EMC TEST REPORT

REPORT NO.: ECE2106118R

MODEL NO.: To see page 5

RECEIVED: June 03, 2021

TESTED: June 04, 2021 to June 09, 2021

APPLICANT: Ningbo Grand Star Electric Co., Ltd.

ADDRESS: No 1, Zhanjia, Xidian Town, Ninghai County, Ningbo City, Zhejiang Province, China

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Prepared for	:	Ningbo Grand Star Electric Co., Ltd.
Address	:	No 1, Zhanjia, Xidian Town, Ninghai County, Ningbo City, Zhejiang Province, China
Product	:	Flashlight
Model No.	:	To see page 5
Trademark	:	ONLYSTAR
Test Standard	:	EN IEC 55015:2019+A11:2020 EN 61547: 2009 EN61000-3-2: 2014, EN61000-3-3: 2013+A1:2019 (EN61000-4-2: 2009, EN61000-4-3: 2006+A1: 2008+A2: 2010, EN61000-4-4:2012, EN61000-4-5: 2014, EN61000-4-6: 2014, EN61000-4-11: 2004)
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Prepared by : (Engineer)

Reviewer by : (Project Engineer)

Approved by : (Manager)

Report Number	:	ECE2106118R
Date of Test	:	June 04, 2021 to June 09, 2021
Date of Report	:	June 10, 2021

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1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Flashlight
Model Number	:	GS-9100, GS-4001, GS-4003, GS-4003A, GS-4004, GS-4004A, GS-4005, GS-4007, GS-4007A, GS-4010, GS-4013, GS-4013A, GS-4014, GS-4021, GS-4024, GS-4024A, GS-4025, GS-4028, GS-4029, GS-4030, GS-4036, GS-4037, GS-4037A, GS-4038, GS-4038A, GS-4040, GS-4048, GS-4049, GS-4050, GS-4050A, GS-4056, GS-4062, GS-4063, GS-4071, GS-4081, GS-4081A, GS-4084, GS-4085, GS-4087, GS-4089, GS-4095, GS-4097, GS-4099, GS-4100, GS-4102, GS-4103, GS-4104, GS-4105, GS-4106, GS-4114, GS-4115, GS-4116, GS-5002, GS-5006, GS-5007, GS-5020, GS-5025, GS-5026, GS-5027, GS-6001, GS-6001A, GS-6008, GS-6009, GS-6040, GS-6041, GS-6041A, GS-6042, GS-7002C, GS-7002D, GS-7004, GS-7006, GS-7006A, GS-7013, GS-7016B, GS-7020, GS-7023, GS-7027, GS-7028, GS-7029, GS-7030, GS-7030A, GS-7031, GS-7032, GS-8001, GS-8005, GS-8008, GS-8013, GS-8015B, GS-8016, GS-8016S, GS-8017, GS-8024, GS-8027A, GS-8028, GS-8036A, GS-8039, GS-8040, GS-8040A, GS-8041, GS-8042, GS-8042A, GS-8043, GS-8045, GS-8046, GS-8049, GS-8062, GS-8063, GS-8065, GS-8066, GS-8068, GS-8085, GS-8087, GS-8088, GS-8300, GS-9003, GS-9016, GS-9016A, GS-9016B, GS-9021-2AA, GS-9021-2C, GS-9021-3C, GS-9025A, GS-9025B, GS-9027, GS-9045, GS-9047, GS-9048-1AA, GS-9048-2AA, GS-9050, GS-9052, GS-9053, GS-9059, GS-9069, GS-9080, GS-9081, GS-9087, GS-9097, GS-9099, GS-9106, GS-9166, GS-9401, GS-9410, GS-9412, GS-9414, GS-9419, GS-9438, GS-9440, GS-9447, GS-9455, GS-9504, GS-9805 The applicant models are all identical in interior structure, electrical circuits and components, and just the model names are different for the marketing requirement. We prepare GS-9100 for the test
Power Supply	:	DC 3V
Applicant	:	Ningbo Grand Star Electric Co., Ltd.

Address	:	No 1, Zhanjia, Xidian Town, Ninghai County, Ningbo City, Zhejiang Province, China
Manufacturer	:	Ningbo Grand Star Electric Co., Ltd.
Address	:	No 1, Zhanjia, Xidian Town, Ninghai County, Ningbo City, Zhejiang Province, China
Date of sample receiver	:	June 03, 2021
Date of Test	:	June 04, 2021 to June 09, 2021

1.2. Test Standards

Test Standards	
EN IEC 55015:2019+A11:2020	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
EN61000-3-2: 2014	Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)
EN61000-3-3:2013 +A1:2019	Electromagnetic compatibility (EMC)-Part 3-3: Limits-Limitation of voltage changes, Voltage fluctuations and flicker in public low-voltage supply systems. For equipment with Rated current ≤16A per phase and not subject to conditional connection

1.3. Measurement Uncertainty

Radiation Uncertainty : Ur = 3.84dB

Conduction Uncertainty : Uc = 2.72dB

2. MEASURING DEVICES AND TEST EQUIPMENT

2.1 For Power Line Conducted Emission

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 15, 2021	1 Year
2.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	May 15, 2021	1 Year
3.	50ΩCoaxial Switch	Anritsu	MP59B	M20531	N/A	N/A
4.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	May 15, 2021	1 Year
5.	Voltage Probe	Rohde & Schwarz	TK9416	N/A	May 15, 2021	1 Year

2.2 For Magnetic Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 15, 2021	1 Year
2.	Loop Antenna	Laplace Instrument Ltd	RF300	8006	May 15, 2021	1 Year
3.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	May 15, 2021	1 Year
4.	RF Cable	FUJIKURA	RG-55/U	LISN Cable	May 15, 2021	1 Year
5.	Coaxial Switch	Anritsu	MP59B	M73989	May 15, 2021	1 Year

2.3 For Harmonic / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Test System	HAEFELY	PHF555	080419-03	May 15, 2021	1 Year
2.	PC	N/A	P2L97	N/A	N/A	N/A

2.4 For Electrostatic Discharge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	HAEFELY	PESD1600	H708159	May 15, 2021	1 Year

2.5 For RF Strength Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	HP	8648A	3625U00573	May 15, 2021	1 Year
2.	Amplifier	A&R	500A100	17034	May 15, 2021	1 Year
3.	Amplifier	A&R	100W/1000M	17028	May 15, 2021	1 Year

4.	Isotropic Field Monitor	A&R	FM2000	16829	May 15, 2021	1 Year
5.	Isotropic Field Probe	A&R	FP2000	16755	May 15, 2021	1 Year
6.	Biconic Antenna	EMCO	3108	9507-2534	May 15, 2021	1 Year
7.	Log-periodic Antenna	A&R	AT1080	1621931	May 15, 2021	1 Year
8.	PC	N/A	486DX2	N/A	N/A	N/A

