



中国认可
国际互认
检测
TESTING
CNAS L3110



TEST REPORT

Reference No..... : WTF18F08121600E
 Applicant..... : Mid Ocean Brands B.V.
 Address..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon,
 Hong Kong
 Manufacturer : 114276
 Product Name..... : Small COB light
 Model No..... : MO8996
 Standards : EN 55015:2013+A1:2015
 EN 61547:2009
 Date of Receipt sample : 2018-08-20
 Date of Test : 2018-08-21 to 2018-08-27
 Date of Issue..... : 2018-08-28
 Test Report Form No. : WEL-55015A-01A
 Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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1 Test Summary

EMISSION				
Test Item	Test Standard	Class / Severity	Result	
Mains Terminal Disturbance Voltage, 9kHz to 30MHz	EN 55015:2013+A1:2015	Clause 4.3.1	N/A	
Radiated electromagnetic disturbance, 9kHz to 30MHz	EN 55015:2013+A1:2015	Clause 4.4.1	Pass	
Radiated Emission, 30MHz to 300MHz	EN 55015:2013+A1:2015	Clause 4.4.2	Pass	
IMMUNITY (EN 61547: 2009)				
Test Item	Test Method	Class / Severity	Performance Criteria	Result
Electrostatic Discharge(ESD)	IEC 61000-4-2:2008	±4 kV Contact ±8 kV Air	B	Pass
Radio-frequency electromagnetic fields (80MHz to 1GHz)	IEC 61000-4-3:2010	3V/m, 80%, 1kHz, Amp. Mod.	A	Pass
Electrical Fast Transients (EFT)	IEC 61000-4-4:2012	AC ±1.0kV DC ±0.5kV	B	N/A
Surge	IEC 61000-4-5:2005	±1kV D.M.† ±2kV C.M.‡	C	N/A
Injected Currents, 0.15MHz to 80MHz	IEC 61000-4-6:2013	3Vr.m.s.(emf), 80%, 1kHz Amp. Mod.	A	N/A
Power-frequency magnetic field	IEC 61000-4-8:2009	3A/m	A	N/A
Voltage Dips and Interruptions	IEC 61000-4-11:2004	0 % UT* for 0.5per	B	N/A
		70 % UT* for 10per	C	N/A

Remark:

Pass	Test item meets the requirement
Fail	Test item does not meet the requirement
N/A	Test case does not apply to the test object
A.M	Amplitude Modulation
†	Differential Mode
‡	Common Mode
*	U _T is the nominal supply voltage



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3 General Information

3.1 General Description of E.U.T.

Product Name : Small COB light

Model No. : MO8996

Remark : ---

3.2 Details of E.U.T.

Technical Data..... : Battery 6V

3.3 Description of Support Units

The EUT has been tested as an independent unit. MO8996 is the test sample. All tests were performed in the condition of Battery 6V Sinput.

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

EN 55015:2013+A1:2015 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

EN 61547:2009 Equipment for general lighting purposes — EMC immunity requirements

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3.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

Yes No

If Yes, list the related test items and lab information:

Test items: ---

Lab information: ---

3.6 Abnormalities from Standard Conditions

None.



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4 Equipment Used during Test

Radiated electromagnetic disturbance(9kHz to 30MHz)					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESCI	101155	Valid
2.	LARGE LOOP ANTENNA	Laplace	RF300	9057	Valid
3.	Cable	LARGE	RF300	-	Valid
3m Semi-anechoic Chamber for Radiation					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESCI	101296	Valid
2.	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Valid
3.	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Valid
4.	Cable	HUBER+SUHNER	CBL2	525178	Valid
ESD					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	Electrostatic Discharge Simulator	Em Test	DITO	V0745103094	Valid
Radio-frequency electromagnetic fields					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	Signal Generater	R&S	SMB100A	105942	Valid
2.	RF Power Amplifier	BONN Elektronik	BLWA0830-160/100/40D	128740	Valid
3.	Gestockte Breitband (S tacked) Log.-per.Antenna	SCHWARZBECK	STLP9128D	043	Valid
4.	Power Meter	R&S	NRP2	102031	Valid

4.1 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Radiated electromagnetic disturbance	9kHz to 30MHz	±3.00dB	(1)
Radiated Emission	30MHz~300MHz	±5.03dB	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



5 Emission Test Results

5.1 Radiated Electromagnetic Disturbance, 9kHz to 30MHz

Test Requirement..... : EN 55015 Clause 4.4.1

Test Method..... : EN 55015 Clause 9.1

Test Result..... : Pass

Frequency Range..... : 9kHz to 30MHz

Class/Severity..... : Table 3a of EN55015

5.1.1 E.U.T. Operation

Operating Environment:

Temperature..... : 24.8°C

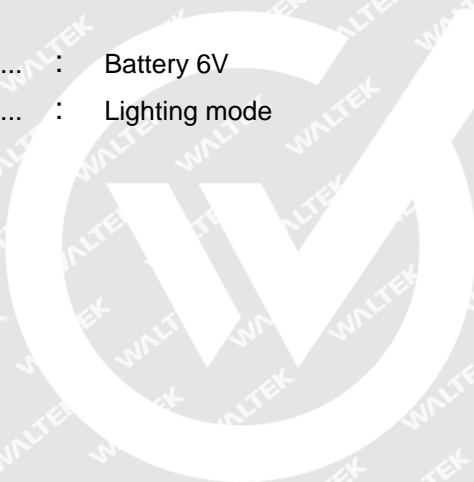
Humidity..... : 49.3%RH

Barometric Pressure..... : 101.2kPa

EUT Operation:

Input Voltage..... : Battery 6V

Operating Mode..... : Lighting mode

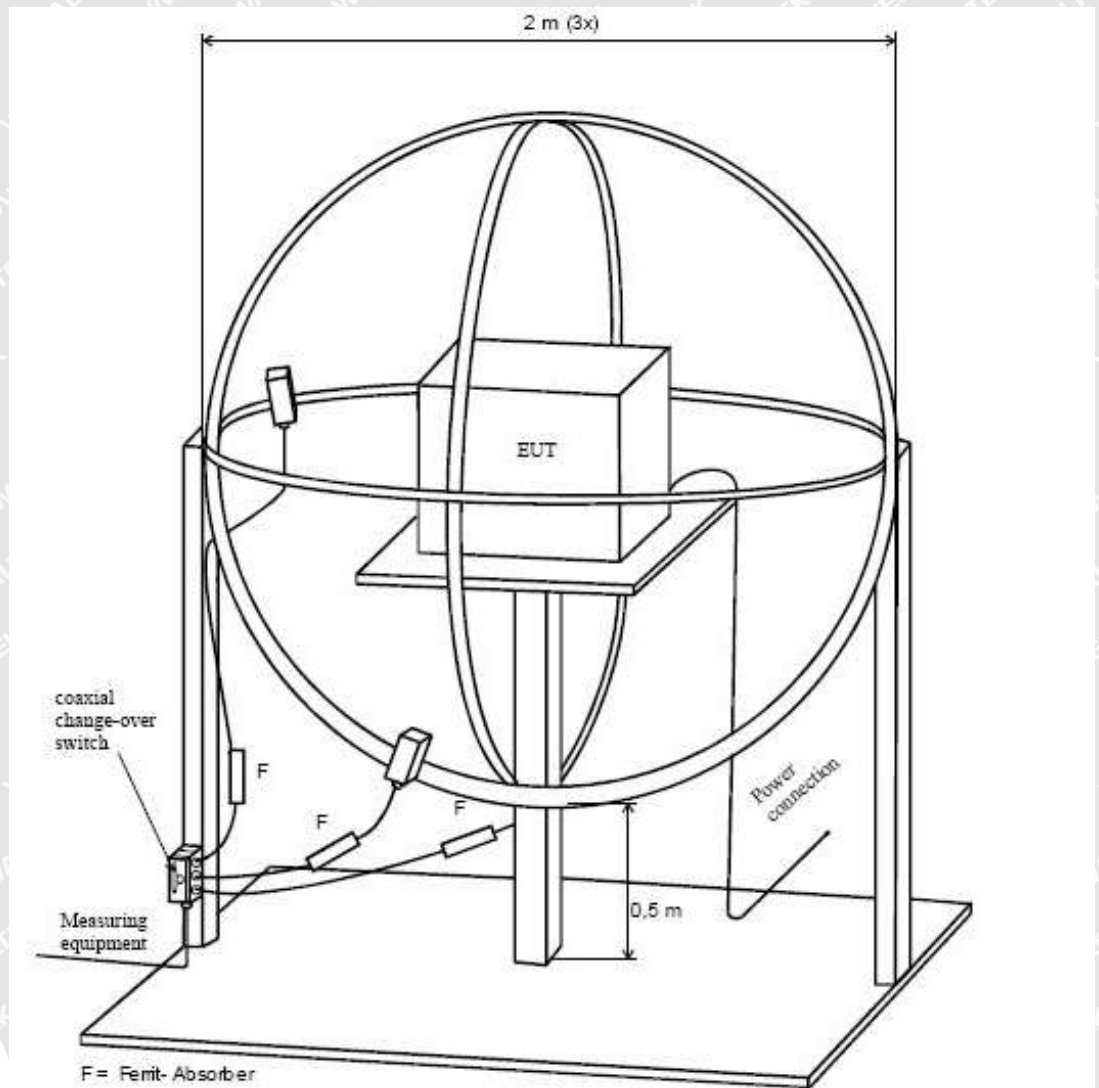


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5.1.2 Block Diagram of Test Setup

The Radiated Electromagnetic Disturbance (9kHz to 30MHz) test was performed in accordance with the EN 55015.



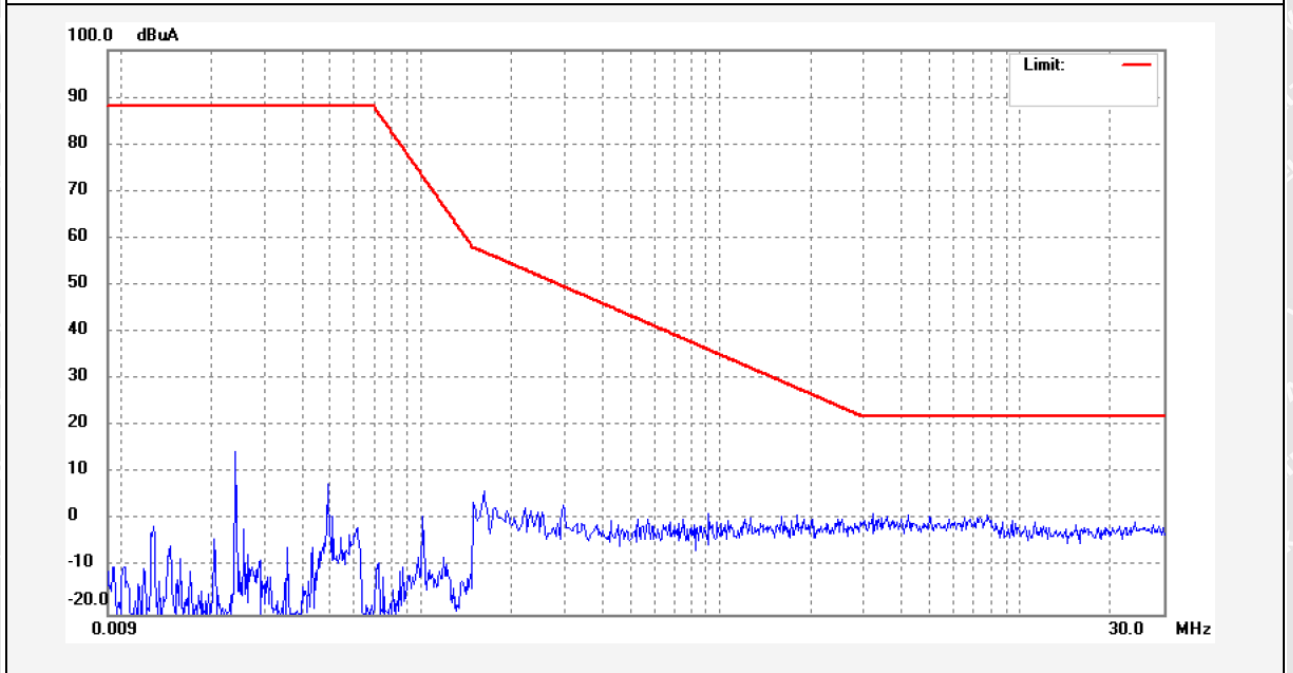
5.1.3 Measurement Data

According to the data in section 5.2.4, the EUT complied with the EN55015 standards.



