

# TEST REPORT

**Applicant:** Mid Ocean Brands B.V.

**Address of Applicant:** 7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

**Manufacturer:** Mid Ocean Brands B.V.

**Address of Manufacturer:** 7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

**Equipment Under Test (EUT)**

Product Name: Multifunctional COB Light

Model No.: MO6702

**Applicable standards:** EN IEC 55015:2019+A11:2020  
EN IEC 61547:2023  
EN IEC 61000-3-2:2019+A1:2021  
EN 61000-3-3:2013+A2:2021

**Date of sample receipt:** December 28, 2023

**Date of Test:** December 28, 2023- January 03, 2024

**Date of report issued:** January 03, 2024

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Luo

**Laboratory Manager**

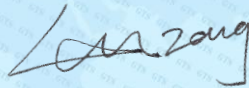
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## 2 Version

Version No.	Date	Description
00	January 03, 2024	Original

Prepared By:

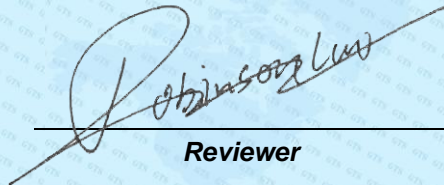


Date:

January 03, 2024

Project Engineer

Reviewed By:



Date:

January 03, 2024

Reviewer

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## 4 Test Summary

Test item	Test Requirement	Test Method	Class / Severity	Result
Radiated electromagnetic disturbances (9kHz-30MHz)	EN IEC 55015	EN IEC 55015	Table 8	Pass
Radiated electromagnetic disturbances	EN IEC 55015	EN IEC 55015	Table 10	Pass
Disturbance voltages	EN IEC 55015	EN IEC 55015	Table 1	Pass
Disturbance voltage wired network interfaces other than power supply	EN IEC 55015	EN IEC 55015	Table 2	N/A
Disturbance voltage local wired ports	EN IEC 55015	EN IEC 55015	Table 5	N/A
Harmonic Emission	EN IEC 61000-3-2	EN IEC 61000-3-2	Class C	N/A
Flicker Emission	EN 61000-3-3	EN 61000-3-3*	Clause 5 of EN61000-3-3	N/A
Electrostatic discharges	EN IEC 61547	EN 61000-4-2	Contact:±4kV Air: ±2, ±4, ±8kV	Pass
Radio-frequency electromagnetic fields	EN IEC 61547	EN 61000-4-3	3V/m 80%, 1kHz, AM	Pass
Fast Transients	EN IEC 61547	EN 61000-4-4	AC ± 1.0kV	Pass
Surges	EN IEC 61547	EN 61000-4-5	Table 10	Pass
Injected currents	EN IEC 61547	EN 61000-4-6	3Vrms (emf), 80%, 1kHz Amp. Mod.	Pass
Voltage dips and short interruptions	EN IEC 61547	EN 61000-4-11	0 % UT* for 0.5per 70 % UT* for 10per	Pass

Remark:

\*: Limits are not specified when LED luminaires with rating less than or equal to 600W (EN 61000-3-3:2013+A2:2021, AnnexA (A.2)).

UT\* is the nominal supply voltage.

N/A: Not applicable.

## 5 General Information

### 5.1 General Description of EUT

Product Name:	Multifunctional COB Light
Model No.:	MO6702
Power Supply:	USB input: DC 5V Li-battery: DC 3.7V, 400mAh

Remark: The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

### 5.2 Test mode and voltage

<b>Test mode:</b>	
Operation mode	Keep the EUT in the operation status.
Charge mode	Keep the EUT charging.
<b>Test voltage:</b>	
USB input: DC 5V& Li-battery: DC 3.7V	

### 5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
Apple adapter	USB Charger	A1443	N/A

### 5.4 Monitoring of EUT for All Immunity Test

Visual:	Monitored the luminous intensity.
Audio:	N/A

### 5.5 Deviation from Standards

None.
-------

### 5.6 Abnormalities from Standard Conditions

None.
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## 5.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.

- **ISED —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing.

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

## 5.8 Test Location

All test items were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480; Fax: 0755-27798960

## 6 Test Instruments List

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	June 23, 2021	June 22, 2024
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 14, 2023	April 13, 2024
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 19, 2023	March 18, 2025
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	April 17, 2023	April 16, 2025
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 14, 2023	April 13, 2024
8	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 13, 2023	Nov.12, 2024
9	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 14, 2023	April 13, 2024
10	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 14, 2023	April 13, 2024
11	Horn Antenna (18-26.5GHz)	/	UG-598A/U	GTS664	Oct. 29, 2023	Oct. 28, 2024
12	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 29, 2023	Oct. 28, 2024
13	FSV-Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	March 13, 2023	March 12, 2024
14	Amplifier	/	LNA-1000-30S	GTS650	April 14, 2023	April 13, 2024
15	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 08, 2023	Nov.07, 2024
16	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	April 14, 2023	April 13, 2024
17	Thermo meter	JINCHUANG	GSP-8A	GTS643	April 19, 2023	April 18, 2024
18	RE cable 1	GTS	N/A	GTS675	July 31. 2023	July 30. 2024
19	RE cable 2	GTS	N/A	GTS676	July 31. 2023	July 30. 2024
20	RE cable 3	GTS	N/A	GTS677	July 31. 2023	July 30. 2024
21	RE cable 4	GTS	N/A	GTS678	July 31. 2023	July 30. 2024
22	RE cable 5	GTS	N/A	GTS679	July 31. 2023	July 30. 2024
23	RE cable 6	GTS	N/A	GTS680	July 31. 2023	July 30. 2024
24	RE cable 7	GTS	N/A	GTS681	July 31. 2023	July 30. 2024
25	RE cable 8	GTS	N/A	GTS682	July 31. 2023	July 30. 2024

Loop						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	July 12, 2022	July 11, 2027
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI 7	GTS552	April 14, 2023	April 13, 2024
3	TPIPLE-LOOP ANTENNA	EVERFINE	LLA-2	GTS539	April 14, 2023	April 13, 2024
4	Thermo meter	JINCHUANG	GSP-8A	GTS642	April 19, 2023	April 18, 2024

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	July 12, 2022	July 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	April 14, 2023	April 13, 2024
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Thermo meter	JINCHUANG	GSP-8A	GTS642	April 19, 2023	April 18, 2024
7	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	April 14, 2023	April 13, 2024
8	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 14, 2023	April 13, 2024
9	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 14, 2023	April 13, 2024
10	Antenna end assembly	Weinschel	1870A	GTS560	April 14, 2023	April 13, 2024

ESD						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	ESD Simulator	LINCEL	ESD-203B	GTS645	April 17, 2023	April 16, 2024
2	Thermo meter	KTJ	TA328	GTS243	April 18, 2023	April 17, 2024

Conducted Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Signal Generator	ROHDE & SCHWARZ	SMB 100A	GTS553	April 14, 2023	April 13, 2024
2	CDN	LionCEL	CDN-M3-16	GTS554	April 14, 2023	April 13, 2024
3	CDN	CYBERTEK	EM 5070	GTS559	April 14, 2023	April 13, 2024
4	Power amplifier	rflight	NTWPA-00010475	GTS555	April 14, 2023	April 13, 2024
5	ATT	SUNWAVE	SJ-50-06DB	GTS556	April 14, 2023	April 13, 2024
6	Clamp	SCHAFFNER	KEMZ 801	GTS558	April 14, 2023	April 13, 2024
7	Thermo meter	JINCHUANG	GSP-8A	GTS642	April 19, 2023	April 18, 2024



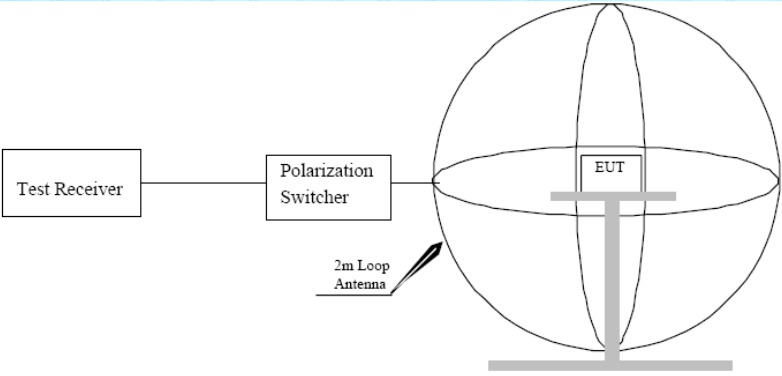
<b>EFT, Surge, Voltage dips and Interruption</b>						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	EMTEST system	EMTEST	UCS500N	GTS239	April 14, 2023	April 13, 2024
2	Clamp	EMTEST	HFK	GTS557	April 14, 2023	April 13, 2024
3	Thermo meter	JINCHUANG	GSP-8A	GTS639	April 18, 2023	April 17, 2024