2.6 For Electrical Fast Transient/Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	HAEFELY	PEFT4010	080981-16	May 15, 2021	1 Year
2.	Coupling Clamp	HAEFELY	IP-4A	147147	May 15, 2021	1Year

2.7 For Surge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	HAEFELY	PSURGE4.1	080107-04	May 15, 2021	1 Year

2.8 For Injected Currents Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Simulator	EMTEST	CWS500C	0900-12	May 15, 2021	1Year
2.	CDN	EMTEST	CDN-M2	5100100100	May 15, 2021	1Year
3.	CDN	EMTEST	CDN-M3	0900-11	May 15, 2021	1Year
4.	Injection Clamp	EMTEST	F-2031-23MM	368	May 15, 2021	1Year
5.	Attenuator	EMTEST	ATT6	0010222A	May 15, 2021	1Year

2.9 For Magnetic Field Immunity Test

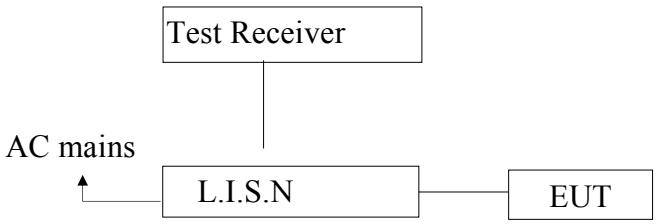
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Magnetic Field Tester	HAEFELY	MAG100	250040.1	May 15, 2021	1 Year
2	AC Transformer	CHOKUN	TDGC2J-5	N/A	N/A	N/A

2.10 For Voltage Dips and Interruptions Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Dips Tester	HAEFELY	Pline1610	083732-18	May 15, 2021	1 Year

3. POWER LINE CONDUCTED MEASUREMENT

3.1 Block Diagram of Test Setup



(EUT: Flashlight)

3.2 Conducted Power Line Emission Measurement Standard and Limits

3.2.1 Standard:

EN IEC 55015:2019+A11:2020

3.2.2 Limits

Frequency	At mains terminals (dBμV)	
	Quasi-peak Level	Average Level
9KHz ~ 50KHz	110	--
50KHz ~ 150KHz	90 ~ 80*	--
150KHz ~ 0.5MHz	66 ~ 56*	56 ~ 46*
0.5MHz ~ 2.51MHz	56	46
2.51MHz ~ 3.0MHz	73	63
3.0MHz ~ 5.0MHz	56	46
5.0MHz ~ 30MHz	60	50

1. At the transition frequency the lower limit applies.
2. * decreasing linearly with logarithm of the frequency.

3.3 EUT Configuration on Measurement

The configuration of the EUT is same as Section 1.1.

3.4 Operating Condition of EUT

3.4.1 Setup the EUT as shown in Section 3.1.

3.4.2 Turn on the power of all equipments.

3.4.3 Let the EUT work in test mode (On) and measure it.

3.5 Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN55015 regulations during conducted emission measurement. And the voltage probe had been used for the load terminals measurement according to the EN55015 standard.

The bandwidth of the test receiver (R&S ESCS30) is set at 200Hz in 9K~150KHz range and 9KHz in 150K~30MHz range.

The frequency range from 9KHz to 30MHz is checked.

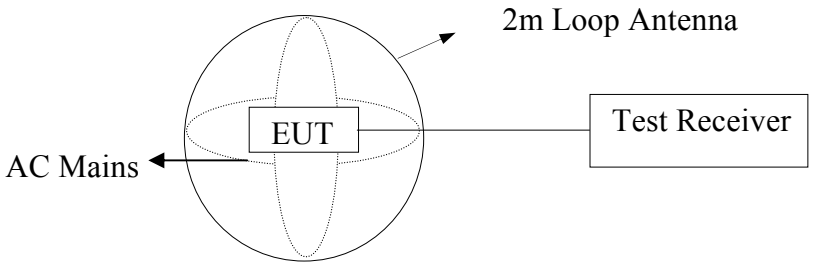
3.6 Measurement Results

N/A.

* N/A --- Not apply

4.MAGNETIC FIELD EMISSION MEASUREMENT

4.1 Block Diagram of Test Setup



(EUT: Flashlight)

4.2 Magnetic Field Emission Measurement Standard and Limits

4.2.1 Test Standard

EN IEC 55015:2019+A11:2020

4.2.2 Test Limits

Frequency	Limits for loop diameter (dBμA)
	2m
9KHz ~ 70KHz	88
70KHz ~ 150KHz	88 ~ 58*
150KHz ~ 2.2MHz	58 ~ 26*
2.2MHz ~ 3.0MHz	58
3.0MHz ~ 30MHz	22

1. At the transition frequency the lower limit applies.
2. * decreasing linearly with logarithm of the frequency.

4.3 EUT Configuration on Measurement

The configuration of the EUT is same as Section 1.1.

4.4 Operating Condition of EUT

4.4.1 Setup the EUT as shown in Section 4.1.

4.4.2 Turn on the power of all equipments.

3.4.3 The EUT work in test mode (ON) and measure it

4.5 Test Procedure

The EUT is 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.
Three field components are checked by means of a coaxial switch.

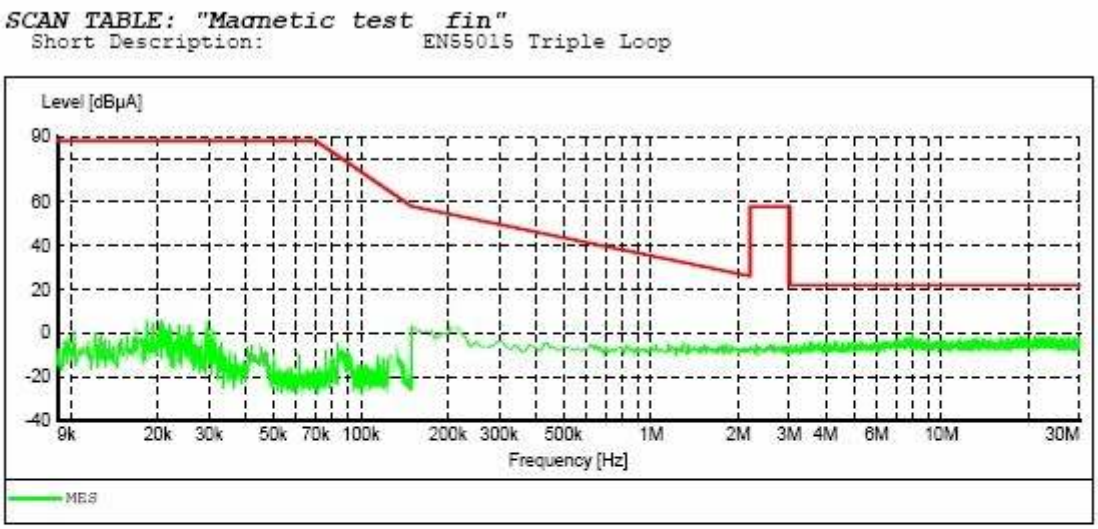
The frequency range from 9KHz to 30MHz is investigated. The receiver is measured with the quasi-peak detector. For frequency band 9KHz to 150KHz, the bandwidth of the field strength meter (R&S test receiver ESCS30) is set at 200Hz. For frequency band 150KHz to 30MHz, the bandwidth is set at 9KHz .

