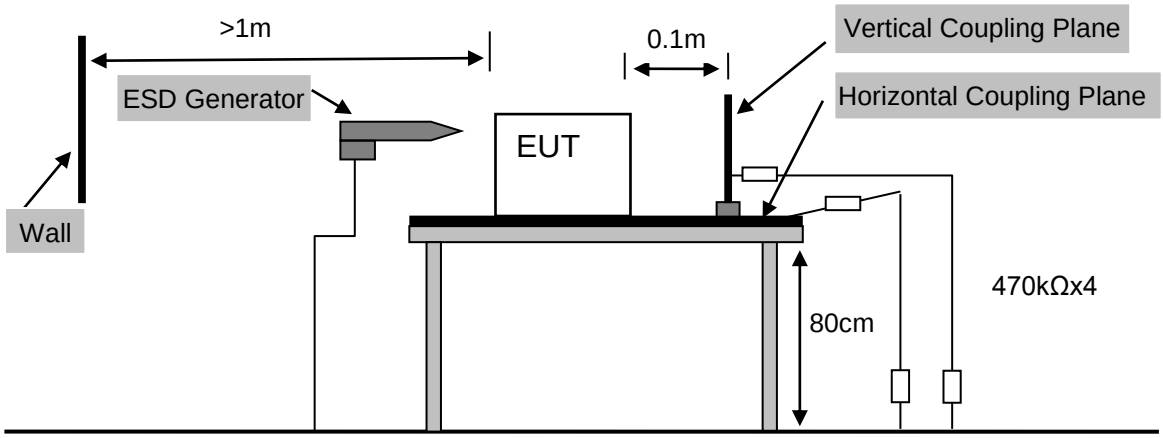
Criterion C:

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention.

During and after the test any change of the luminous intensity is allowed and the lamps may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control. Additional requirement for Lighting equipment incorporating a starting device: after the test the Lighting equipment is switched off. After half an hour it is switched on again. The Lighting equipment shall start and operate as intended.

9. Electrostatic Discharge Test

9.1. Block Diagram of Test Setup



9.2. Test Standard

EN IEC 61547:2023 (IEC 61000-4-2:2008)

9.3. Electrostatic Discharge Test Levels

Test Type	Test Level	Performance Criterion
Air Discharge	8KV	B
Contact Discharge	4KV	B
Notes:	1. A performance criterion C could be applied to toys mot using score or data entered by the user. Examples are musical soft toys, sounding toys, etc. 2. Test set-up reference IEC 61000-4-2:2008	

9.4. Configuration of EUT on Test

The following equipment are installed on Electrostatic Discharge Test to meet the IEC 61000-4-2 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

9.5. Operating Condition of EUT

（1） Setup the EUT as shown as Section 9.1.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode and 15 minutes before taking the test.

9.6. Test Procedure

(1) Air Discharge**:**

Electrostatic discharge tests shall be carried out according to lEC 61000-4-2:2008, Contact discharge is the preferred test method. Twenty discharges (10 with positive and 10 with negative polarity) shall be applied on each accessible metallic part of the enclosure, including terminals for connecting end-user replaceable modules. Air discharges shall be used where contact discharges cannot be applied. In addition, discharges shall be applied on the horizontal and vertical coupling planes.

(2) Contact Discharge:

During normal operation: Electrostatic discharges shall be applied only to points and surfaces of the EUT which are expected to be touched during normal operation. Modules and self-ballasted lamps are tested in a representative host.

During handling: Electrostatic discharges shall be applied to interconnecting pins, terminals or any metal parts of end-user replaceable modules which are accessible during installation and maintenance by the end-user. Tests shall be carried out without the hostwhereas the assessment of the performance of the module may be done inside the hostconfiquration. The EUT is not powered during the handling of ESD tests.

(3) Indirect discharge for horizontal coupling plane:

At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

(4) Indirect discharge for vertical coupling plane:

At least 20 single discharge were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

9.7. Electrostatic Discharge Test Results

EUT	:	Book light	Test Date	:	2024.10.16
M/N	:	MO9460	Temperature	:	24℃
Test Engineer	:	Lily Wang	Humidity	:	56%
Test Voltage		DC 3V From Battery	Pressure		101.6kPa
Test Mode	:	Lighting			
Test Results	:	**PASS**			

Discharge Voltage (kV)	**Type Of Discharge**	**Dischargeable Points**	**Performance**	
			Required	**Observation**
±4	Contact	N/A	B	N/A
±8	Air	1, 2	B	A
±4	HCP-Bottom	Edge of the HCP	B	A
±4	VCP-Front	Center of the VCP	B	A
±4	VCP-Left	Center of the VCP	B	A
±4	VCP-Back	Center of the VCP	B	A
±4	VCP-Right	Center of the VCP	B	A

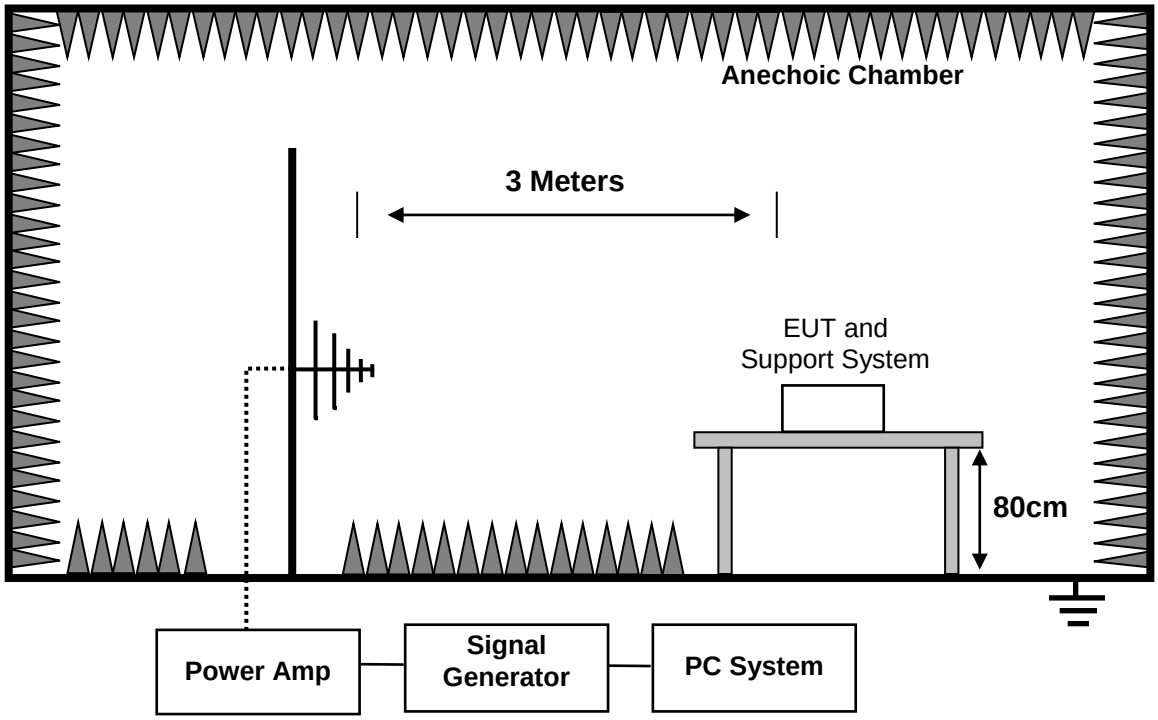
Discharge Points Description

1	Shell	4	N/A
2	Switch	5	N/A
3	N/A	6	N/A

Note:
1. For the time interval between successive single discharges an initial value of one second.
2. For Discharge each Point Positive 10 times and negative 10 times discharge.
3. Class A is no function loss.
4. EUT does not contain metal contact points, not need to contact discharge measurement