5.1.4 Radiated Electromagnetic Disturbance test data, 9kHz to 30MHz

Loop X:

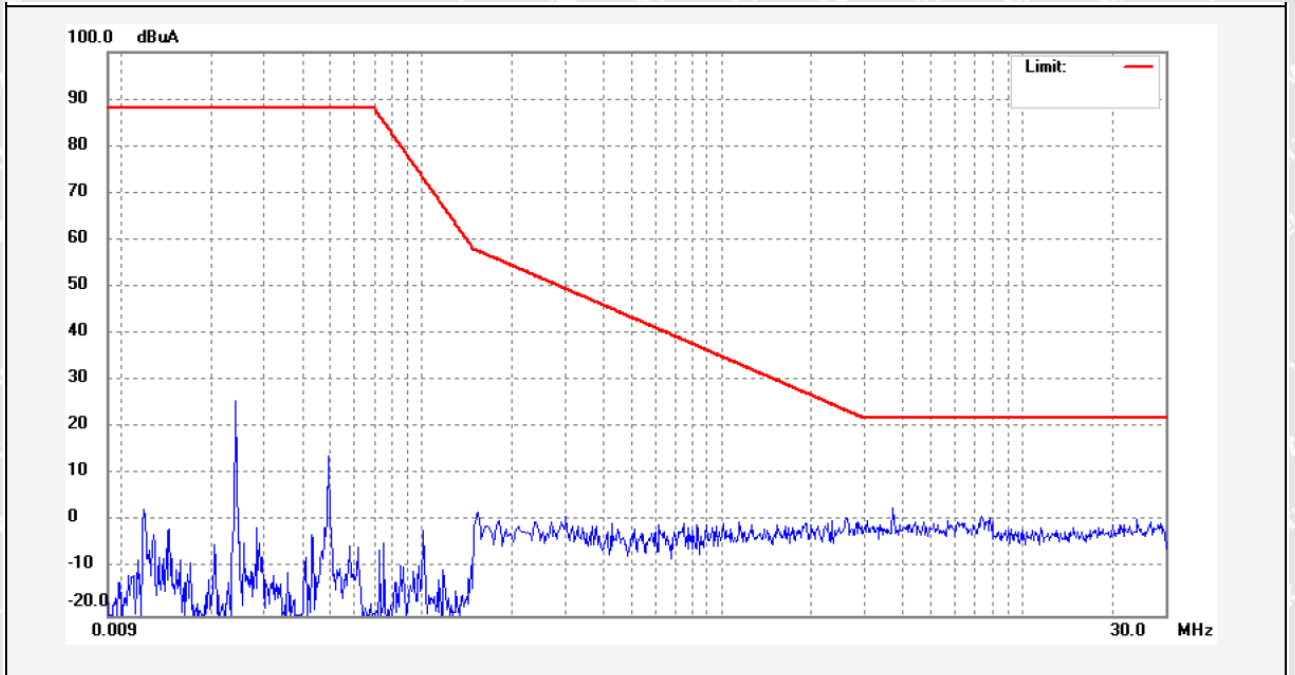


No.	Freq. (MHz)	Reading (dBuA)	Factor (())	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
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Loop Y:

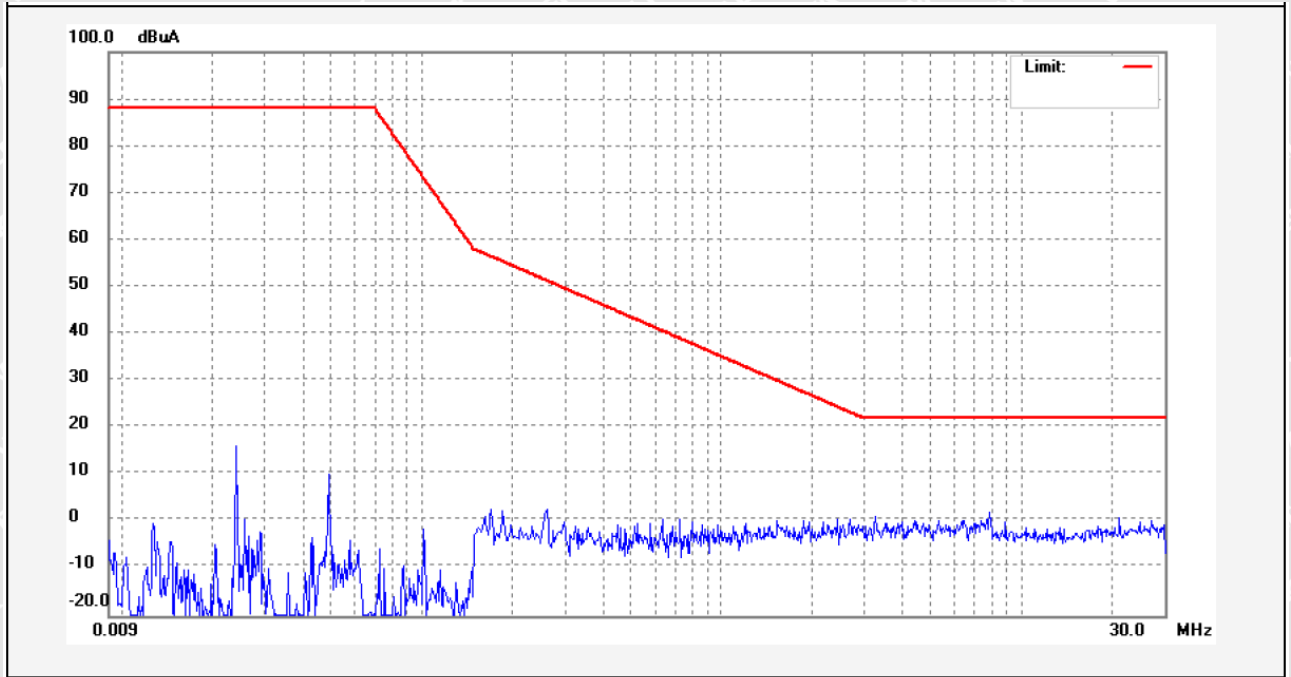


No.	Freq. (MHz)	Reading (dBuA)	Factor (())	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
-----	-------------	----------------	-------------	---------------	--------------	-------------	----------	--------





Loop Z:



No.	Freq. (MHz)	Reading (dBuA)	Factor (())	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
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5.2 Radiated Emission, 30MHz to 300MHz

Test Requirement.....	: EN 55015 Clause 4.4.2
Test Method.....	: Clause 10 of CISPR 22
Test Result.....	: Pass
Frequency Range.....	: 30MHz to 300MHz
Class/Severity.....	: Table 3b of EN55015

5.2.1 E.U.T. Operation

Operating Environment:

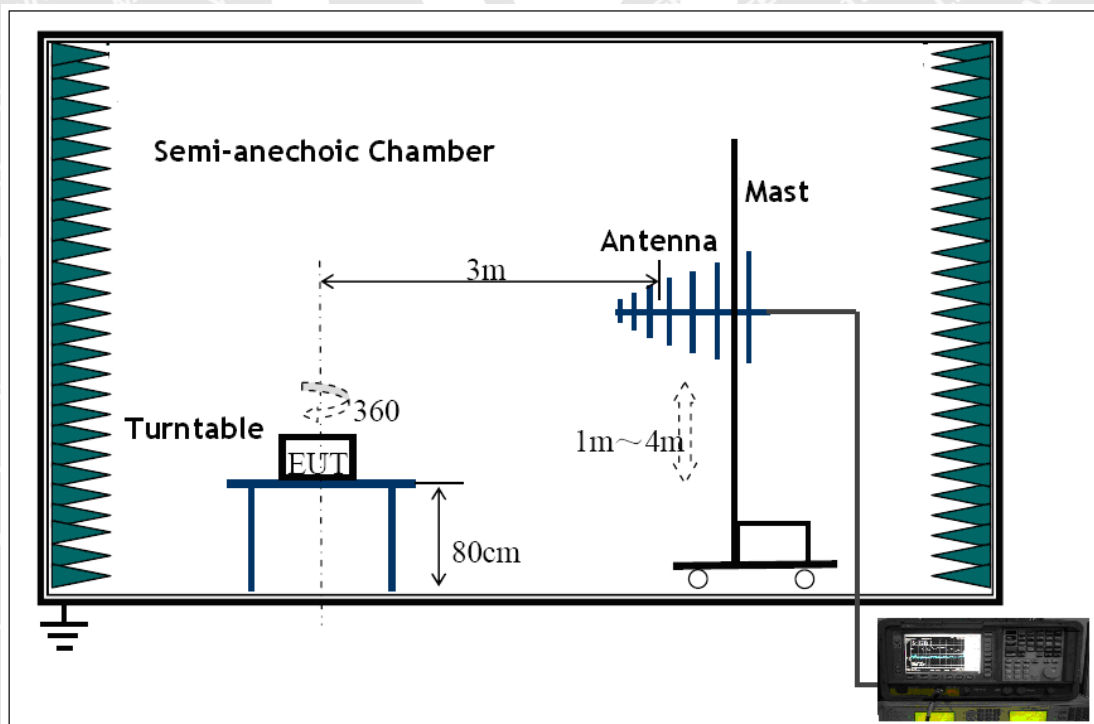
Temperature.....	: 23.6°C
Humidity.....	: 46.4%RH
Atmospheric Pressure	: 101.2kPa

EUT Operation :

Input Voltage.....	: Battery 6V
Operating Mode.....	: Lighting mode

5.2.2 Block Diagram of Setup

The Radiated Emission test was performed in the 3m Semi- Anechoic Chamber test site and accordance with CISPR16-2-3.