4.6 Test Results

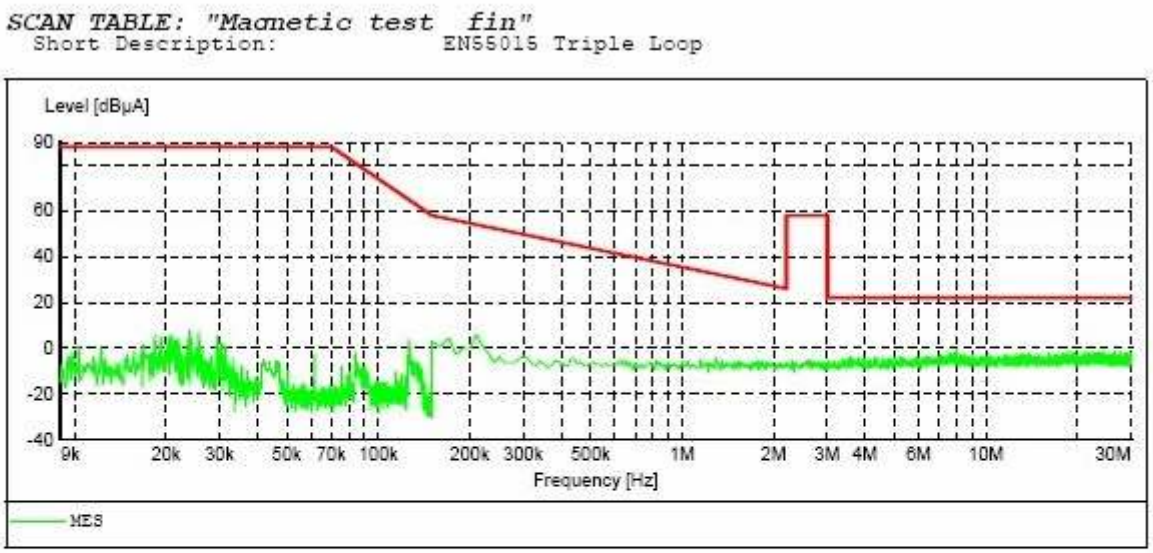
PASS.

Please reference to the following pages

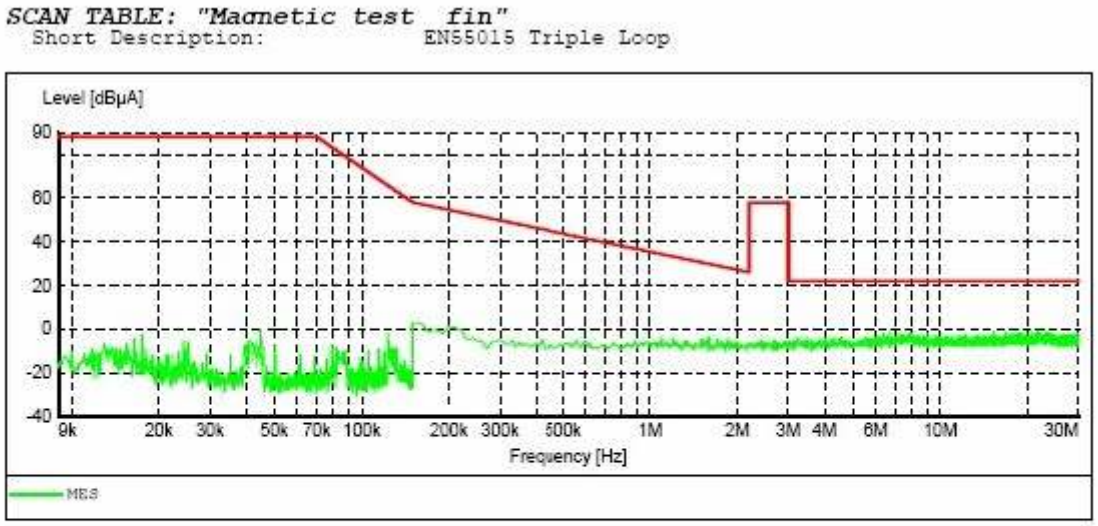
X Test Data


SCAN TABLE: "Magnetic test fin"
Short Description: EN55015 Triple Loop
Level [dBµA]
90
60
40
20
0
-20
-40
9k
20k
30k
50k
70k
100k
200k
300k
500k
1M
2M
3M
4M
6M
10M
30M
Frequency [Hz]
MES

Y Test Data


SCAN TABLE: "Magnetic test fin"
Short Description: EN55015 Triple Loop
Level [dBµA]
90
60
40
20
0
-20
-40
9k
20k
30k
50k
70k
100k
200k
300k
500k
1M
2M
3M
4M
6M
10M
30M
Frequency [Hz]
MES

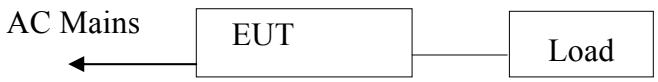
Z Test Data


SCAN TABLE: "Magnetic test fin"
Short Description: EN55015 Triple Loop
Level [dBµA]
90
60
40
20
0
-20
-40
9k
20k
30k
50k
70k
100k
200k
300k
500k
1M
2M
3M
4M
6M
10M
30M
Frequency [Hz]
MES