<b>Radiated Immunity</b>						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Probe	STT	SEM-600	GTS648	April 17, 2023	April 16, 2024
2	Stacked Log.-Per.-Broadband Antenna	SCHWARZBECK	STLP 9129	GTS658	Aug.04, 2023	Aug.03, 2024
3	MXG vector Signal Generator	Agilent	N5181A	GTS659	Nov. 08, 2023	Nov.07, 2024
4	Power amplifier	Micotop	MPA-20-1000-250	GTS660	Aug.04, 2023	Aug.03, 2024
5	Power amplifier	Micotop	MPA-1000-6000-100	GTS661	Aug.04, 2023	Aug.03, 2024
6	EPM S SERIES POWER METER	Agilent	E4419B	GTS662	Nov. 08, 2023	Nov.07, 2024
7	E-SERIES AVG POWER SENSOR	HP	E9301A	GTS670	Nov. 08, 2023	Nov.07, 2024
8	Thermo meter	JINCHUANG	GSP-8A	GTS643	April 19, 2023	April 18, 2024

<b>General used equipment:</b>						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	KUMAO	SF132	GTS647	April 19, 2023	April 18, 2024

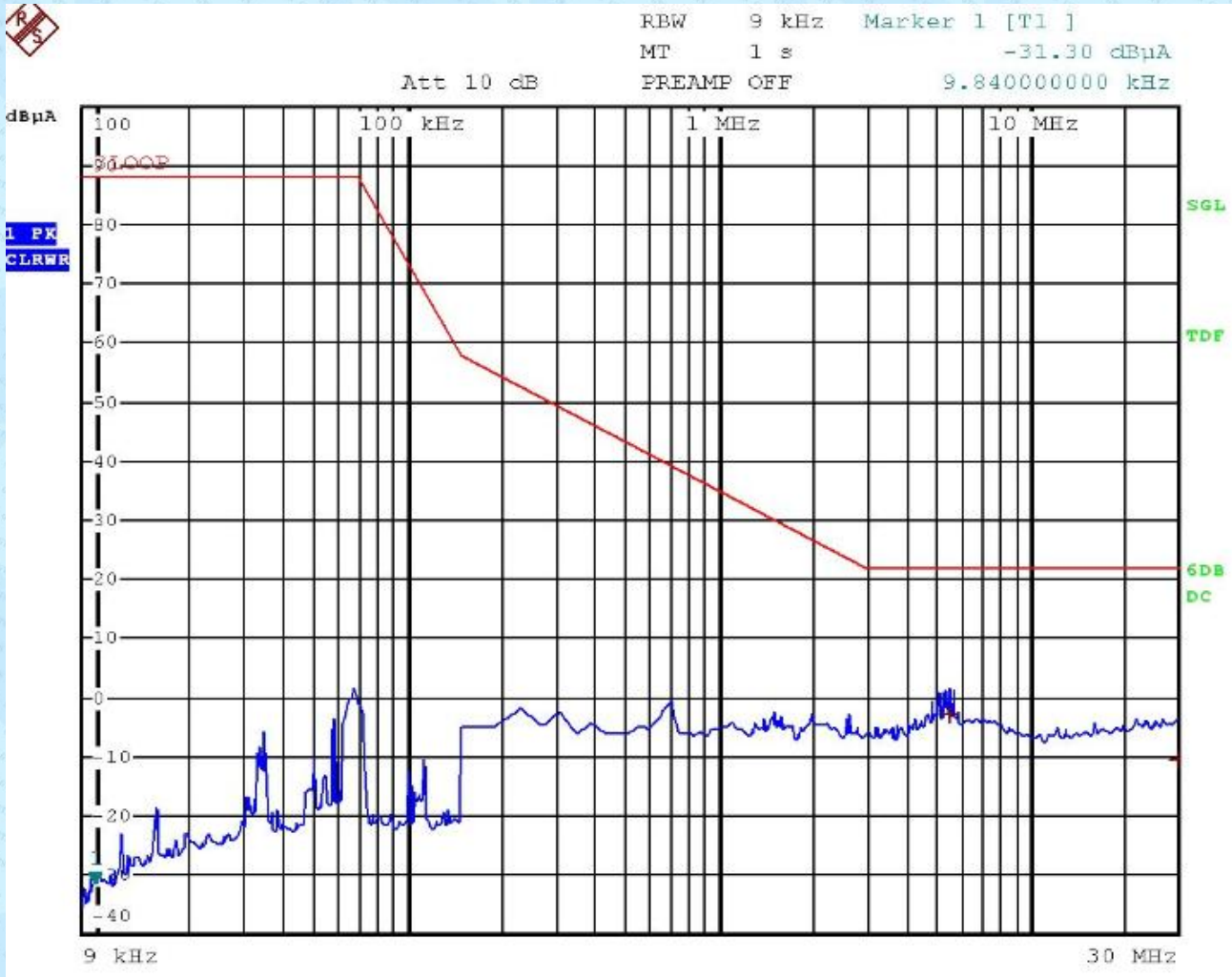
## 7 Emission Test Results

### 7.1 Radiated Electromagnetic Disturbance(9kHz-30MHz)

Test Requirement:	EN IEC 55015					
Test Method:	EN IEC 55015					
Test Frequency Range:	9kHz to 30MHz					
Receiver set:	Frequency	Detector	RBW	VBW	Value	
	9KHz~150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak	
	150KHz~30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak	
Limit:	Frequency range (MHz)		Limits for loop diameter dBuA @2m			
	0.009-0.070		88			
	0.070-0.150		88 to 58*			
	0.15-3.0		58 to 22*			
	3.0-30		22			
*Decreasing linearly with the logarithm of the frequency. For electrodeless lamps and luminaires, the limit in the frequency range of 2,2 MHz to 3,0 MHz is 58 dB(μA) for 2 m, 51dB(μA) for 3 m and 45 dB(μA) for 4 m loop diameter.						
Test Setup:						
Test procedure	<ol style="list-style-type: none"> <li>1. An initial pre-scan was performed in the 2m loop antenna using the spectrum analyser in peak detection mode.</li> <li>2. The EUT was measured for X(A), Y(B), Z(C) polarities.</li> <li>3. No further quasi-peak measurements were performed since no peak emissions from the EUT were detected within 6dB of the limit for 2m diameter loop antenna.</li> </ol>					
Test Instruments:	Temp.:	25 °C	Humid.:	50%	Press.:	1 012mbar
Measurement Record:	Uncertainty: 3.26dB					
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.2 for details only show the worst case.					
Test results:	Pass					