10. RF Field Strength Susceptibility Test

10.1.Block Diagram of Test Setup



10.2.Test Standard

EN IEC 61547: 2023 (IEC 61000-4-3:2020)

10.3.RF Field Strength susceptibility Test Levels

Test Specifications	Test Level	Performance Criterion
80MHz-1000MHz	3V/m (r.m.s.)	A
Notes: 1. Test set-up reference IEC 61000-4-3:2020		

10.4.Configuration of EUT on Test

The following equipment are installed on RF Field Strength Susceptibility Test to meet the IEC 61000-4-3 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

10.5.Operating Condition of EUT

(1) Setup the EUT as shown as Section 10.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

10.6.Test Procedure

(1) Testing was performed in a Fully anechoic chamber as recommended by IEC 61000-4-3.

(2) The EUT was placed on an 80 cm high non-conductive table located in the area of field uniformity. The radiating antenna was placed 3m in front of the EUT and Support system, and dwell time of the radiated interference was controlled by an automated, computer-controlled system.

(3) The signal source was stepped through the applicable frequency range at a rate no faster than 1% of the fundamental. The signal was amplitude modulated 80% over the frequency range 80 MHz to 1GHz at a level of 3 V/m. The dwell time was set at 3 s. Field presence was monitored during testing via a field probe placed in close proximity to the EUT.

(4) Throughout testing, the EUT was closely monitored for signs of susceptibility. The test was performed with the antennae oriented in both a horizontal and vertical polarization.

(5) All the scanning conditions are as follows:

Condition of Test	Require of Test
Test Fielded Strength	3 V/m
Radiated Signal	80% amplitude modulated with a 1kHz sine wave
Scanning Frequency	80 - 1000 MHz
Sweeping time of radiated	0.0015 decade/s
Dwell Time	1 Sec.

10.7.RF Field Strength Susceptibility Test Results

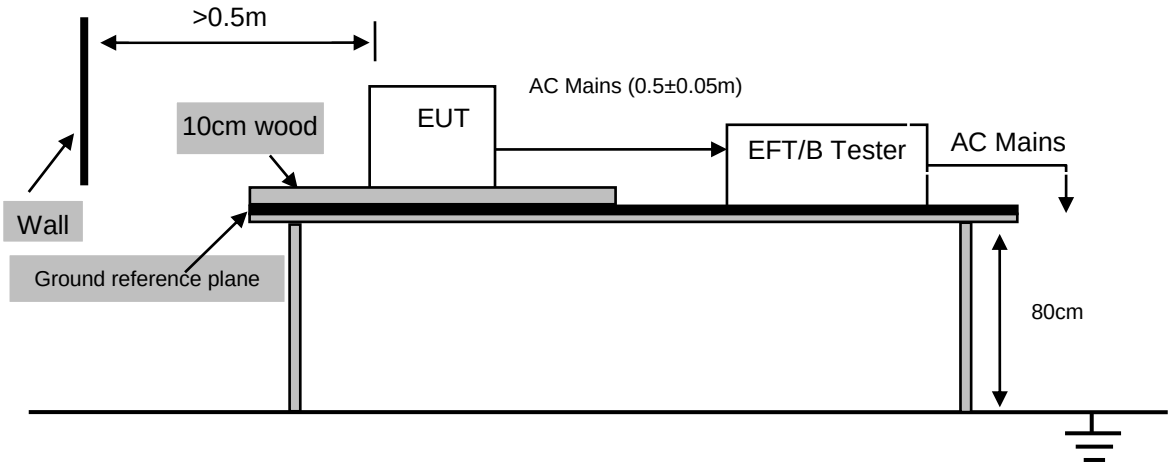
EUT	:	Book light	Test Date	:	2024.10.16
M/N	:	MO9460	Temperature	:	24℃
Test Engineer	:	Lily Wang	Humidity	:	56%
Test Voltage		DC 3V From Battery	Pressure		101.6kPa
Test Mode	:	Lighting			
Test Results	:	**PASS**			
Modulation:		☑ AM ☐ Pulse ☐ none 1 kHz 80%			

	Frequency Range :80 MHz -1000MHz				
	Field strength: 3V/m				
Steps	1%				
	Horizontal		Vertical		Result
	Required	Observation	Required	Observation	(Pass / Fail)
Front	A	A	A	A	Pass
Right	A	A	A	A	Pass
Rear	A	A	A	A	Pass
Left	A	A	A	A	Pass

Note: 1. Class A is no function loss.

11. Electrical Fast Transient/Burst Immunity Test

11.1.Block Diagram of Test Setup



11.2.Test Standard

EN IEC 61547:2023(IEC 61000-4-4: 2012)
(Severity Level 2 at 1kV)

11.3.Electrical Fast Transient/Burst Test Levels

Test levels at ports for signal/control lines and load ports	Performance Criterion

Characteristics	Test levels
Voltage peak	±0,5 kV (peak)
Rise time/hold time	5/50 ns
Repetition frequency	5 kHz
NOTE 1 Only applicable to ports interfacing with cables whose total length, according to the manufacturer's specification, can exceed 3 m. NOTE 2 Change of state commands are not applied during the test.	

B

Test levels at input and output DC power ports	Performance Criterion

Characteristics	Test levels
Voltage peak	±0,5 kV (peak)
Rise time/hold time	5/50 ns
Repetition frequency	5 kHz
NOTE Not applicable to equipment not connected to the mains while in use.	

B

Test levels at input and output AC power ports	Performance Criterion

Characteristics	Test levels
Voltage peak	±1 kV (peak)
Rise time/hold time	5/50 ns
Repetition frequency	5 kHz

B

11.4.Configuration of EUT on Test

The following equipment are installed on Electrical Fast Transient/Burst immunity Test to meet the IEC 61000-4-4 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application. Fast transients are carried out with a minimum duration of 2 min with a positive polarity and a minimum of 2 min with a negative polarity.