5.RADIATED EMISSION MEASUREMENT

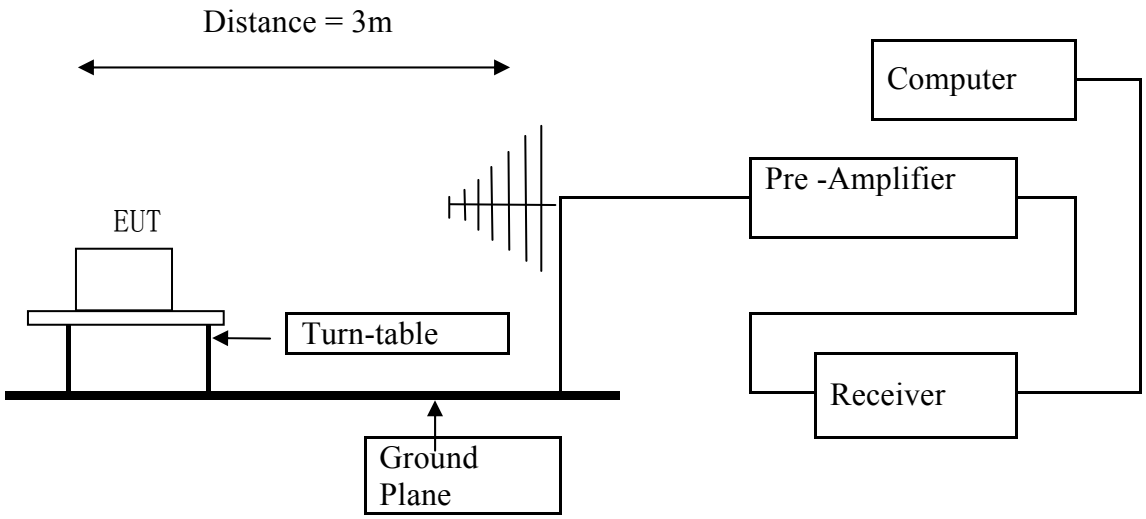
5.1 Block Diagram of Test Setup

5.1.1 Block diagram of connection between the EUT and simulators



(EUT: Flashlight)

5.1.2 Block diagram of test setup (In chamber)



(EUT: Flashlight)

5.2 Measuring Standard

EN IEC 55015:2019+A11:2020

5.3 Radiated Emission Limits

All emanations from a device 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 LIMIT (dBμV/m)
30-230	3	40
230-300	3	47

Note**:** (1) The smaller limit shall apply at the combination point between two frequency bands.

(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

5.4 EUT Configuration on Test

The EN55015 regulations test method must be used to find the maximum emission during radiated emission measurement.

5.5 Operating Condition of EUT

5.5.1 Turn on the power.

5.5.2 After that, let the EUT work in test mode (Normal) and measure it.

5.6 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarizations of the antenna are set on test.

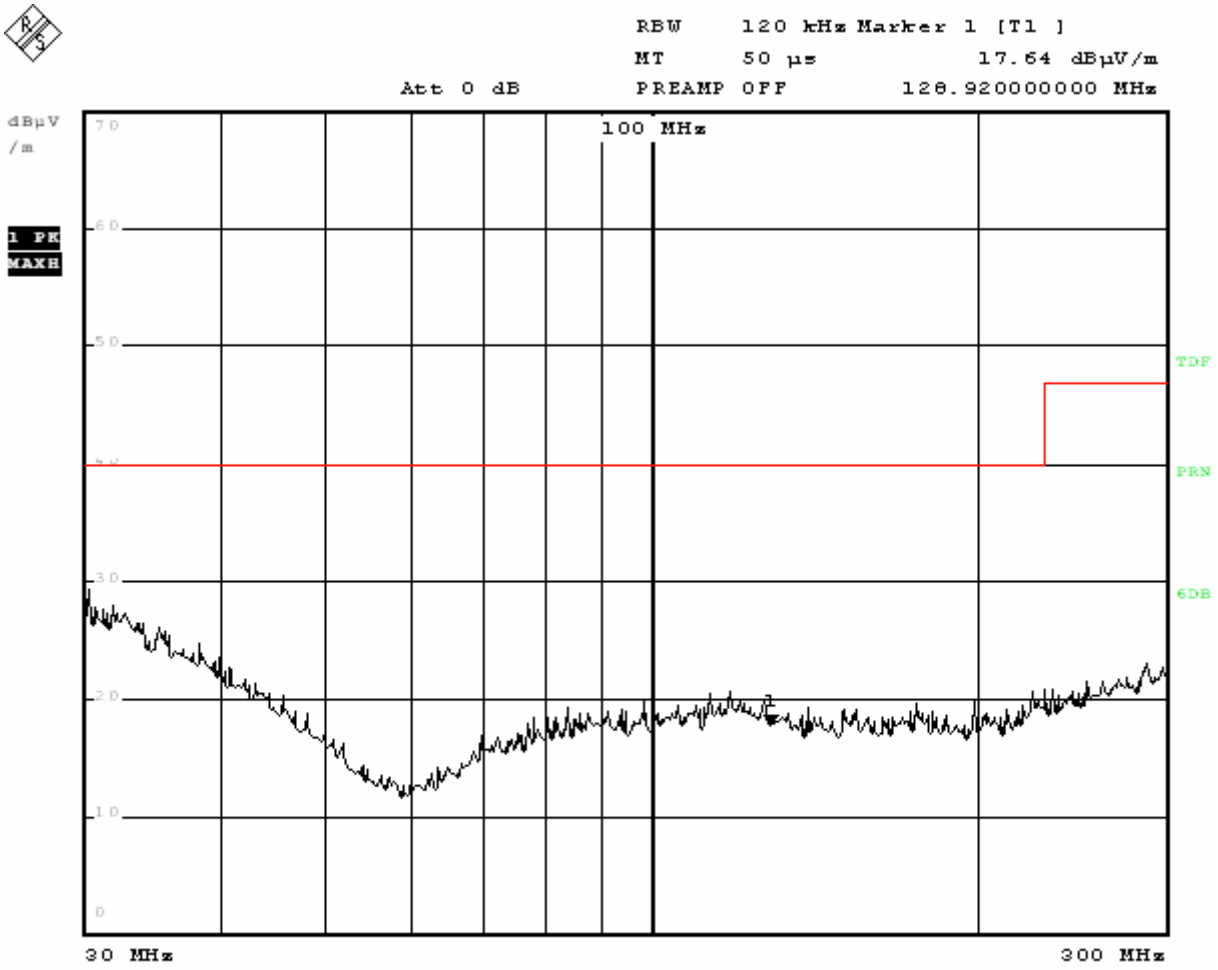
The bandwidth of the Receiver (ESCS30) is set at 120 kHz.
The frequency range from 30MHz to 300MHz is investigated.