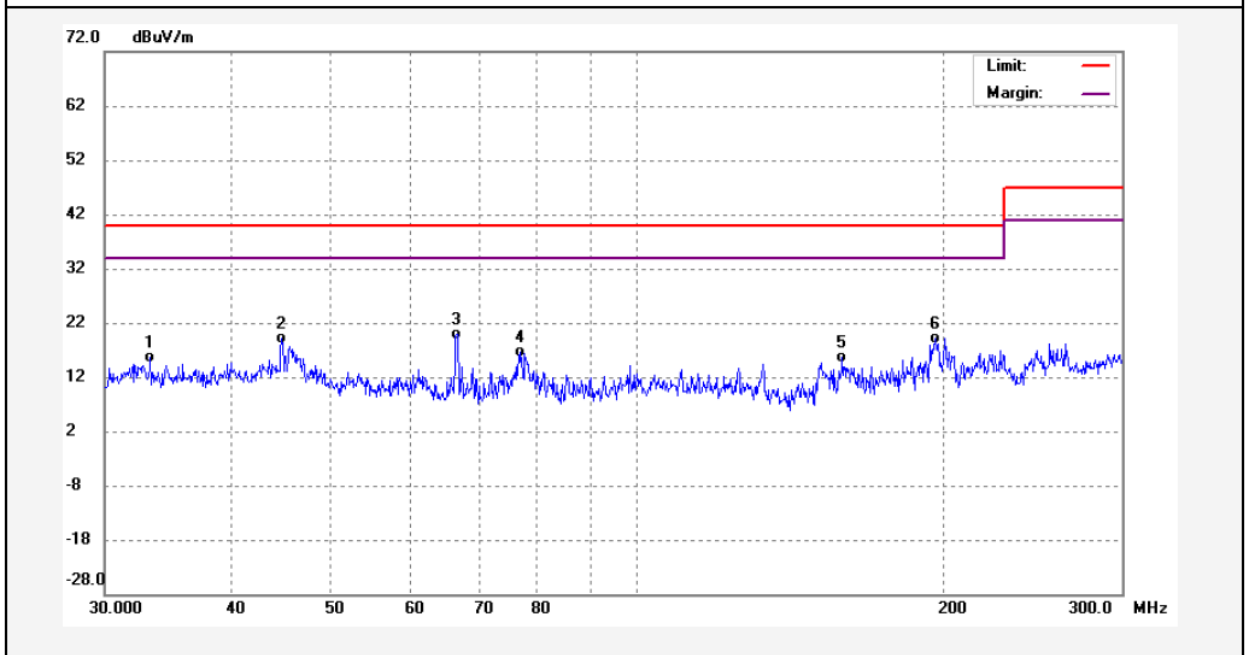


5.2.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for Horizontal & Vertical polarisation. Quasi-peak measurements were performed if peak emissions were within 6dB of the limit line.

5.2.4 Radiated Emission Test Data

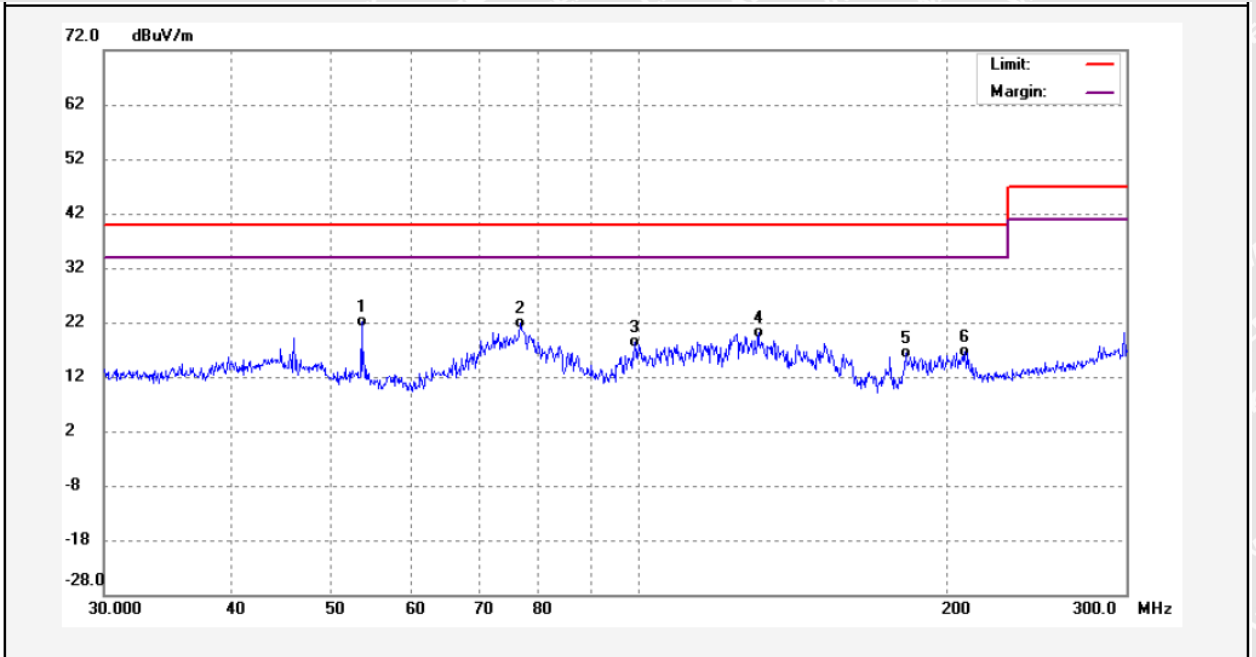
Vertical Polarization:



No.	Freq. (MHz)	Reading (dBuV)	Factor ((dB/m))	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	33.2752	2.33	13.25	15.58	40.00	-24.42	QP	
2	44.7838	3.36	15.85	19.21	40.00	-20.79	QP	
3	66.5459	9.68	10.18	19.86	40.00	-20.14	QP	
4	76.7576	8.36	8.32	16.68	40.00	-23.32	QP	
5	159.2652	6.95	8.57	15.52	40.00	-24.48	QP	
6	196.3909	7.54	11.54	19.08	40.00	-20.92	QP	



Horizontal Polarization :



No.	Freq. (MHz)	Reading (dBuV)	Factor ((dB/m))	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	53.5946	9.00	13.21	22.21	40.00	-17.79	QP	
2	76.5810	13.63	8.37	22.00	40.00	-18.00	QP	
3	99.1109	6.93	11.36	18.29	40.00	-21.71	QP	
4	130.9546	9.90	10.35	20.25	40.00	-19.75	QP	
5	182.4405	6.13	10.13	16.26	40.00	-23.74	QP	
6	208.5073	5.39	11.19	16.58	40.00	-23.42	QP	





6 Immunity Test Results

6.1 Performance Criteria

Performance 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.

Performance 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.

Performance 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.