11.5.Operating Condition of EUT

(1) Setup the EUT as shown as Section 11.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

11.6.Test Procedure

(1) The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

11.6.1. For input and AC power ports:

The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive Fast transients and negative Fast transients of test voltage were applied during compliance test. Fast transients are carried out with a minimum duration of 2 min with a positive polarity and a minimum of 2 min with a negative polarity.

11.6.2. For signal lines and control lines ports(Only applicable to ports interfacing with cables whose total length, according to the manufacturer's specification, may exceed 3 m.):

It’s not to be tested.

11.6.3. For DC input and DC output power ports(Not applicable to equipment not connected to the mains while in use.):

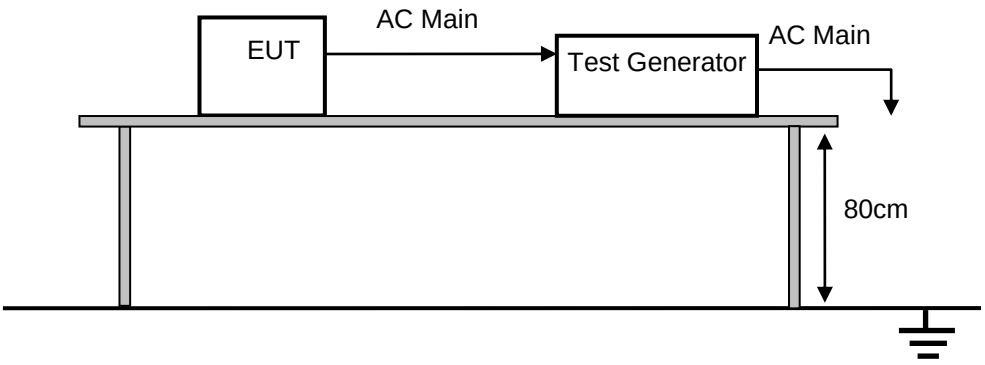
It’s not to be tested.

11.7.Electrical Fast Transient/Burst immunity Test Results

EUT	:	Book light	Test Date	:	N/A
M/N	:	MO9460	Temperature	:	N/A
Test Engineer	:	N/A	Humidity	:	N/A
Test Voltage		N/A	Pressure		N/A
Test Mode	:	N/A			
Test Results	:	N/A			
Note	:	EUT is powered by battery, and there is no interconnection between the battery and the EUT, So not applicable to this project			

12. Surge Test

12.1. Block Diagram of Test Setup



12.2. Test Standard

EN IEC 61547:2023(IEC 61000-4-5:2014+A1:2017)

12.3. Surge Test Levels

Test levels at ports for signal/control lines and load ports

Characteristics		Test levels [a]	
		Device	
		Self-ballasted lamps ≤ 25 W	Lighting equipment (except self-ballasted lamps ≤ 25 W)
Wave-shape data		1,2/50 µs	1,2/50 µs
	line to line	±0,5 kV	±1,0 kV
	line to ground	N.A.	±2,0 kV[b]

[a] In addition to the specified test level, all lower test levels as detailed in IEC 61000-4-5:2014 shall also be satisfied.

[b] Line to ground and neutral to ground surge tests also apply to class II lighting equipment with metal enclosures which may be connected to earth potential via, for example, the pole or conductive ceiling. Therefore, during the test the metal enclosure of the host or the luminaire shall be connected to the ground. For self-ballasted lamps (> 25 W) the conical housing as specified in Annex A of CISPR 15:2018 shall be used as metal enclosure.

Note : In addition to the levels in Table, road and street lighting equipment shall comply with ±2.0 kV line to line and ±4.0 kV line to ground voltages.

Performance criterion : C

12.4. Configuration of EUT on Test

The following equipment are installed on Surge Test to meet the IEC 61000-4-5:2014+A1:2017 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

12.5. Operating Condition of EUT

(1) Setup the EUT as shown as Section 12.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

12.6.Test Procedure

(1) For line to line coupling mode, provide a 1.0kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

(2) These tests are carried out according to IEC 61000-4-5, with test levels as shown as Section 12.2. Lower levels need not to be tested. Pulses shall be applied to the a.c. voltage wave as follows; five positive polarity pulses at the 90º phase angle, five negative polarity pulses at the 270º phase angle.

(3) Different phase angles are done individually.

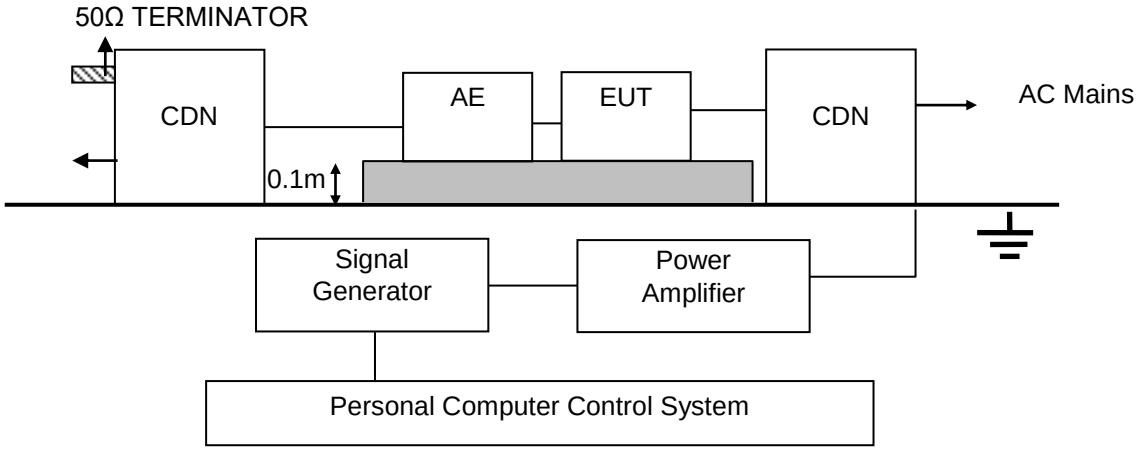
(4) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

12.7.Surge Test Results

EUT	:	Book light	Test Date	:	N/A
M/N	:	MO9460	Temperature	:	N/A
Test Engineer	:	N/A	Humidity	:	N/A
Test Voltage	:	N/A	Pressure	:	N/A
Test Mode	:	N/A			
Test Results	:	N/A			
Note	:	Not applicable for equipment operated with battery or DC powered devices.			

13. Injected Currents Susceptibility Test

13.1. Block Diagram of Test Setup



13.2. Test Standard

EN IEC 61547: 2023 (IEC 61000-4-6:2013)

13.3. Injected Currents Susceptibility Test Levels

Test levels at ports for signal and control lines

Characteristics	Test levels
Frequency range	0,15 MHz to 80 MHz
Voltage level	3 V RMS (unmodulated)
Modulation	1 kHz, 80 % AM, sine wave
Source impedance	150 Ω

NOTE Only applicable to ports interfacing with cables whose total length, according to the manufacturer's specification, can exceed 3 m.