5.7 Measuring Results

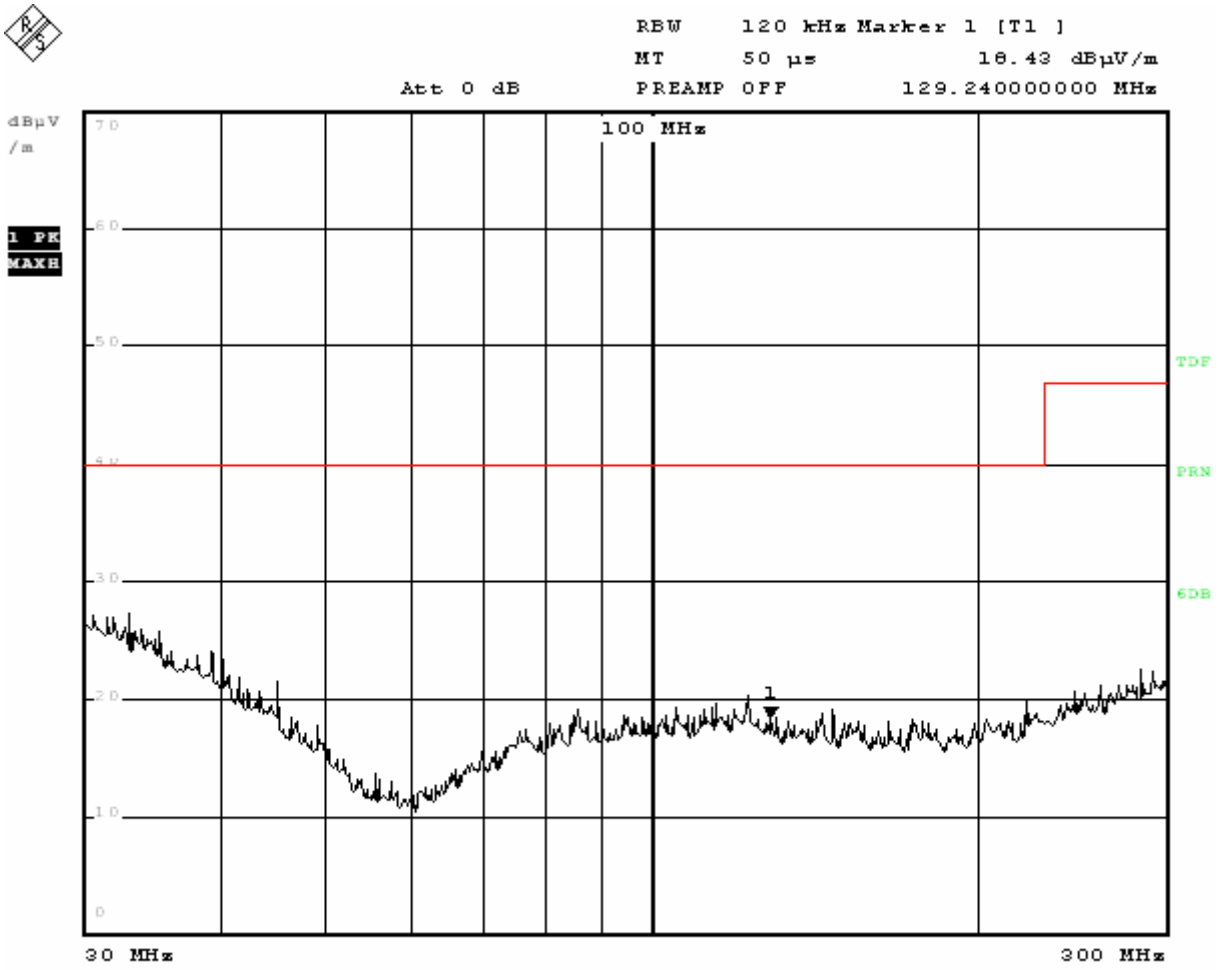
PASS.

Please refer to the following page.

Horizontal Polarization Test Data

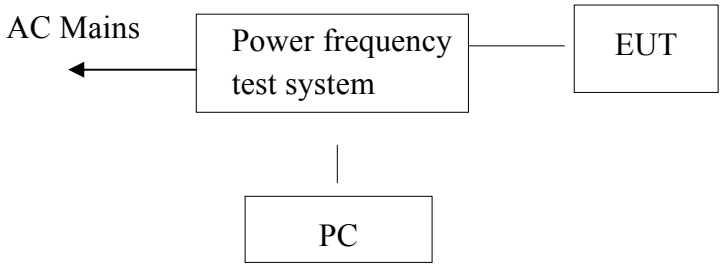


Vertical Polarization Test Data



6.HARMONIC CURRENT MEASUREMENT

6.1 Block Diagram of Test Setup



(EUT: Flashlight)

6.2 Measuring Standard

EN61000-3-2: 2014 CLASS C

6.3 Operating Condition of EUT

Same as Section 3.4. except the test setup replaced by Section 5.1.

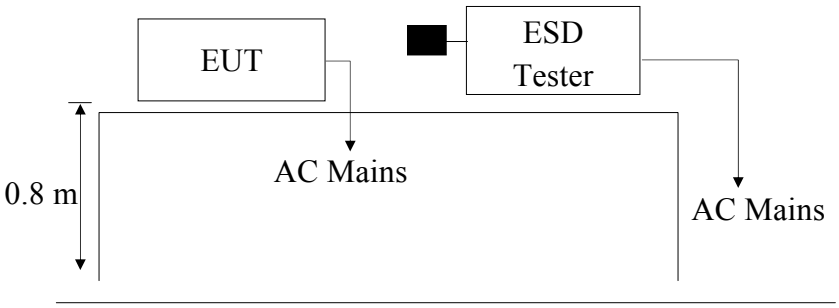
6.4 Test Results

N/A.

* N/A --- Not apply

7. ELECTROSTATIC DISCHARGE TEST

7.1 Block Diagram of ESD Test Setup



(EUT: Flashlight)

7.2 Test Standard

EN61547: 2009 (EN61000-4-2: 2009, Severity Level**:**
Air Discharge: Level 3,±8KV Contact Discharge: Level 2, ±4KV)

7.3 Severity Levels and Performance Criterion

7.3.1 Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

7.3.2 Performance criterion**: B**

7.4 EUT Configuration

The configuration of EUT is listed in Section 1.1

7.5 Operating Condition of EUT

7.5.1 Setup the EUT as shown in Section 7.1.

7.5.2 Turn on the power of all equipments.

7.5.3 Let the EUT work in test mode (On) and measure it.

7.6 Test Procedure

7.6.1 Air Discharge**:**

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

7.6.2 Contact Discharge**:**

All the procedure shall be same as Section 6.6.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.6.3 Indirect discharge for horizontal coupling plane

At least 10 single discharges(in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit(if applicable) 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.

7.6.4 Indirect discharge for vertical coupling plane

At least 10 single discharge (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

7.7 Test Results

PASS.