6.2 Electrostatic Discharge (ESD)

Test Requirement	:	EN 61547
Test Method	:	IEC 61000-4-2
Test Result	:	Pass
Discharge Impedance	:	330Ω / 150pF
Discharge Voltage	:	Air Discharge: ±8kV Contact Discharge: ±4kV HCP & VCP: ±4kV
Polarity	:	Positive & Negative
Number of Discharge	:	Minimum 10 times at each test point
Discharge Mode	:	Single Discharge
Discharge Period	:	1 second minimum

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6.2.1 E.U.T. Operation

Operating Environment:

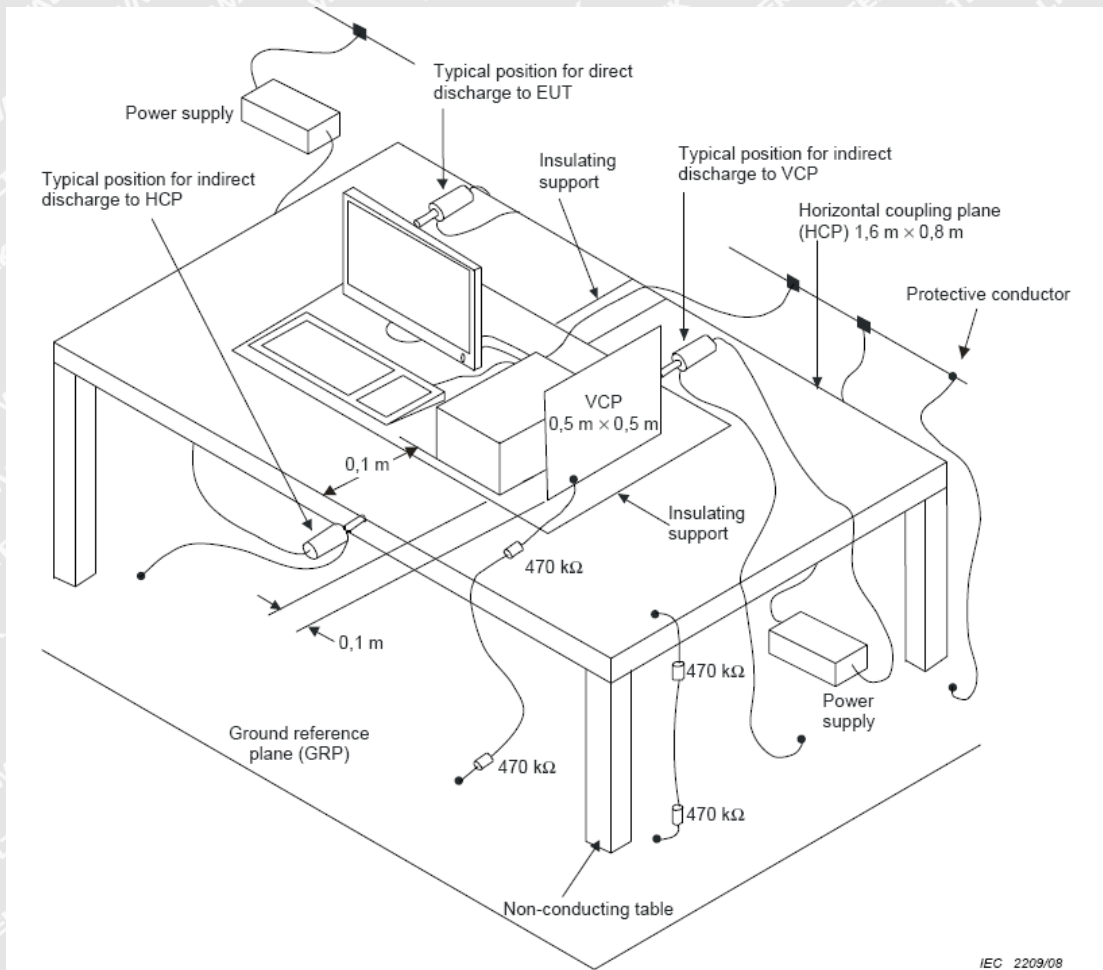
Temperature	: 23.4°C
Humidity	: 52.6%RH
Barometric Pressure	: 101.3kPa

EUT Operation:

Input Voltage.....	: Battery 6V
Operating Mode	: Lighting mode

6.2.2 Block Diagram of Setup

The ESD test was performed in accordance with the IEC 61000-4-2.





6.2.3 Direct Discharge Test Results

Observations:

Test points:

1. All Exposed Surface & Seams;
2. All metallic part

Direct Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Contact Discharge	Air Discharge
±8	B	1	N/A	Pass*
±4	B	2	Pass*	N/A

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

6.2.4 Indirect Discharge Test Results

Observations:

Test points:

1. All sides.

Indirect Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Horizontal Coupling	Vertical Coupling
±4	B	1	Pass*	Pass*

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

6.3 Radio-frequency electromagnetic fields, 80MHz to 1GHz

Test Requirement..... : EN 61547

Test Method..... : IEC 61000-4-3

Test Result..... : Pass

Frequency Range..... : 80MHz to 1GHz

Test level..... : 3V/m

Modulation..... : 80%, 1kHz Amplitude Modulation.

Face of EUT..... : Front, Back, Left, Right

Antenna polarisation : Horizontal& Vertical



6.3.1E.U.T. Operation

Operating Environment:

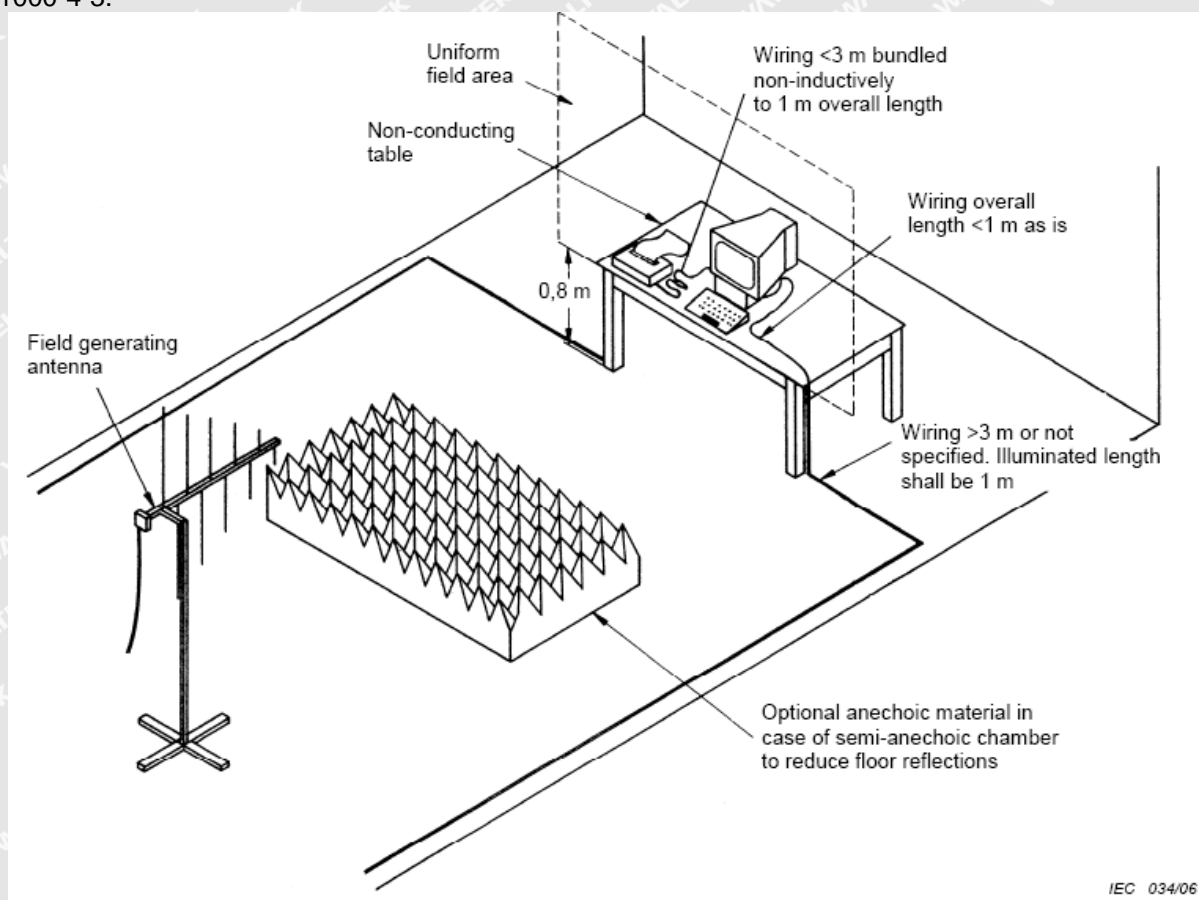
- Temperature : 23.2°C
- Humidity..... : 46.5%RH
- Barometric Pressure..... : 100.2kPa

EUT Operation:

- Input Voltage : Battery 6V
- Operating Mode..... : Lighting mode

6.3.2 Block Diagram of Setup

The Radio-frequency electromagnetic fields Immunity test was performed in accordance with the IEC 61000-4-3.



IEC 034/06



6.3.3 Test Results

Frequency	Face of EUT	Antenna polarisation	Test Level	Step Size	Dwell Time	Performance Criterion	Result
80 to 1000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
80 to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*

Remark:

* During the test no deviation was detected to the selected operation mode(s)



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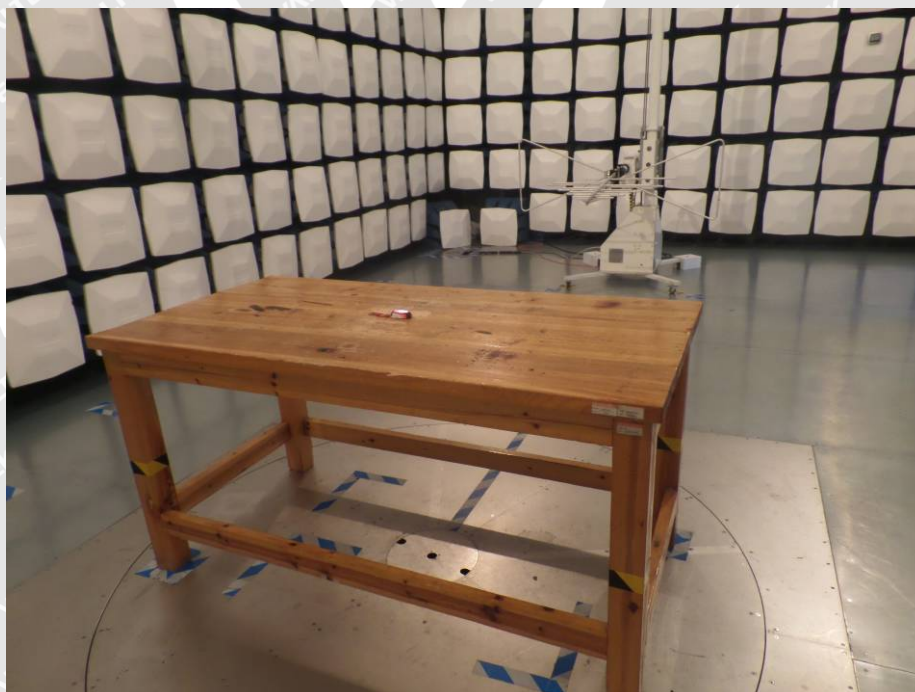