Test levels at input and output DC power ports

Characteristics	Test levels
Frequency range	0,15 MHz to 80 MHz
Voltage level	3 V RMS (unmodulated)
Modulation	1 kHz, 80 % AM, sine wave
Source impedance	150 Ω

NOTE 1 Only applicable to ports interfacing with cables whose total length, according to the manufacturer's specification, can exceed 3 m.

NOTE 2 Only applicable to equipment that is connected to the mains while in use.

Test levels at input and output AC power ports

Characteristics	Test levels
Frequency range	0,15 MHz to 80 MHz
Voltage level	3 V RMS (unmodulated)
Modulation	1 kHz, 80 % AM, sine wave
Source impedance	150 Ω
NOTE Only applicable to ports interfacing with cables whose total length, according to the manufacturer's specification, can exceed 3 m.	

Performance criterion: A

13.4.Configuration of EUT on Test

The following equipment are installed on Injected Currents Susceptibility Test to meet the IEC 61000-4-6 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

13.5.Operating Condition of EUT

(1) Setup the EUT as shown as Section 13.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

13.6.Test Procedure

(1) Let the EUT work in test mode and test it.

(2) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

(3) The disturbance signal described below is injected to EUT through CDN.

(4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.

(5) The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

(6) The rate of sweep shall not exceed 1.5*10-3decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

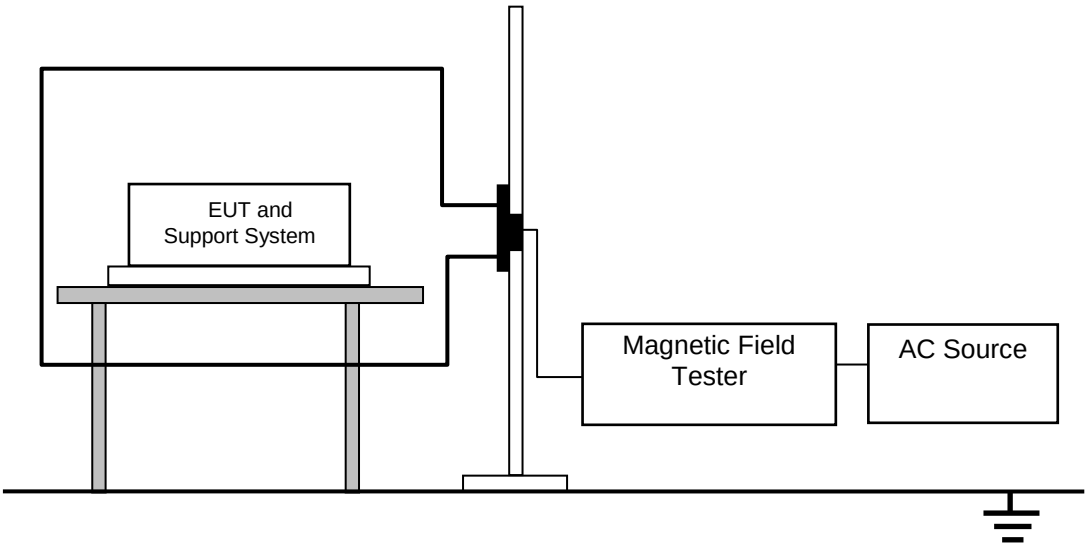
(7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

13.7.Injected Currents Susceptibility Test Results

EUT	:	Book light	Test Date	:	N/A
M/N	:	MO9460	Temperature	:	N/A
Test Engineer	:	N/A	Humidity	:	N/A
Test Voltage	:	N/A	Pressure	:	N/A
Test Mode	:	N/A			
Test Results	:	N/A			
Note	:	Not applicable for equipment operated with battery or DC powered devices.			

14. Magnetic Field Immunity Test

14.1.Block Diagram of Test Setup



14.2.Test Standard

EN IEC 61547:2023(IEC 61000-4-8:2009)

14.3.magnetic field Test Levels

Test levels at enclosure port	
Characteristics	**Test levels**
Test frequency	50/60 Hz
Magnetic field strength	3 A/m

Performance criterion: A

14.4.Configuration of EUT on Test

The following equipment are installed on Magnetic Field Immunity Test to meet the IEC 61000-4-8 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

14.5.Operating Condition of EUT

(1) Setup the EUT as shown as Section 14.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

14.6.Test Procedure

(1) The EUT was subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 14.1. The induction coil was then rotated by 90°in order to expose the EUT to the test field with different orientations.

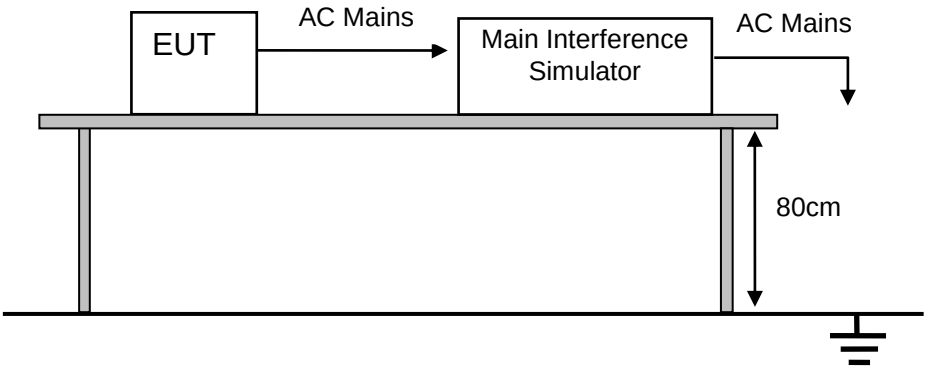
(2) These tests are carried out according to IEC 61000-4-8, with test levels as Section 14.3 and need only to be applied to equipment containing components susceptible to magnetic fields, such as Hall elements or magnetic field sensors.

14.7.Magnetic Field Immunity Test Results

EUT	:	Book light	Test Date	:	N/A
M/N	:	MO9460	Temperature	:	N/A
Test Engineer	:	N/A	Humidity	:	N/A
Test Voltage	:	N/A	Pressure	:	N/A
Test Mode	:	N/A			
Test Results	:	N/A			
Note	:	Not applicable for equipment operated with battery or DC powered devices.			

15. Voltage Dips And Interruptions Test

15.1.Block Diagram of Test Setup



15.2.Test Standard

EN IEC 61547: 2023 (IEC 61000-4-11:2020)

15.3.Voltage Dips And Interruptions Test Levels

Test Level %U_T	Voltage dip and short interruptions %U_T	Performance Criterion	Duration (in period)
0	100	B	0.5
70	30	B	10

15.4.Configuration of EUT on Test

The following equipment are installed on Voltage Dips and Interruptions Test to meet the IEC 61000-4-11 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

15.5.Operating Condition of EUT

(1) Setup the EUT as shown as Section 15.1.

(2) Turn on the power of all equipment.

(3) Let the EUT work in test mode and 15 minutes before taking the test.