### Measurement Data

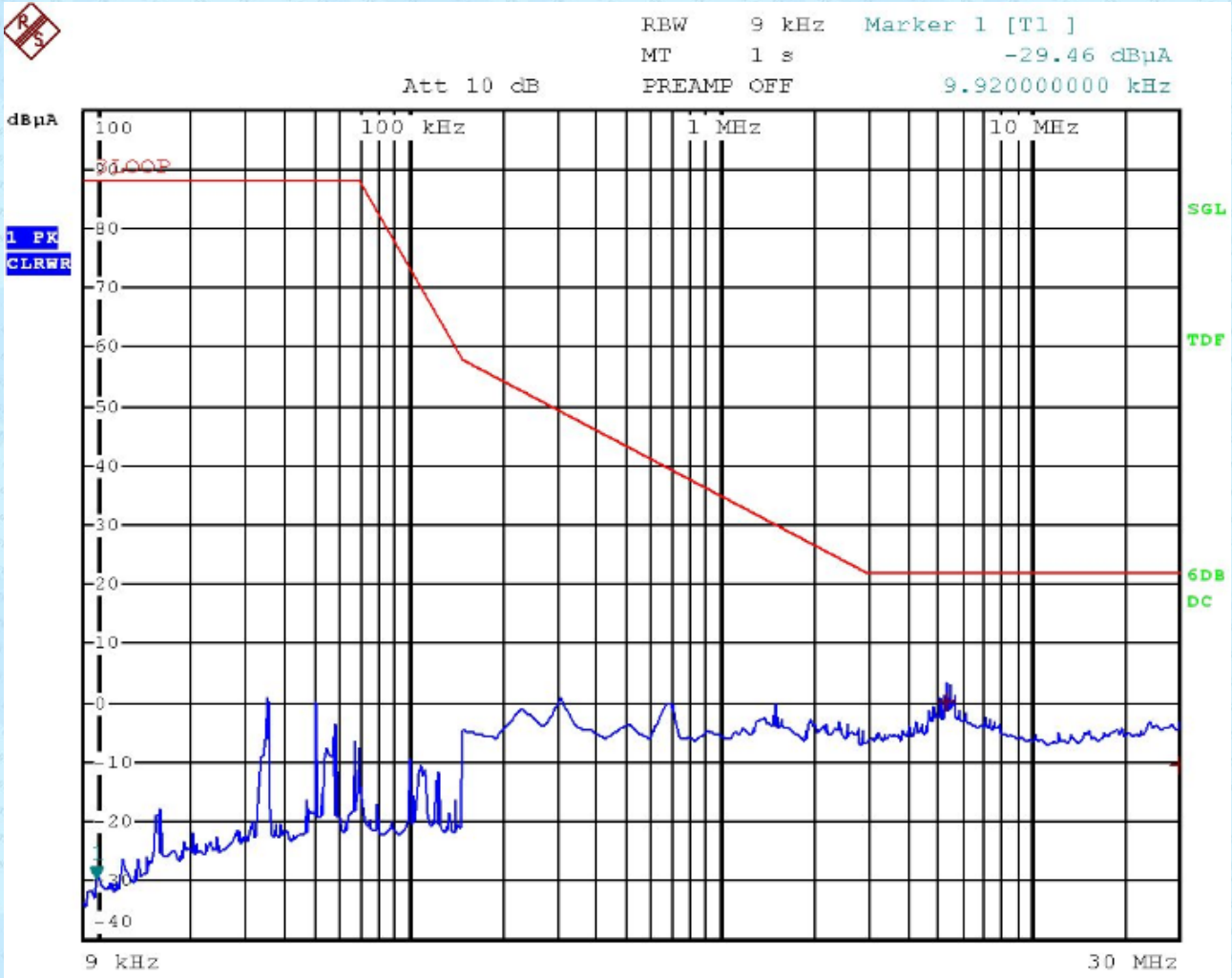
X:



Trace1: 3LOOP  
 Trace2: ---  
 Trace3: ---

TRACE	FREQUENCY	LEVEL dBμA	DELTA LIMIT dB
1 Quasi Peak	5.51 MHz	-2.67	-24.67
1 Quasi Peak	29.87 MHz	-10.29	-32.29

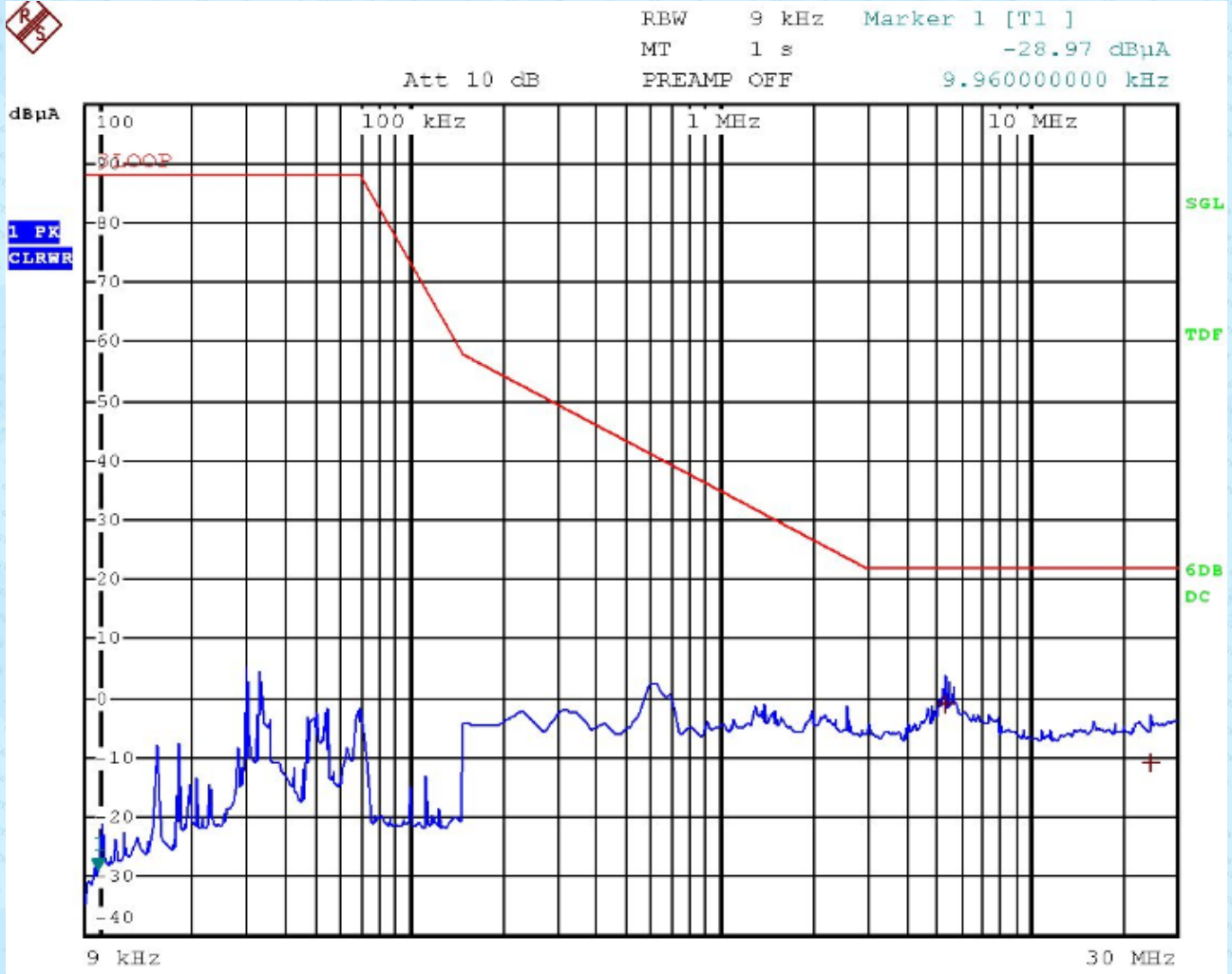
Y:



Trace1: 3LOOP  
 Trace2: ---  
 Trace3: ---

TRACE	FREQUENCY	LEVEL dBμA	DELTA LIMIT dB
1 Quasi Peak	5.31 MHz	0.14	-21.85
1 Quasi Peak	29.95 MHz	-10.23	-32.23

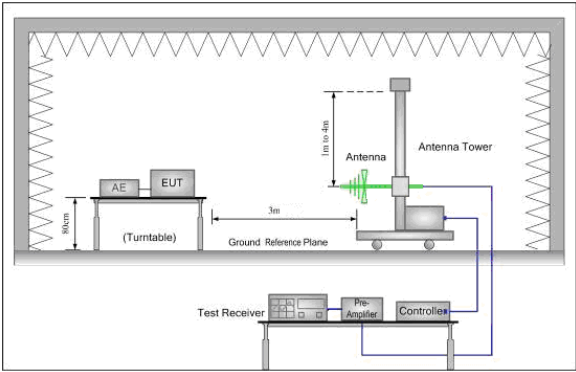
Z:



Trace1: 3LOOP  
 Trace2: ---  
 Trace3: ---

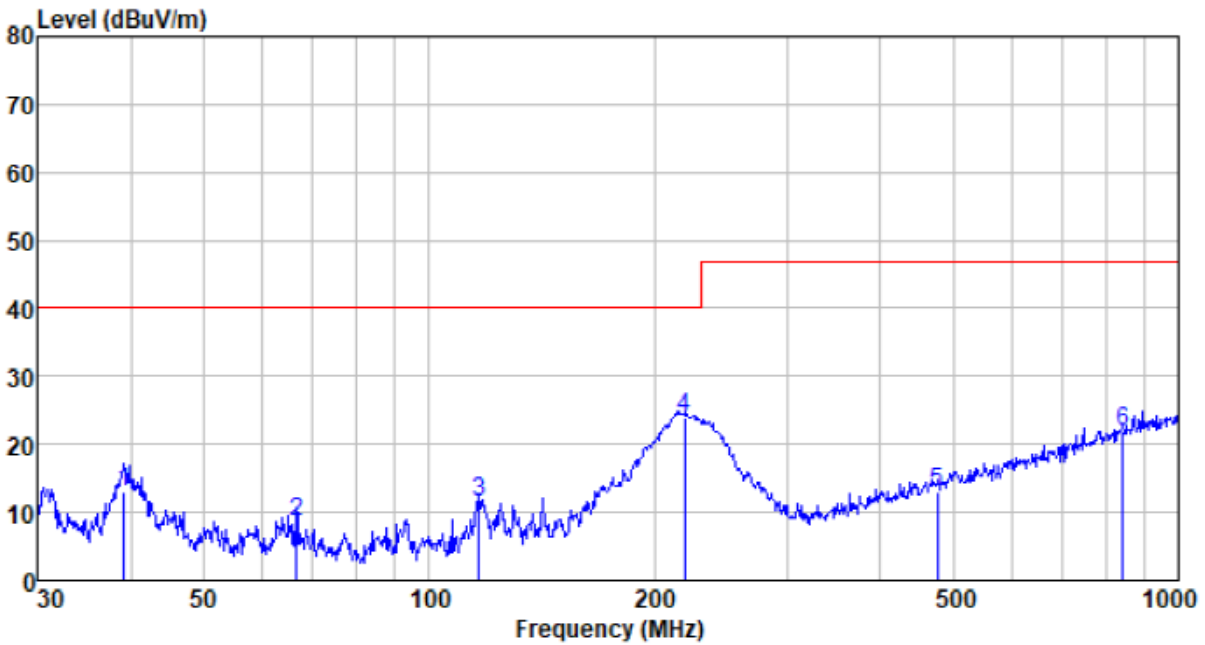
TRACE	FREQUENCY	LEVEL dBμA	DELTA LIMIT dB
1 Quasi Peak	5.31 MHz	-0.80	-22.80
1 Quasi Peak	24.71 MHz	-10.76	-32.76

## 7.2 Radiated electromagnetic disturbances(30MHz-1000MHz)

Test Requirement:	EN IEC 55015					
Test Method:	EN IEC 55015					
Test Frequency Range:	30MHz to 1000MHz					
Test site:	Measurement Distance: 3m					
Limit:	Frequency range(MHz)			Limit @3m (dBuV)		
	30 to 230			40.00		
	230 to 1000			47.00		
	* At the transition frequency, the lower limit applies.					
Test setup:						
Test procedure	<ol style="list-style-type: none"> <li>1. The radiated emissions test was conducted in a semi-anechoic chamber.</li> <li>2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.</li> <li>3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.</li> <li>4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.</li> </ol>					
Test Instruments:	Temp.:	25 °C	Humid.:	50%	Press.:	1 012mbar
Measurement Record:	Uncertainty: 3.8039dB (30MHz-200MHz) 3.9679dB (200MHz-1GHz)					
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.2 for details only show the worst case.					
Test results:	Pass					

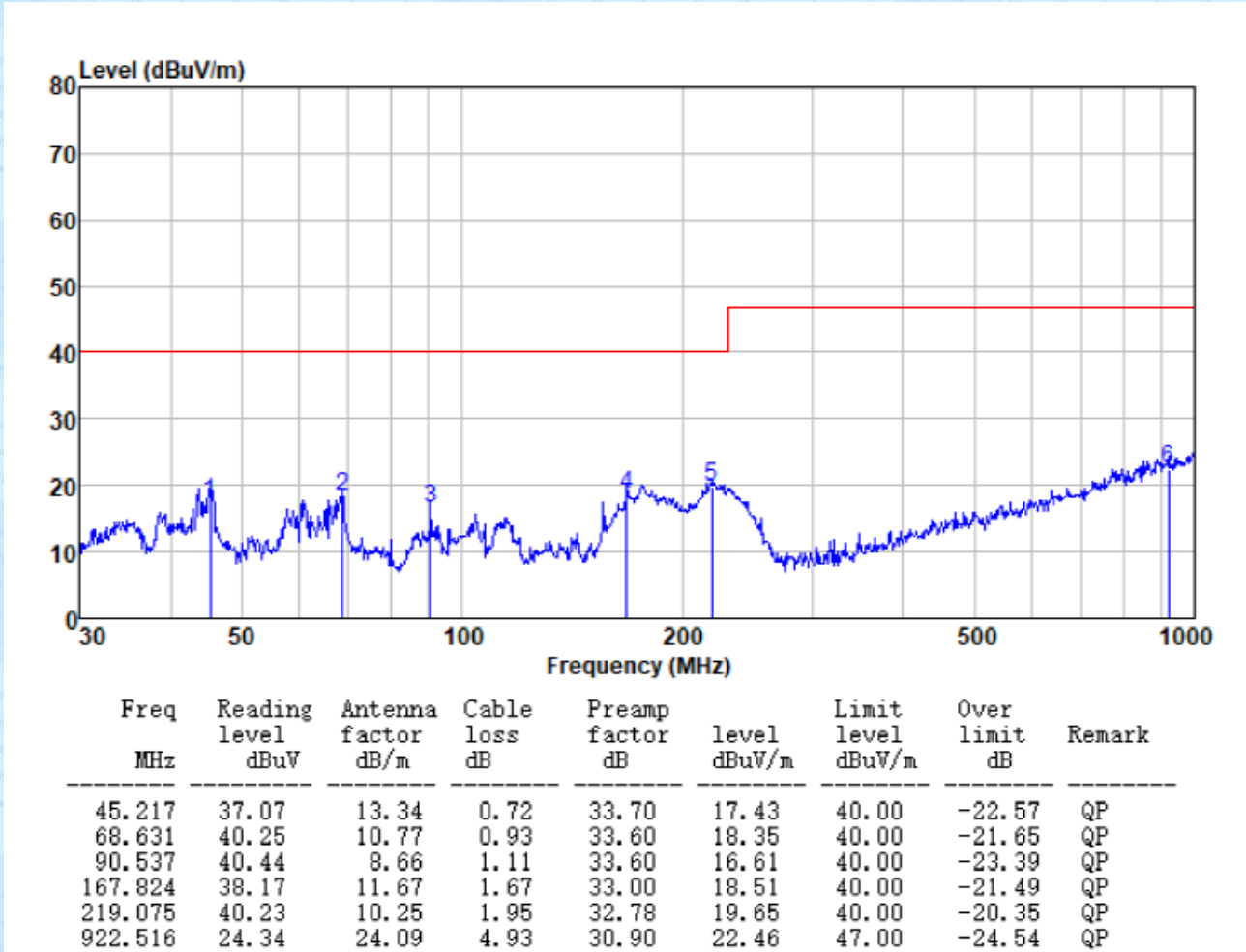
### Measurement Data

Test mode:	Charge mode	Antenna Polarity:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
39.162	32.76	13.37	0.65	33.74	13.04	40.00	-26.96	QP
66.499	30.08	11.20	0.91	33.61	8.58	40.00	-31.42	QP
116.540	32.53	10.96	1.33	33.42	11.40	40.00	-28.60	QP
219.075	44.40	10.25	1.95	32.78	23.82	40.00	-16.18	QP
477.169	24.53	17.20	3.21	32.06	12.88	47.00	-34.12	QP
842.130	25.18	23.22	4.63	31.13	21.90	47.00	-25.10	QP

Test mode:	Charge mode	Antenna Polarity:	Vertical
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**Note:**

The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:

$$1. \text{ Final Level} = \text{Receiver Read level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-amplifier Factor}$$