7 Photographs – Test Setup

7.1 Photograph – Radiated electromagnetic disturbance Test Setup, 9kHz to 30MHz



7.2 Photograph – Radiated Emission Test Setup, 30MHz to 300MHz

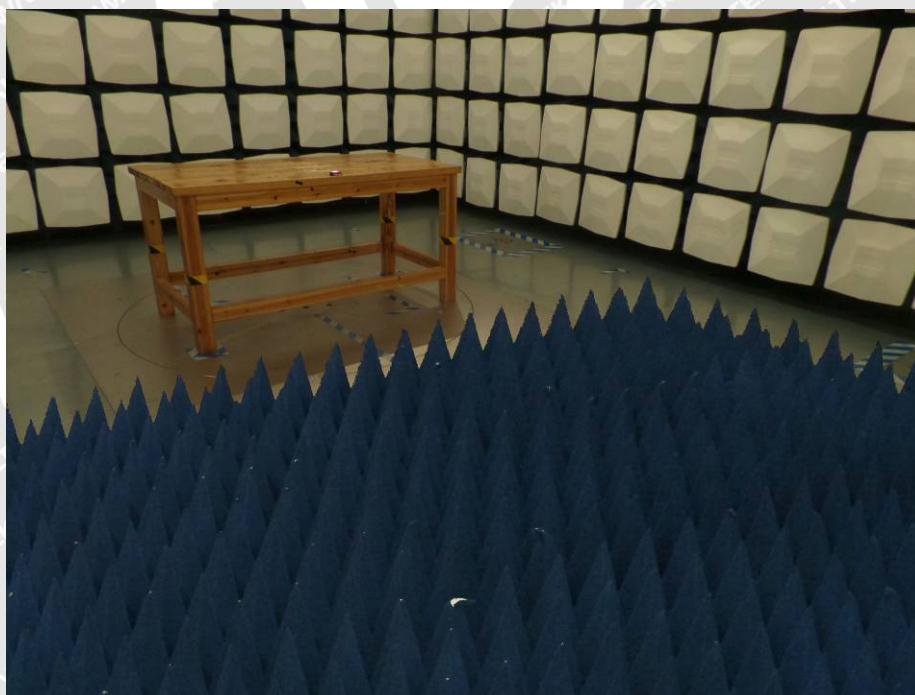




7.3 Photograph – ESD Immunity Test Setup



7.4 Photograph – Radio-frequency electromagnetic fields Immunity Test Setup





8 Photographs – Constructional Details

8.1 EUT – External View

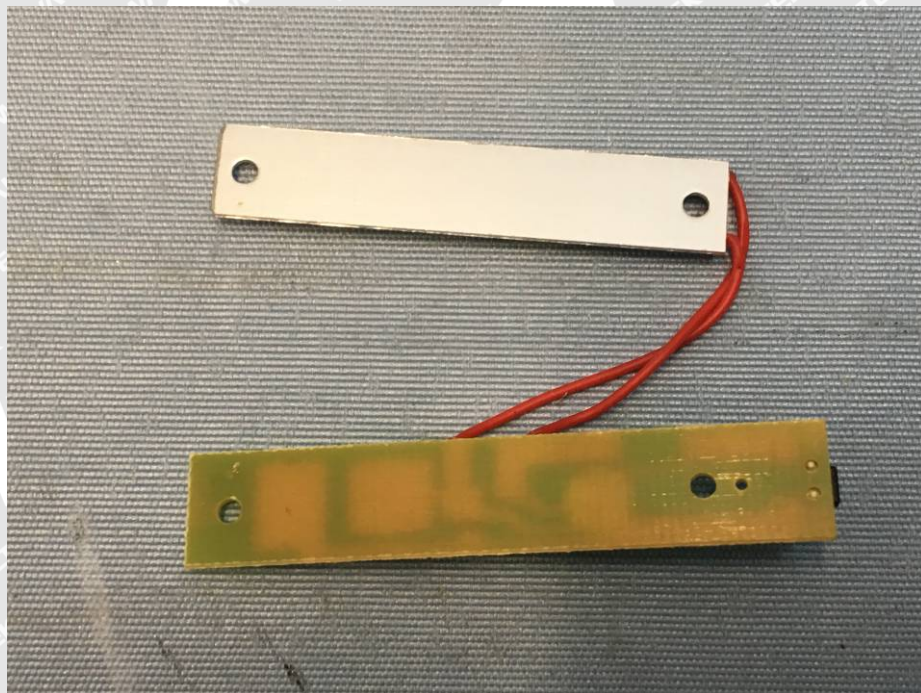
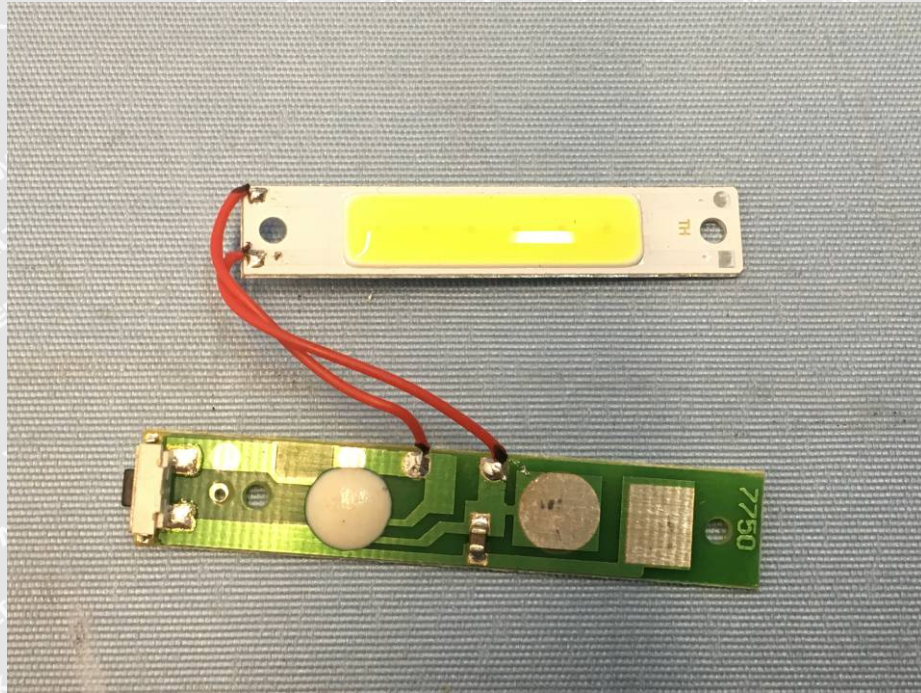




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8.2 EUT – Internal View



===== End of Report =====