15.6.Test Procedure

(1) The interruption is introduced at selected phase angles with specified duration.

(2) Record any degradation of performance.

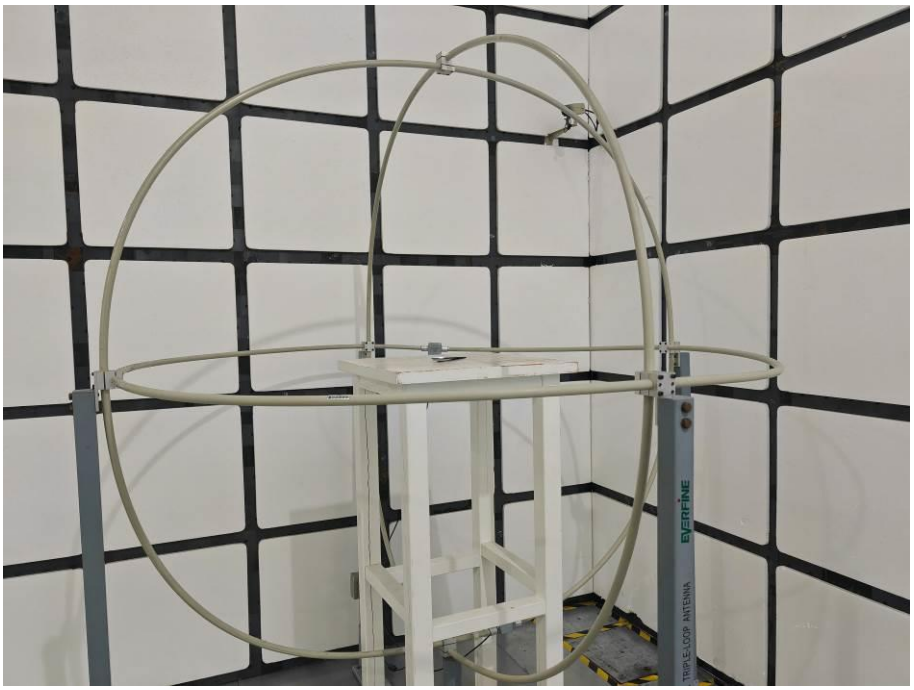
15.7.Voltage Dips And Interruptions Test Results

EUT	:	Book light	Test Date	:	N/A
M/N	:	MO9460	Temperature	:	N/A
Test Engineer	:	N/A	Humidity	:	N/A
Test Voltage	:	N/A	Pressure	:	N/A
Test Mode	:	N/A			
Test Results	:	N/A			
Note	:	Not applicable for equipment operated with battery or DC powered devices.			

16. Photograph

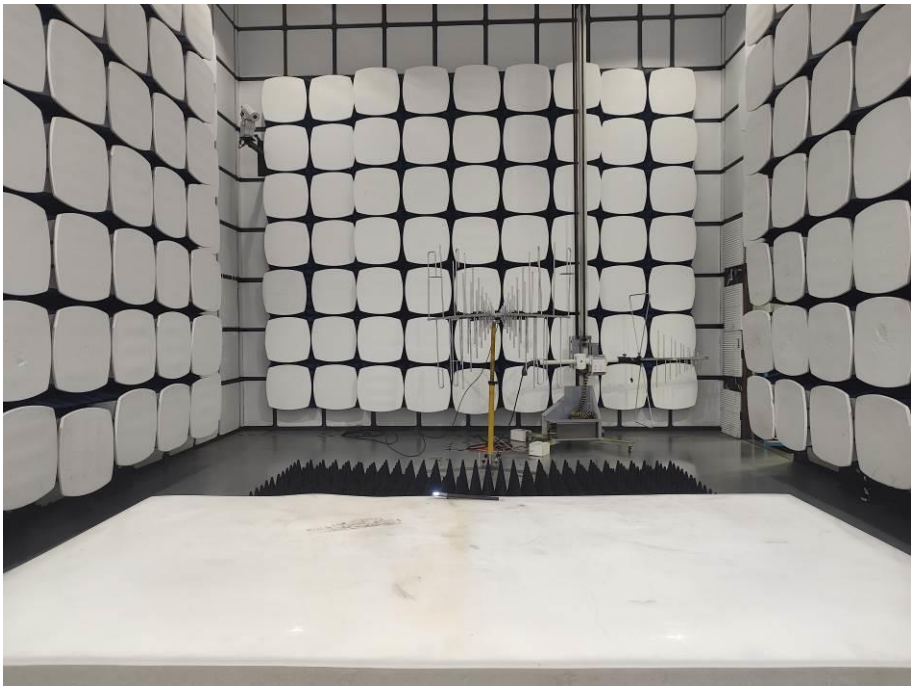
16.1.Photos of Radiated Disturbance Test (In Semi Anechoic Chamber)