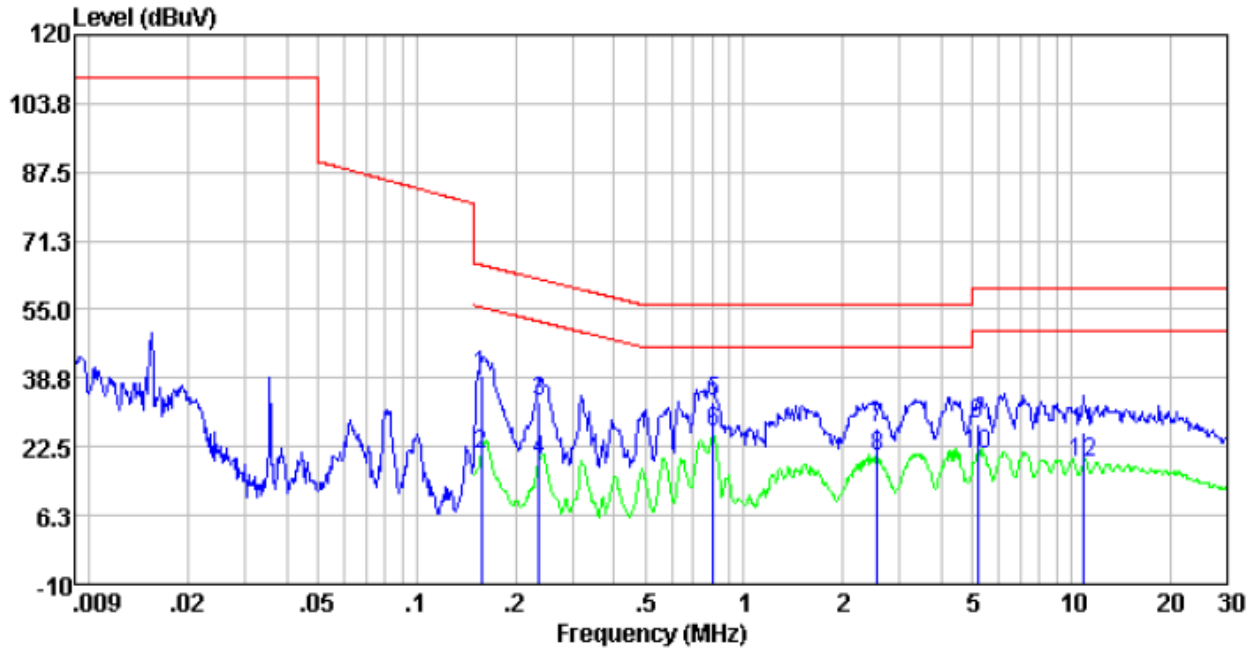


### 7.3 Disturbance voltages

Test Requirement:	EN IEC 55015					
Test Method:	EN IEC 55015					
Test Frequency Range:	9kHz to 30MHz					
Receiver setup:	Frequency range	RBW		VBW		
	9KHz~150KHz	200Hz		600Hz		
	150KHz~30MHz	9KHz		30KHz		
Limit:	Frequency range (MHz)	Limit (dBuV)				
		Quasi-peak		Average		
	0.009-0.05	110		-		
	0.05-0.15	90-80*		-		
	0.15-0.5	66 to 56*		56 to 46*		
	0.5-5	56		46		
5-30	60		50			
* Decreases with the logarithm of the frequency.						
Test setup:	<p><i>Remark:</i>  E.U.T.: Equipment Under Test  LISN: Line Impedance Stabilization Network  Test table height=0.8m</p>					
Test procedure	<ol style="list-style-type: none"> <li>The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs).</li> <li>Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN IEC 55015 Class B on conducted measurement.</li> </ol>					
Test Instruments:	Temp.:	25 °C	Humid.:	50%	Press.:	1 012mbar
Measurement Record:	Uncertainty: 3.44dB					
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.2 for details only show the worst case.					
Test results:	Pass					

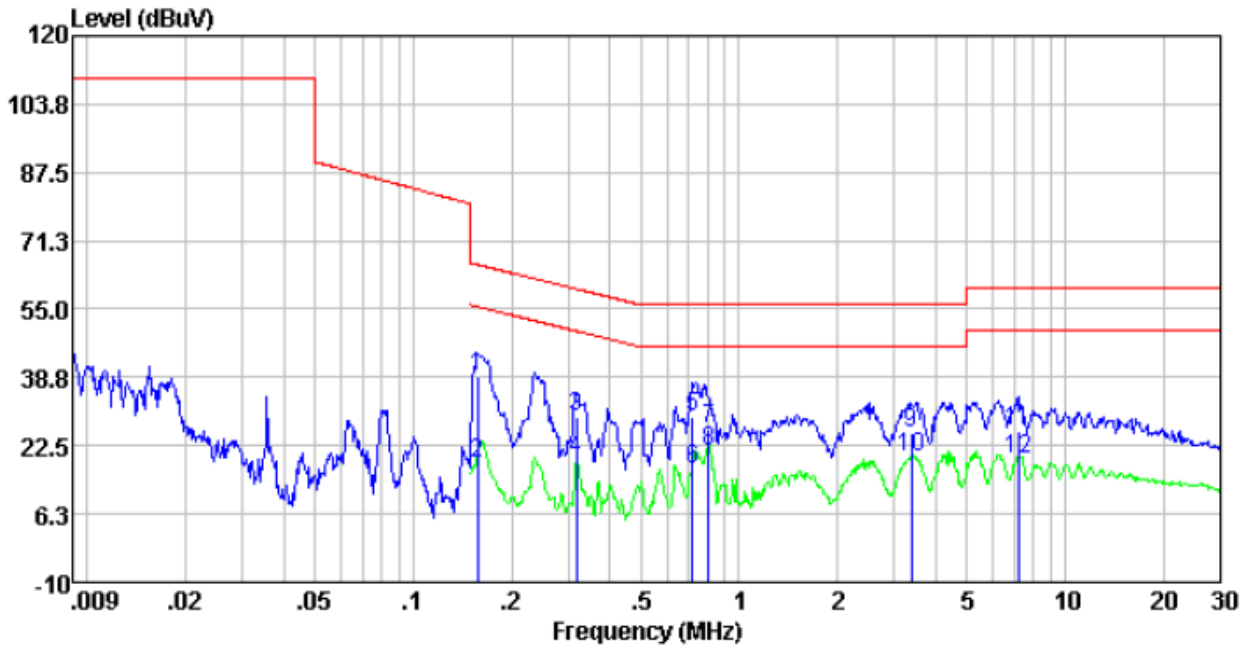
#### Measurement Data

Test mode:	Charge mode	Antenna Polarity:	Line
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Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	29.84	9.55	0.01	39.40	65.60	-26.20	QP
0.16	11.34	9.55	0.01	20.90	55.60	-34.70	Average
0.24	23.73	9.51	0.01	33.25	62.22	-28.97	QP
0.24	9.92	9.51	0.01	19.44	52.22	-32.78	Average
0.80	23.77	9.50	0.02	33.29	56.00	-22.71	QP
0.80	16.34	9.50	0.02	25.86	46.00	-20.14	Average
2.55	17.21	9.56	0.05	26.82	56.00	-29.18	QP
2.55	10.71	9.56	0.05	20.32	46.00	-25.68	Average
5.17	18.56	9.47	0.07	28.10	60.00	-31.90	QP
5.17	10.99	9.47	0.07	20.53	50.00	-29.47	Average
10.90	16.33	9.37	0.12	25.82	60.00	-34.18	QP
10.90	9.12	9.37	0.12	18.61	50.00	-31.39	Average

Test mode:	Charge mode	Antenna Polarity:	Neutral
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Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	29.38	9.55	0.01	38.94	65.60	-26.66	QP
0.16	8.90	9.55	0.01	18.46	55.60	-37.14	Average
0.32	19.56	9.56	0.01	29.13	59.80	-30.67	QP
0.32	9.89	9.56	0.01	19.46	49.80	-30.34	Average
0.72	19.79	9.56	0.02	29.37	56.00	-26.63	QP
0.72	7.30	9.56	0.02	16.88	46.00	-29.12	Average
0.80	17.02	9.56	0.02	26.60	56.00	-29.40	QP
0.80	11.80	9.56	0.02	21.38	46.00	-24.62	Average
3.36	15.86	9.56	0.05	25.47	56.00	-30.53	QP
3.36	9.95	9.56	0.05	19.56	46.00	-26.44	Average
7.18	16.13	9.53	0.09	25.75	60.00	-34.25	QP
7.18	9.76	9.53	0.09	19.38	50.00	-30.62	Average

Notes:

1. An initial pre-scan was performed on the live and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

## 7.4 Harmonics Test Results

Test Requirement:	EN IEC 61000-3-2
Test Method:	N/A: See Remark Below
Remark	There is no need for Harmonics test to be performed on this product (the lighting equipment with a active power less than 5W, other than discharge lighting equipment.) in accordance with the section 7.3 of EN IEC 61000-3-2.