Please refer to the following page

Electrostatic Discharge Test Results

Applicant	: Ningbo Grand Star Electric Co., Ltd.		
EUT	: Flashlight	Test Date	: June 08, 2021
M/N	: GS-9100	Temperature	: 22℃
Power Supply	: DC 3V	Humidity	: 50%
Test Mode	: Normal	Criterion	: B

Air Discharge: ±8KV

Contact Discharge: ±4KV # For each point positive 10 times and negative 10 times

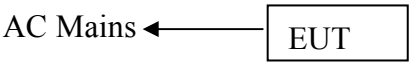
Location	**Kind** A-Air Discharge C-Contact Discharge	**Result**
Gap of the EUT	A	PASS
Metal parts	C	PASS
HCP	C	PASS
VCP of Front	C	PASS
VCP of Rear	C	PASS
VCP of Left	C	PASS
VCP of Right	C	PASS
Remark :	Test Equipment : ESD Tester (HAEFELY, PESD1600)	

Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

8 RF FIELD STRENGTH SUSCEPTIBILITY TEST

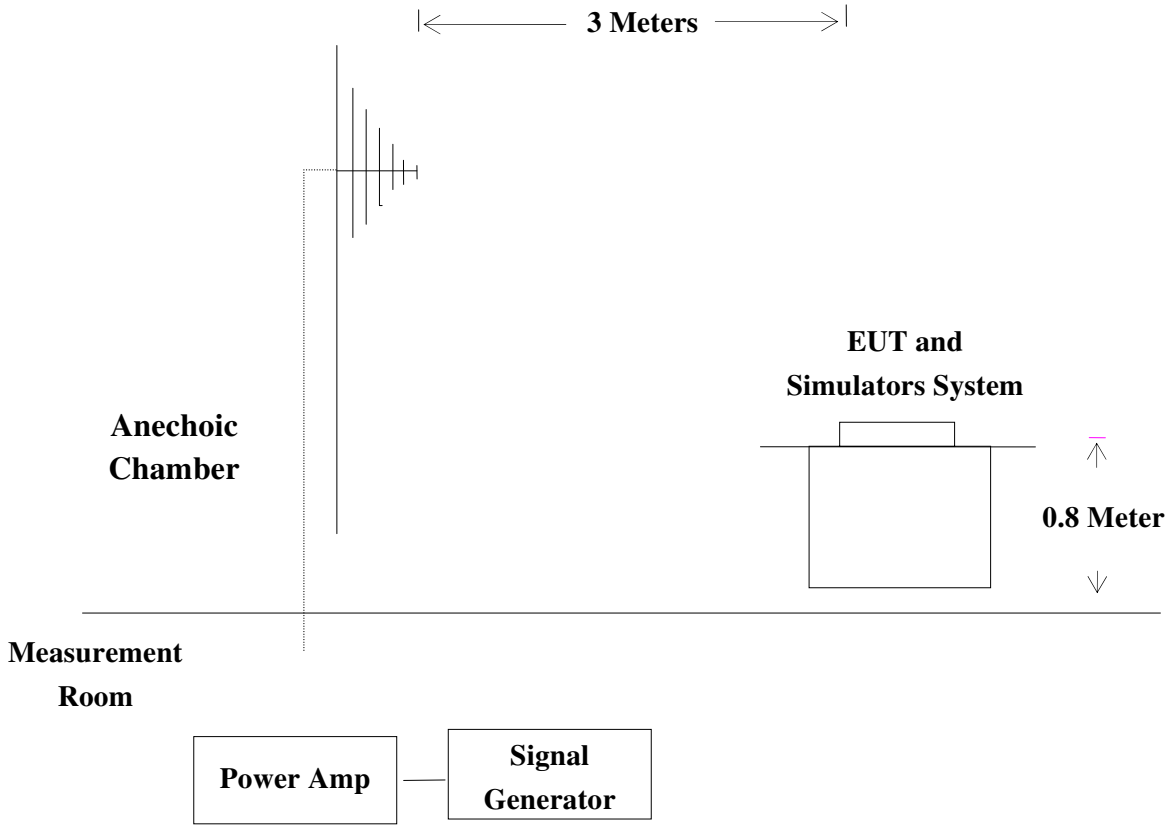
8.1 Block Diagram of Test Setup

8.1.1 Block Diagram of the EUT and the simulators



(EUT: Flashlight)

8.1.2 R/S Test Setup



8.2 Test Standard

EN61547: 2009 (EN61000-4-3: 2006+A1: 2008+A2: 2010, Severity Level: 2, 3V / m)

8.3 Severity Levels and Performance Criterion

8.3.1 Severity level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

8.3.2 Performance criterion **: A**

8.4 EUT Configuration

The configuration of EUT are listed in Section 1.1.

8.5 Operating Condition of EUT

8.5.1 Setup the EUT as shown in Section 8.1.

8.5.2 Turn on the power of all equipments.

8.5.3 Let the EUT work in test mode (On) and measure it.

8.6 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows**:**

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 1000 MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

8.7 Test Results

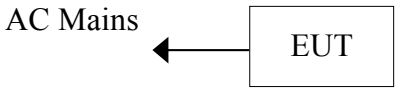
PASS.

Please refer to the following page.

9 ELECTRICAL FAST TRANSIENT/BURST TEST

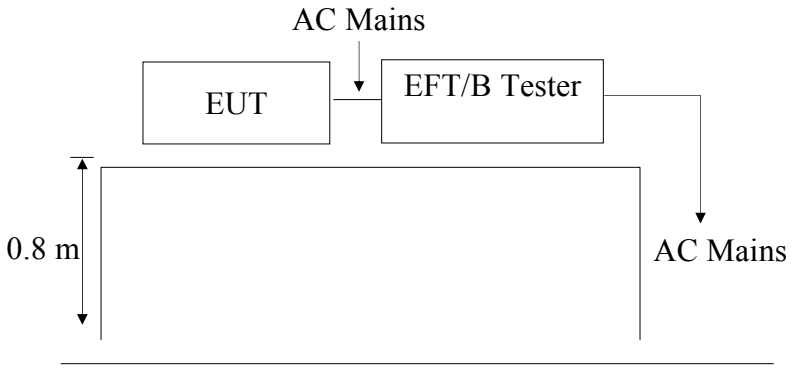
9.1 Block Diagram of Test Setup

9.1.1 Block Diagram of the EUT



(EUT: Flashlight)

9.1.2 EFT Test Setup



9.2 Test Standard

EN61547: 2009 (EN61000-4-4: 2012, Severity Level, Level 2 **:** 1KV)

9.3 Severity Levels and Performance Criterion

9.3.1 Severity level

Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 KV	0.25 KV
2.	1 KV	0.5 KV
3.	2 KV	1 KV
4.	4 KV	2 KV
X	Special	Special

9.3.2 Performance criterion **: B**

9.4 EUT Configuration

The configuration of EUT are listed in Section 1.1.

9.5 Operating Condition of EUT

9.5.1 Setup the EUT as shown in Section 9.1.

9.5.2 Turn on the power of all equipments.

9.5.3 Let the EUT work in test mode (On) and measure it.

9.6 Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall 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 beneath the EUT, shall be more than 0.5m.

9.6.1 For input and output AC power ports**:**

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

9.6.2 For signal lines and control lines ports**:**

No I/O ports. It's unnecessary to test.

9.6.3 For DC output line ports**:**

It's unnecessary to test.