16.2.Photos of Radiated Electromagnetic Disturbance Test

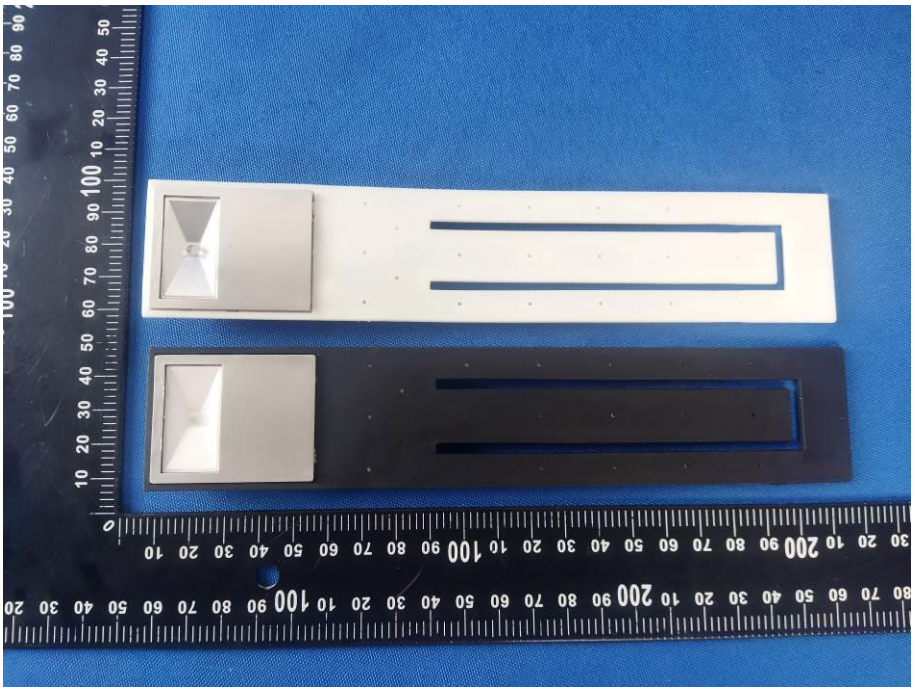


16.3.Photos of Electrostatic Discharge Test

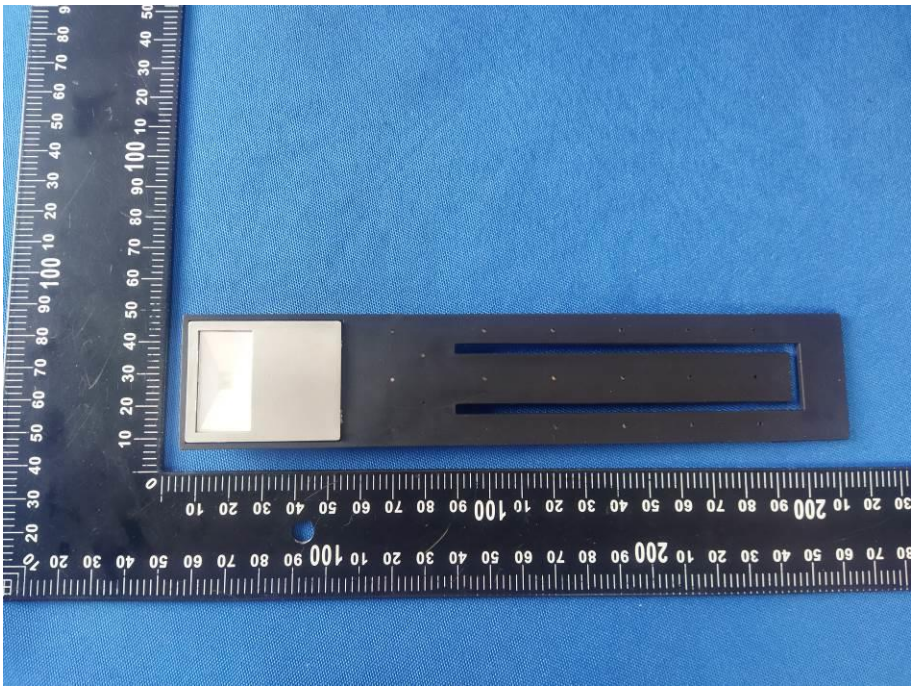
16.4.Photos of RF Field Strength Susceptibility Test



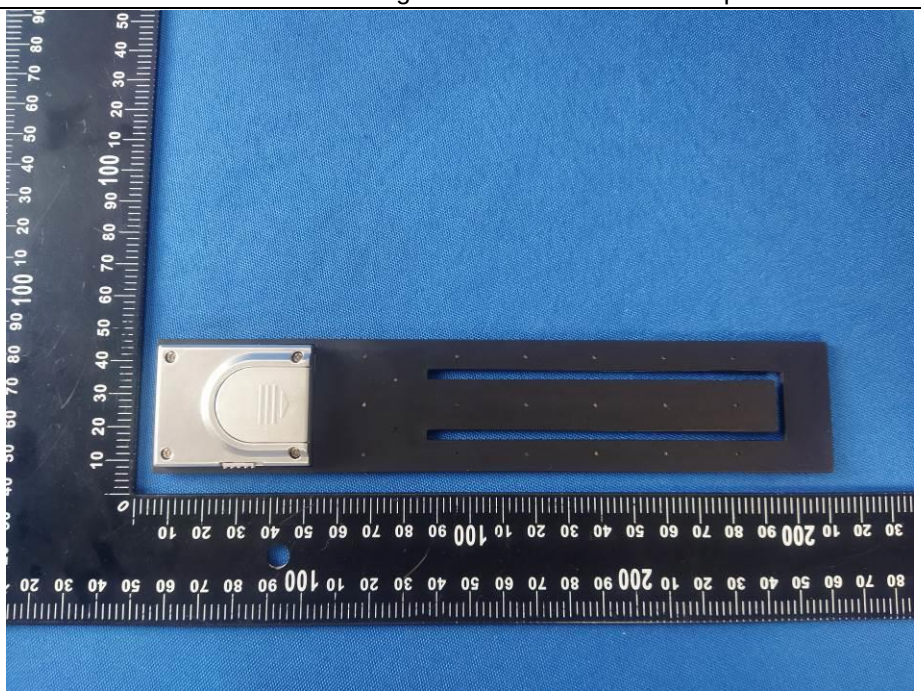
17. Photos Of The EUT



EUT View



EUT View



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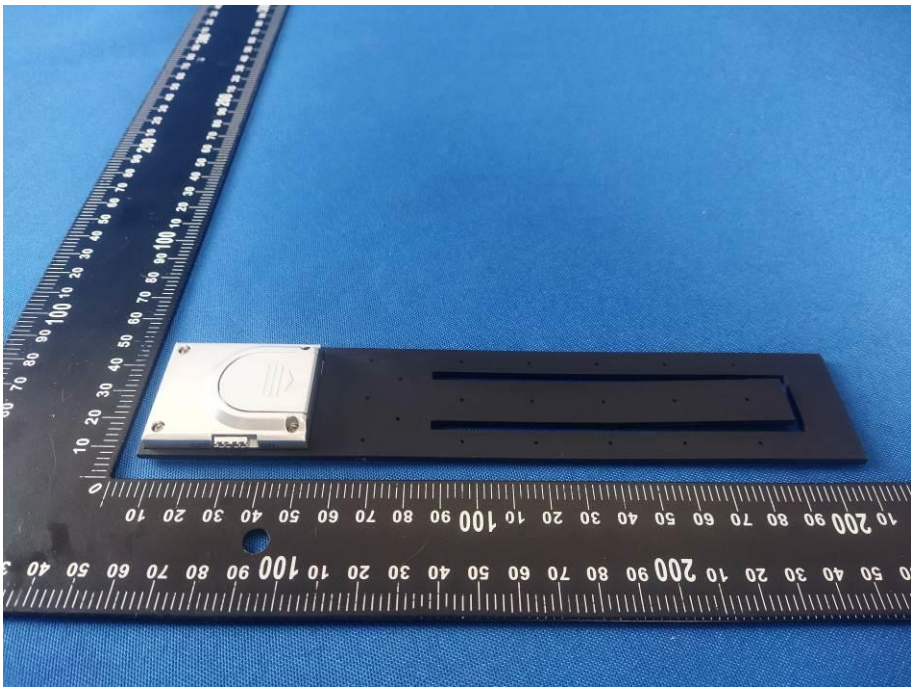