## 7.5 Flicker Test Result

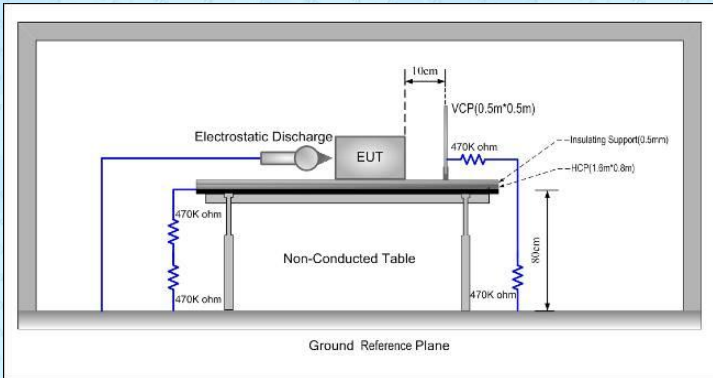
Test Requirement:	EN 61000-3-3
Test Method:	N/A: See Remark Below
Remark	There is no need for Flicker test to be performed on this product (rated power is less than 600W) in accordance with EN 61000-3-3.  Limits are not specified when LED luminaires with rating less than or equal to 600W (EN 61000-3-3:2013+A2:2021, AnnexA (A.2)).

## 8 Immunity Test Results

### 8.1 Performance Criteria Description in Clause 4.2 of EN IEC 61547

Criterion A:	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:	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:	During and after the test any change of the luminous intensity is allowed and the lamp(s) 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.

## 8.2 Electrostatic Discharge

Test Requirement:	EN IEC 61547
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$ , $\pm 4\text{kV}$ , $\pm 8\text{kV}$ HCP/VCP: $\pm 4\text{kV}$
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> <li><b>Air discharge:</b> The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed</li> <li><b>Contact Discharge:</b> The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated.</li> <li><b>Indirect discharge for horizontal coupling plane</b> At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. Consideration should be given to exposing all sides of the EUT.</li> <li><b>Indirect discharge for vertical coupling plane</b> At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X</li> </ol>

	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.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details only show the worst case.
Test results:	Pass

Measurement Record:

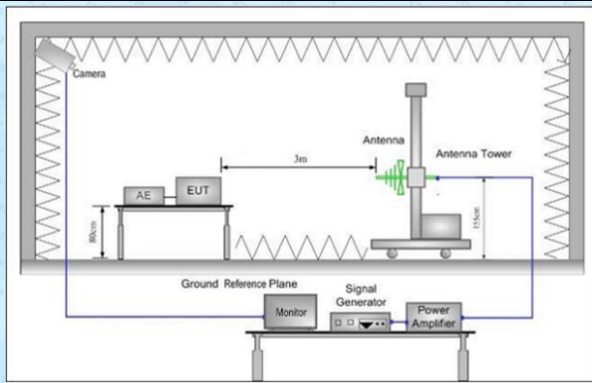
Test points:	I: Metal interface			
	II: Plastic parts			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations (Performance Criterion)	Result
± 4	Contact	I	B	Pass
± 2, ± 4, ± 8	Air	II	B	Pass
Indirect discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observation Performance	Result
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remark:

Performance Criteria: A, B, C: Refer to section 8.1 for details

N/A: Not applicable

## 8.3 Radio-frequency electromagnetic fields

Test Requirement:	EN IEC 61547
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 1GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> <li>1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.</li> <li>2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length.</li> <li>3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area).</li> <li>4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value.</li> <li>5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s.</li> <li>6. The test normally was performed with the generating antenna facing each side of the EUT.</li> <li>7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.</li> <li>8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to</li> </ol>



	monitor the performance of the EUT.
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details only show the worst case.
Test results:	Pass

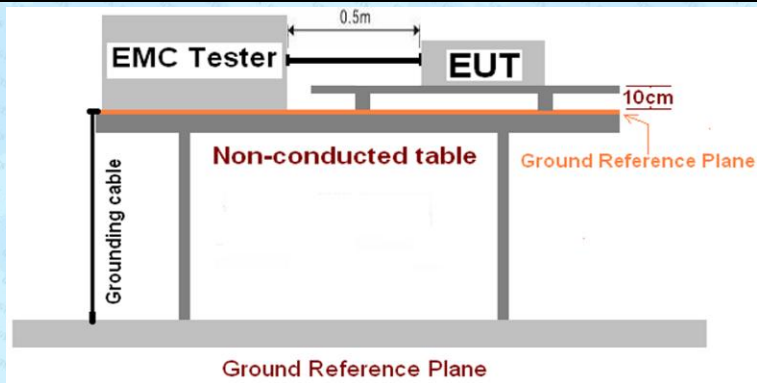
**Measurement Record:**

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-1 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3seconds	V	Front	A
			H		A
			V	Rear	A
			H		A
			V	Left	A
			H		A
			V	Right	A
			H		A
			V	Top	A
			H		A
			V	Bottom	A
			H		A

Remark:

Performance Criteria: A, B, C: Refer to section 8.1 for details

## 8.4 Fast Transients

Test Requirement:	EN IEC 61547
Test Method:	EN 61000-4-4
Test Level:	1.0kV on AC port
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	2 minute per level & polarity
Performance Criterion:	B
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> <li>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.</li> <li>2. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness.</li> <li>3. 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.</li> <li>4. The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal.</li> <li>5. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes.</li> <li>6. The length of the signal and power lines between the coupling device and the EUT is 0.5m</li> </ol>

Test environment:	Temp.: 26 °C	Humid.: 54%	Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.2 for details		
Test results:	Pass		

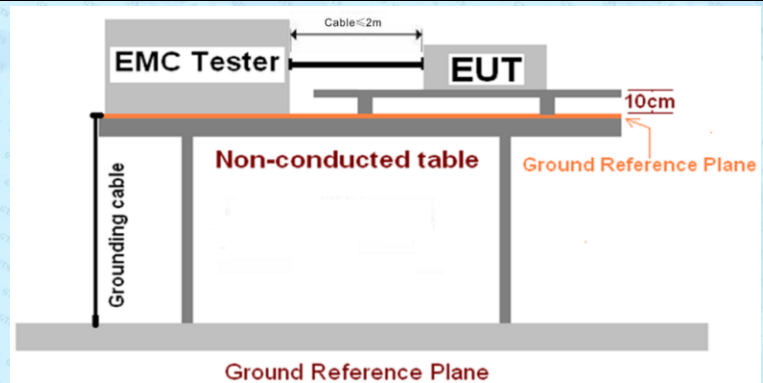
**Measurement Record:**

Lead under Test	Level ( $\pm$ kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	$\pm 1.0$	Direct	A	Pass
N	$\pm 1.0$	Direct	A	Pass
L-N	$\pm 1.0$	Direct	A	Pass

**Remark:**

Performance Criteria: A, B, C: Refer to section 8.1 for details

## 8.5 Surges

Test Requirement:	EN IEC 61547		
Test Method:	EN 61000-4-5		
Test Level:	Characteristics	Test Levels	
		Self-ballasted lamps	Lighting equipment (except selfballasted lamps $\leq 25$ W)
	Line to line	$\leq 25$ W	$> 25$ W
	Line to ground	$\pm 0.5$ kV	$\pm 1.0$ kV
			$\pm 2.0$ kV
NOTE In addition to the specified test level, all lower test levels as detailed in IEC 61000-4-5 should also be satisfied.			
Polarity:	Positive & Negative		
Generator source impedance:	2 $\Omega$ (line-line coupling) 12 $\Omega$ (line-earth coupling)		
No. of surges:	5 positive at 90°, 5 negative at 270°		
Performance Criterion:	Criterion C		
Test setup:			
Test procedure	<ol style="list-style-type: none"> <li>For line-to-line coupling mode, provide a 1.2/50<math>\mu</math>s voltage surge (at open-circuit condition) and 8/20<math>\mu</math>s current surge to EUT selected points, and for active line / neutral lines to ground.</li> <li>At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.</li> <li>Different phase angles are done individually.</li> <li>Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.</li> </ol>		
Test environment:	Temp.:	26 °C	Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.2 for details		
Test results:	Pass		