9.7 Test Result

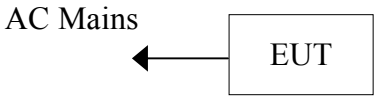
N/A.

* N/A --- Not apply

10 SURGE IMMUNITY TEST

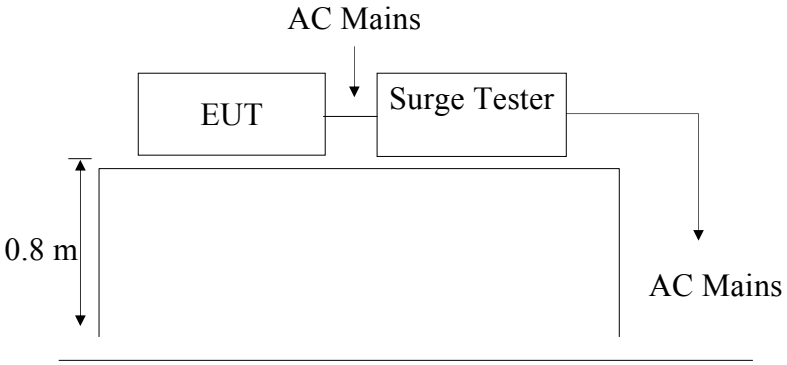
10.1 Block Diagram of Test Setup

10.1.1 Block Diagram of the EUT



(EUT: Flashlight)

10.1.2 Surge Test Setup



(EUT: Flashlight)

10.2 Test Standard

EN61547: 2009 (EN61000-4-5: 2014, Severity Level **:** Line to Line: Level 2 , 1.0KV)

10.3 Severity Levels and Performance Criterion

10.3.1 Severity level

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

9.3.2 Performance criterion **: B**

10.4 EUT Configuration

The configuration of EUT are listed in Section 1.1

10.5 Operating Condition of EUT

10.5.1 Setup the EUT as shown in Section 10.1.

10.5.2 Turn on the power of all equipments.

10.5.3 Let the EUT work in test mode (ON) and measure it.

10.6 Test Procedure

1) Set up the EUT and test generator as shown on Section 10.1.2.
2) For line to line coupling mode, provide a 1 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4) Different phase angles are done individually.
5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

10.7 Test Result

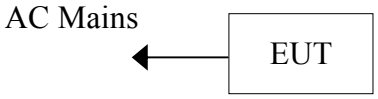
N/A

* N/A --- Not apply

11 INJECTED CURRENTS SUSCEPTIBILITY TEST

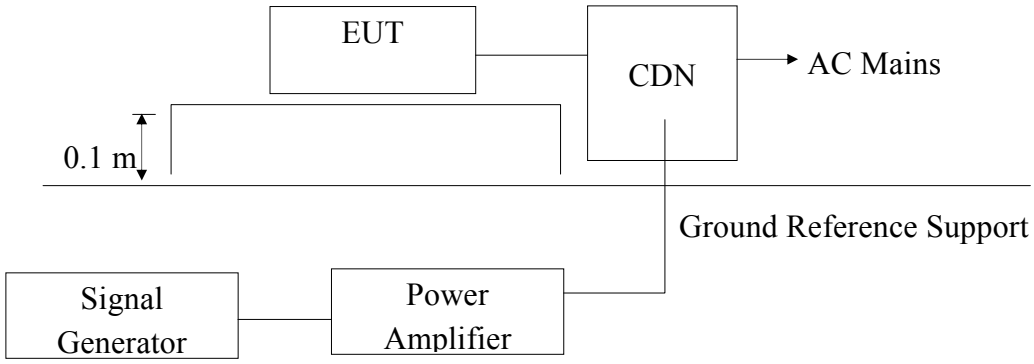
11.1 Block Diagram of Test Setup

11.1.1 Block Diagram of the EUT



(EUT: Flashlight)

11.1.2 Block Diagram of Test Setup



(EUT: Flashlight)

11.2 Test Standard

EN61547: 2009 (EN61000-4-6: 2009, Severity Level**:** 3V (rms), 0.15MHz ~ 80MHz)

11.3 Severity Levels and Performance Criterion

11.3.1 Severity level

Level	Field Strength V
1.	1
2.	3
3.	10
X	Special

11.3.2 Performance criterion**: A**

11.4 EUT Configuration

The configuration of EUT are listed in Section 1.1.

11.5 Operating Condition of EUT

11.5.1 Setup the EUT as shown in Section 11.1.

11.5.2 Turn on the power of all equipments.

11.5.3 Let the EUT work in test mode (ON) and measure it.

11.6 Test Procedure

1) Set up the EUT, CDN and test generators as shown on Section 11.1.2.
2) Let the EUT work in test mode and measure it.
3) 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).
4) The disturbance signal described below is injected to EUT through CDN.
5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
6) The frequency range is swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
7) The rate of sweep shall not exceed $1.5*10^{-3}$decades/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.
8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

11.7 Test Results

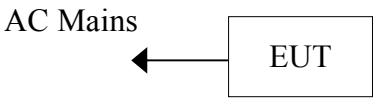
N/A .

* N/A --- Not apply

12 VOLTAGE DIPS AND INTERRUPTIONS TEST

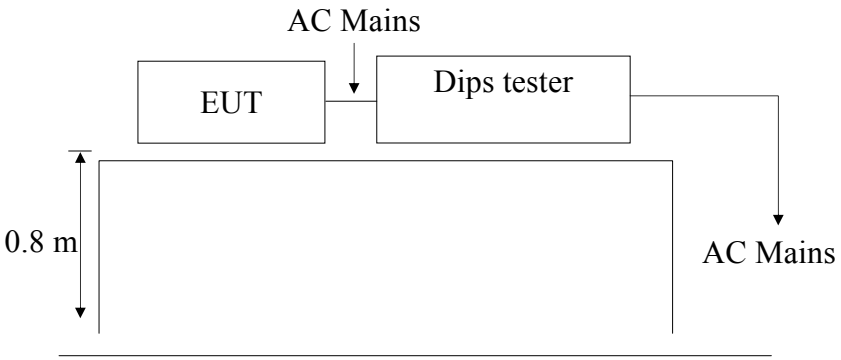
12.1 Block Diagram of Test Setup

12.1.1 Block Diagram of the EUT



(EUT: Flashlight)

12.1.2 Dips Test Setup



12.2 Test Standard

EN61547: 2009 (EN61000-4-11: 2004)

12.3 Severity Levels and Performance Criterion

12.3.1 Severity level

Test Level %U_T	Voltage dip and short interruptions %U_T	Duration (in period)
0	100	0.5 1 5 10 25 50 *
40	60	
70	30	

12.3.2 Performance criterion **: B, C**

12.4 EUT Configuration

The configuration of EUT are listed in Section 1.1.