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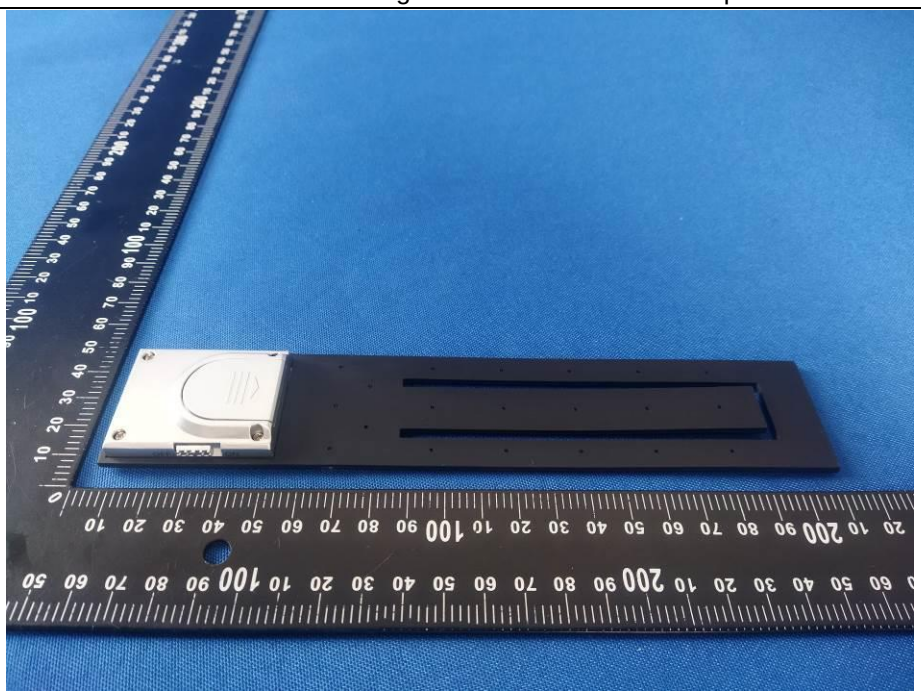

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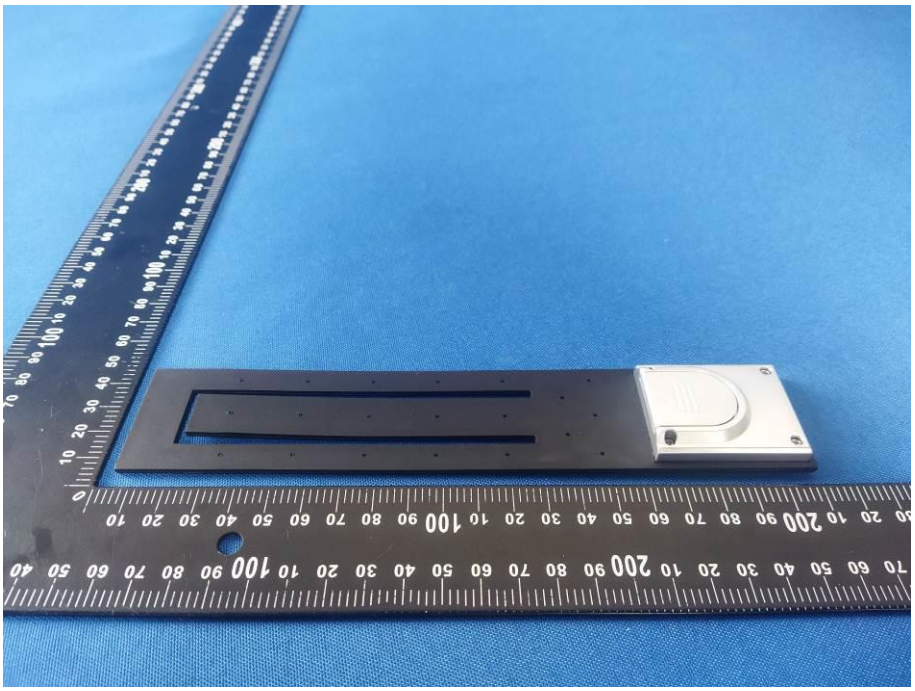

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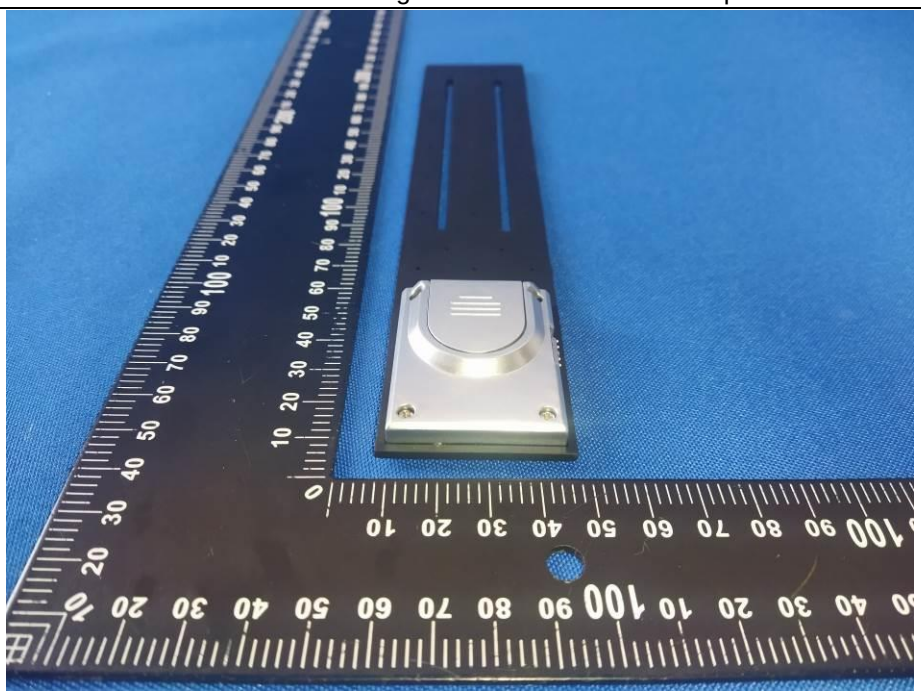

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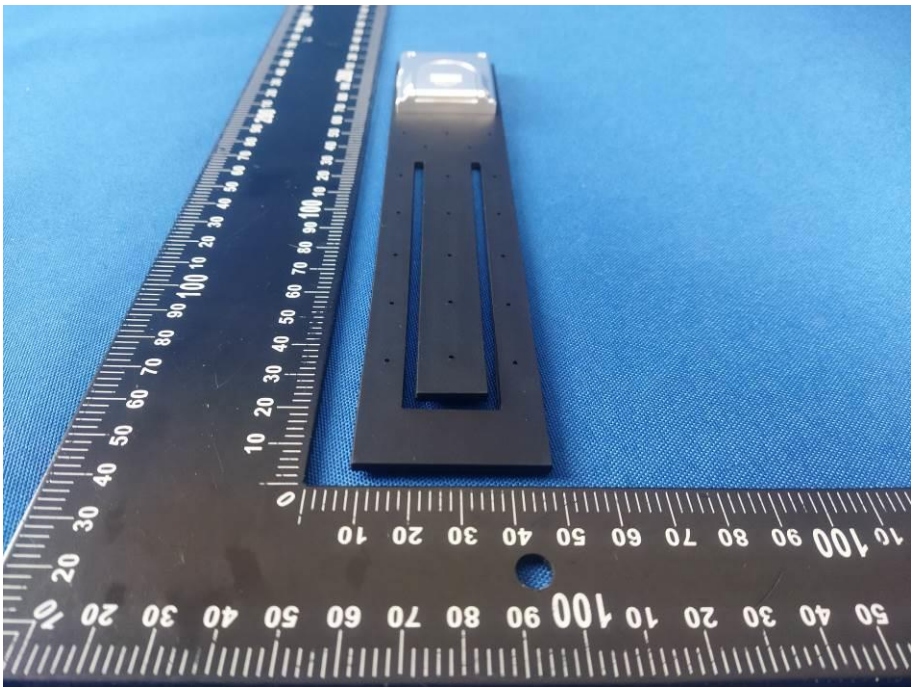