**Measurement Record:**

Location	Level(kV)	Pulse No	Surge Interval	Phase(deg)	Observations (Performance Criterion)	Result
L-N	+1.0	5	60s	90°	A	Pass
	-1.0			270°		

**Remark:**

Performance Criteria: A, B, C: Refer to section 8.1 for details

## 8.6 Injected Currents

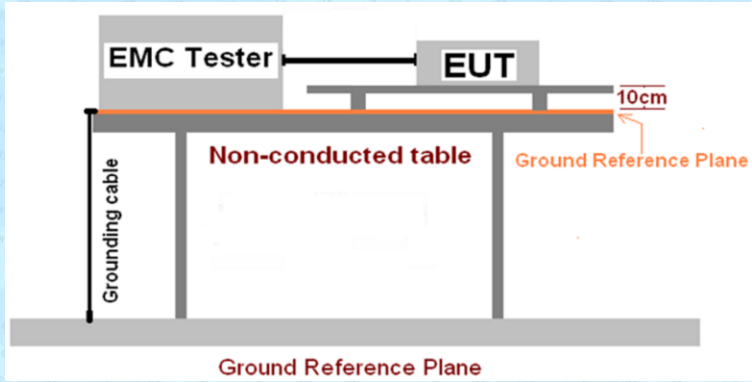
Test Requirement:	EN IEC 61547
Test Method:	EN 61000-4-6
Frequency range:	0.15MHz to 80MHz
Test Level:	3V rms on AC Ports (unmodulated emf into 150 Ω)
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> <li>The EUT 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).</li> <li>The disturbance signal described below is injected to EUT through CDN.</li> <li>The EUT operates within its operational mode(s) under intended climatic conditions after power on.</li> <li>Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.</li> </ol>
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Record:

Frequency	Injected Position	Level	Modulation	Observations (Performance Criterion)	Result
150kHz to 80MHz	AC Mains	3Vrms	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=2seconds	A	Pass

Remark: Performance Criteria: A, B, C: Refer to section 8.1 for details

## 8.7 Voltage Dips and Voltage Interruptions

Test Requirement:	EN IEC 61547
Test Method:	EN 61000-4-11
Test Level:	0% of $U_T$ (Supply Voltage) for 0.5 Periods 70 % of $U_T$ (Supply Voltage) for 10 Periods
No. of Dips / Interruptions:	3 per Level
Performance Criterion:	100% VD ----Performance criterion: B 30% VD ----Performance criterion: C
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> <li>The EUT and test generator were setup as shown on above setup photo.</li> <li>The interruptions are introduced at selected phase angles with specified duration.</li> <li>Record any degradation of performance.</li> </ol>
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Record:

Test Level % $U_T$	Duration (Periods)	Phase angle	No. of drop out	Time between dropout	Observations (Performance Criterion)	Result
0	0.5	0°,180°	3	10s	A	Pass
70	10	0°,180°	3	10s	B	Pass

Remark:

Performance Criteria: A, B, C: Refer to section 8.1 for details

## 9 Test Setup Photo

Radiated Emission



Radiated Electromagnetic Disturbance





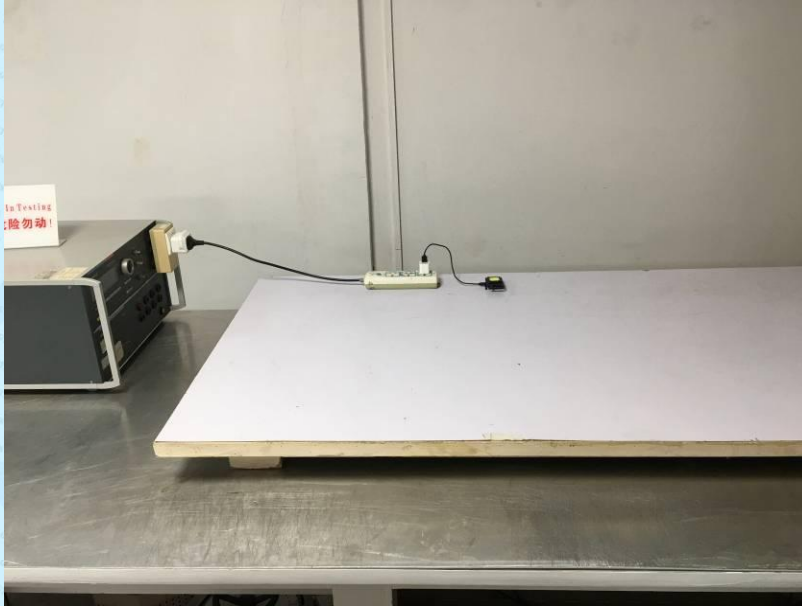
## Disturbance voltages



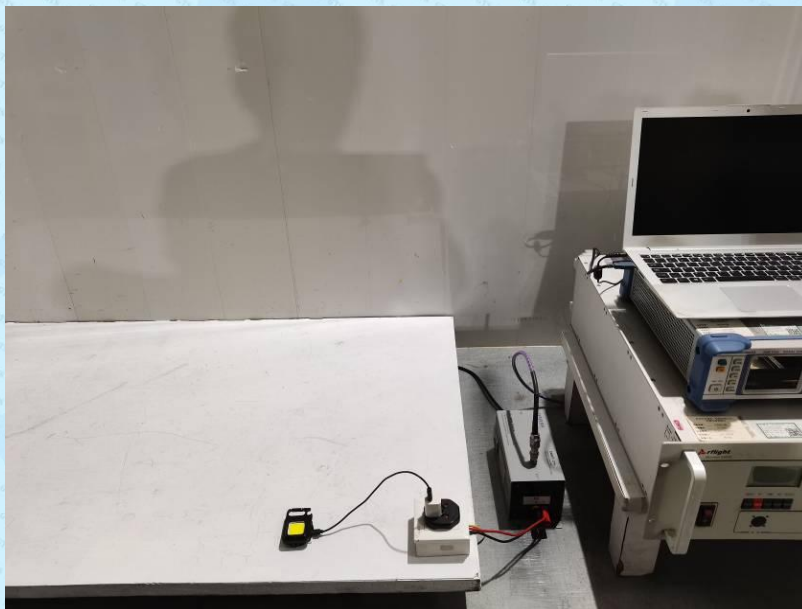
## Electrostatic discharge



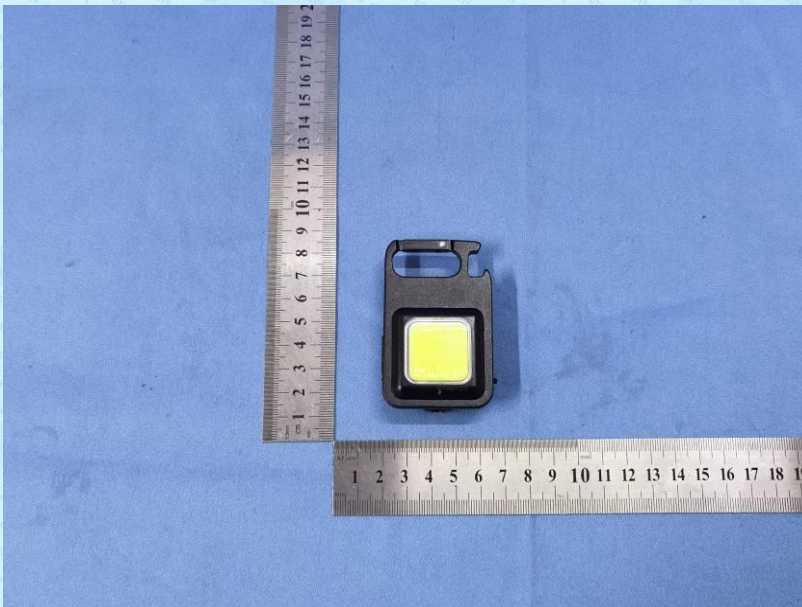
## EFT/Surge/V-Dips

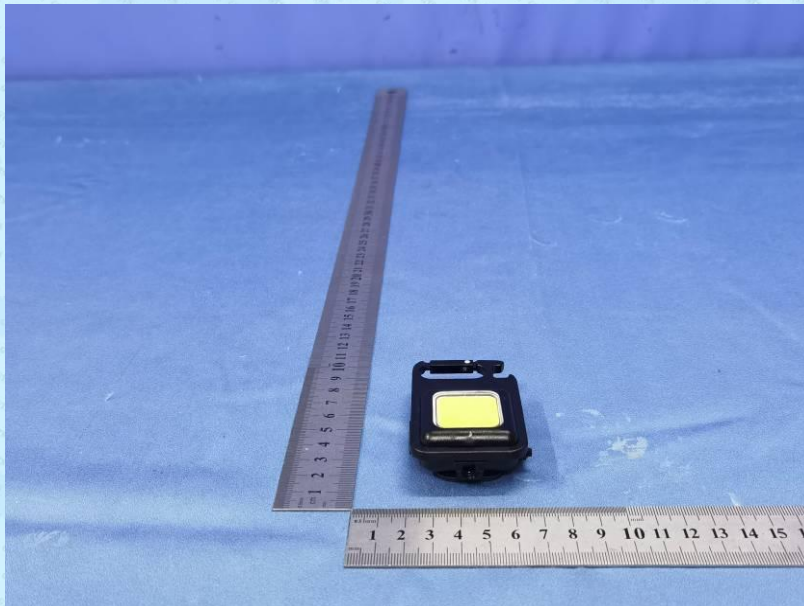


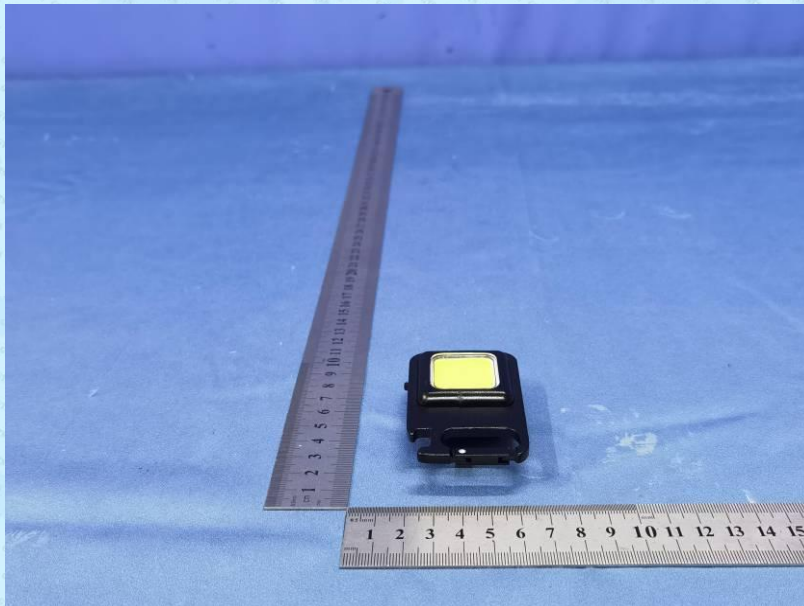
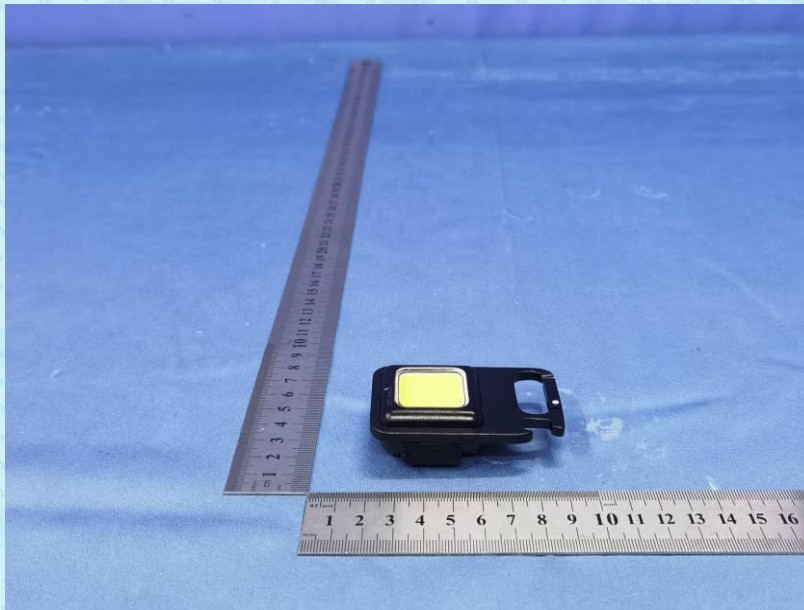
## CS

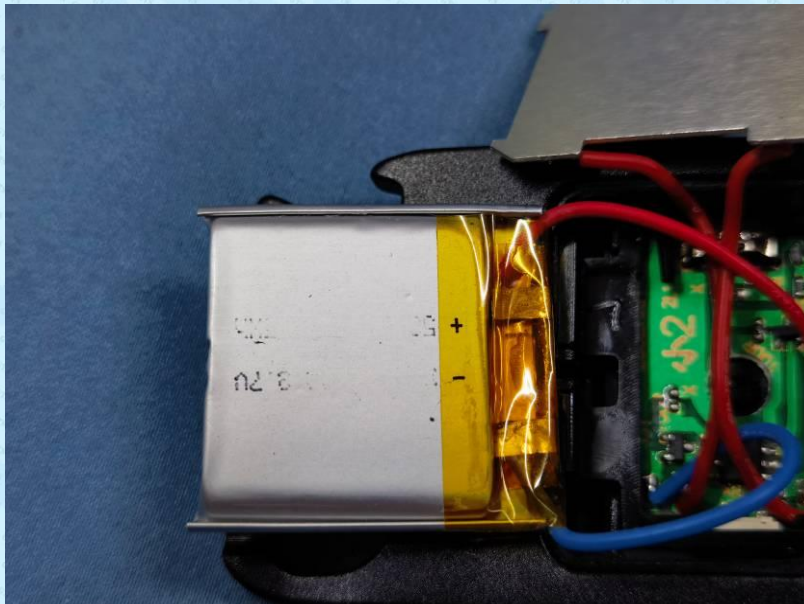
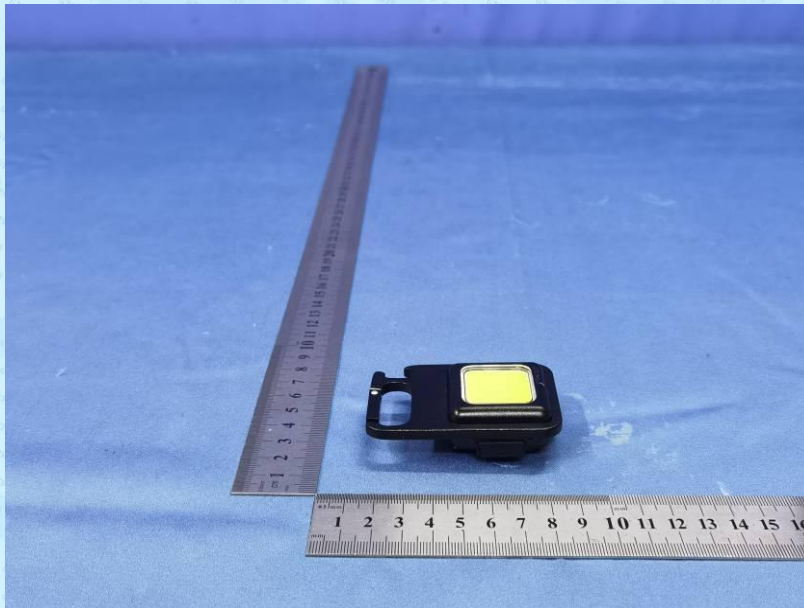


## 10 EUT Constructional Details









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