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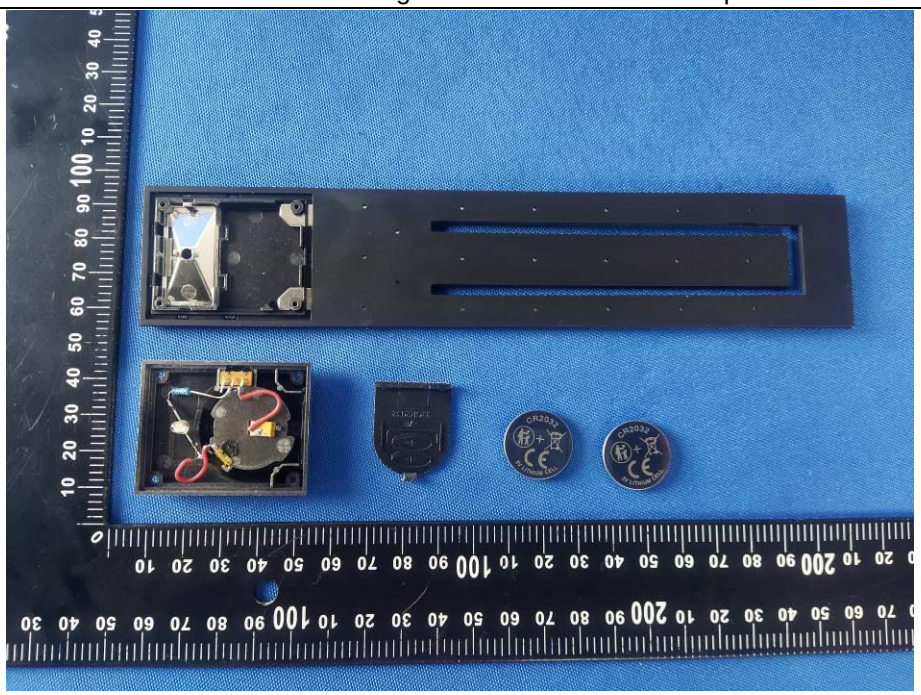
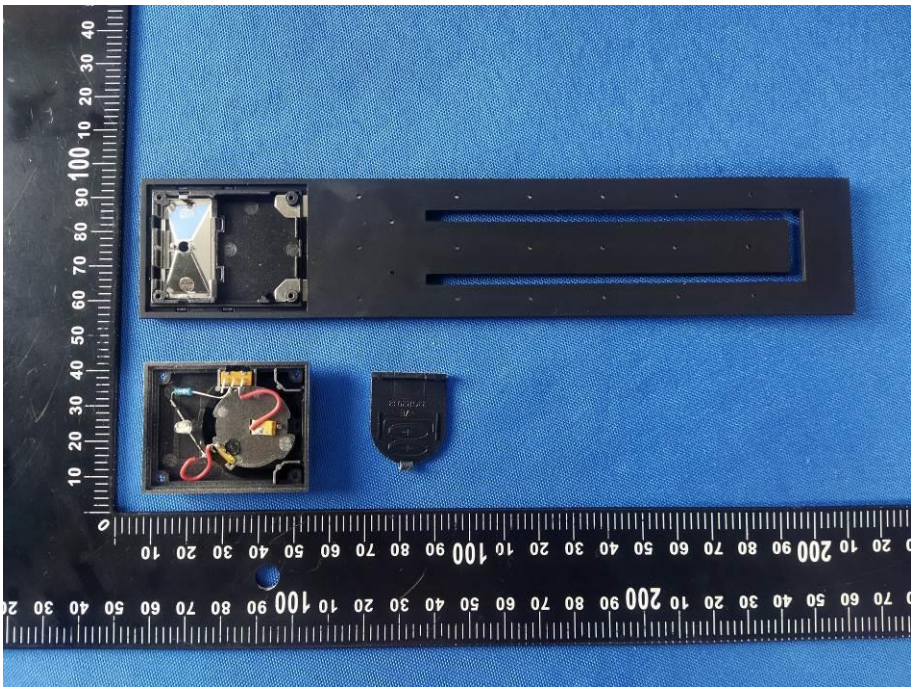
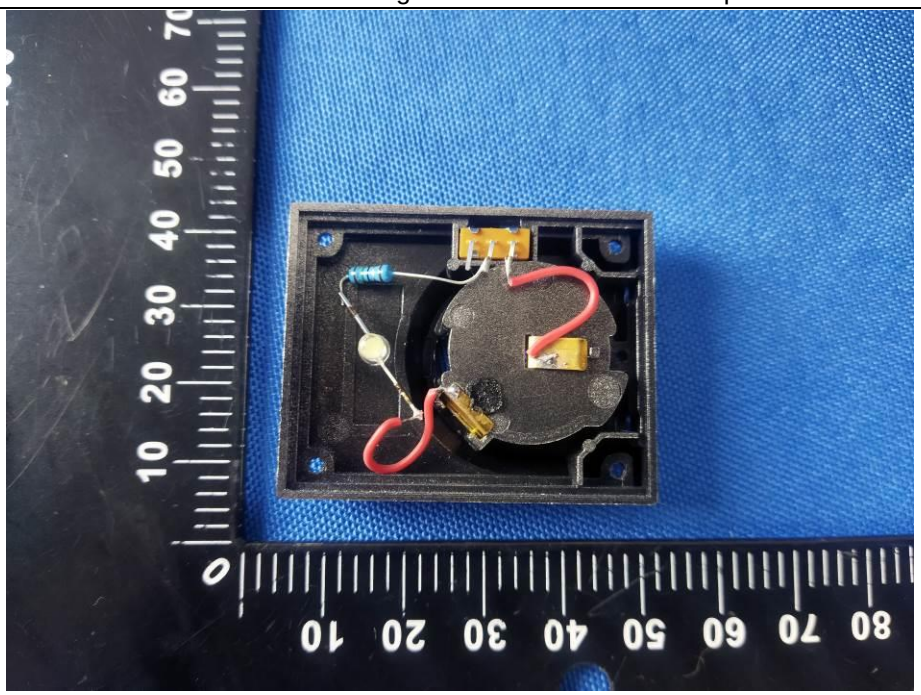


EUT View



EUT View



EUT View

EUT View

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