12.5 Operating Condition of EUT

12.5.1 Setup the EUT as shown in Section 13.1.

12.5.2 Turn on the power of all equipments.

12.5.3 Let the EUT work in test mode (On) and measure it.

12.6 Test Procedure

1) Set up the EUT and test generator as shown on Section 13.1.2.
2) The interruptions is introduced at selected phase angles with specified duration.
3) Record any degradation of performance.

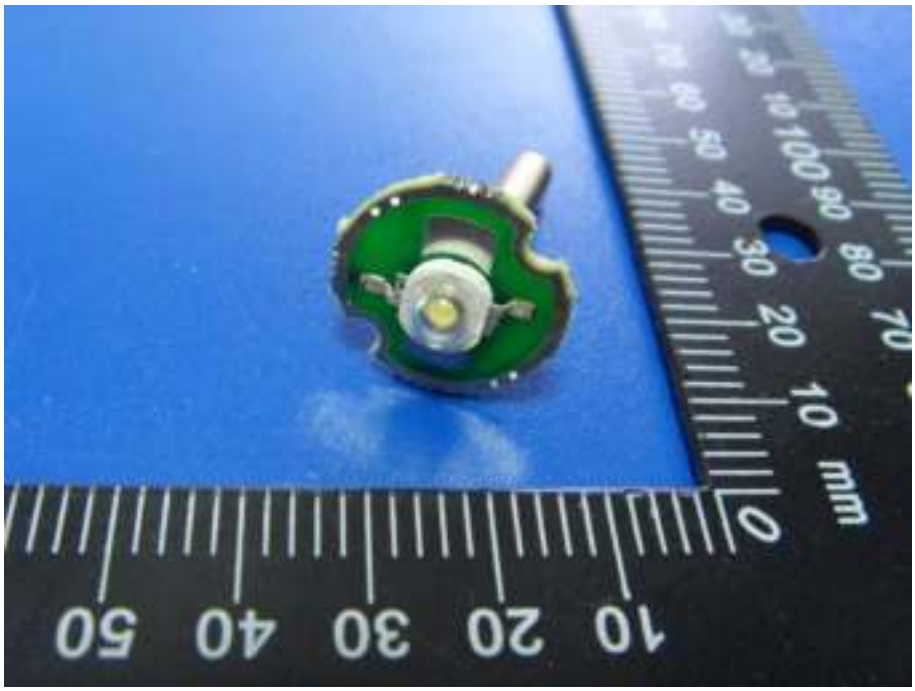
12.7 Test Result

N/A

* N/A --- Not apply

APPENDIX I

(Photos of EUT)



GS-4001

GS-4003

GS-4003A

GS-4004

GS-4004A

GS-4005

GS-4007

GS-4007A

GS-4010

GS-4013

GS-4013A

GS-4014

GS-4021

GS-4024

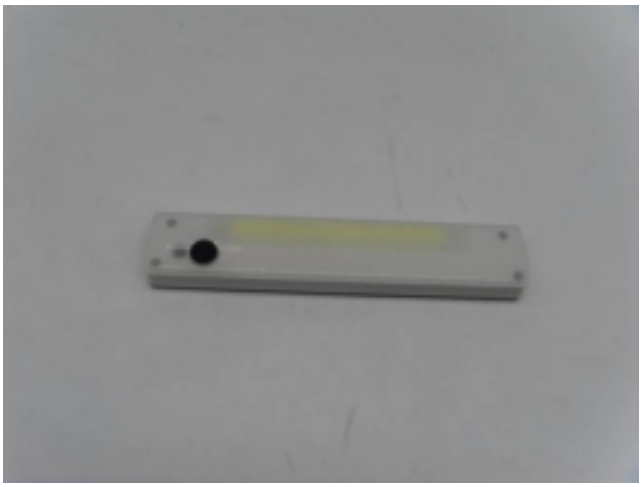
GS-4024A

GS-4025

GS-4028

GS-4029

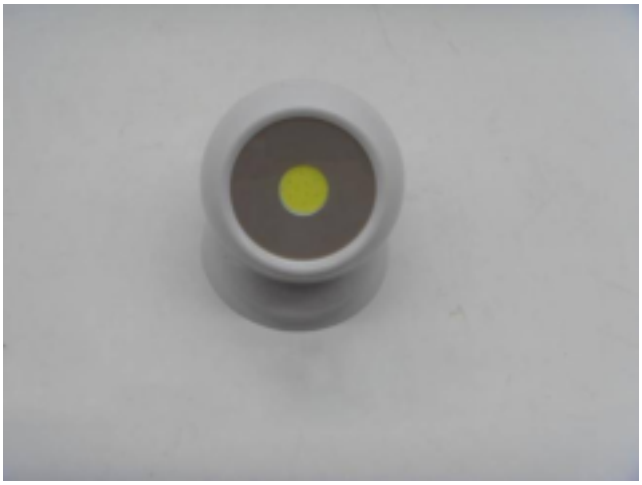
GS-4030



GS-4036

GS-4037

GS-4037A

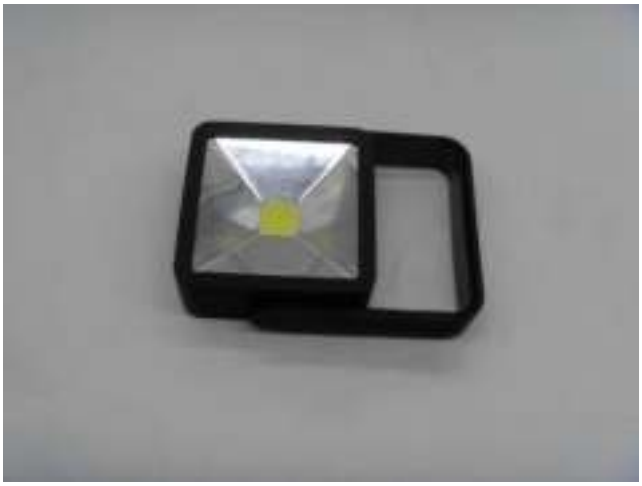


GS-4038

GS-4038A

GS-4040

GS-4048



GS-4049

GS-4050

GS-4050A

GS-4056

GS-4062

GS-4063

GS-4071

GS-4081

GS-4081A

GS-4084

GS-4085

GS-4087

GS-4089

GS-4095

GS-4097

GS-4099

GS-4100

GS-4102

GS-4103

GS-4104

GS-4105

GS-4106

GS-4114

GS-4115

GS-4116

GS-5002

GS-5006

GS-5007

GS-5020

GS-5025

GS-5026

GS-5027

GS-6001

GS-6001A

GS-6008

GS-6009

GS-6040

GS-6041

GS-6041A

GS-6042

GS-7002C

GS-7002D

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GS-7006A

GS-7013

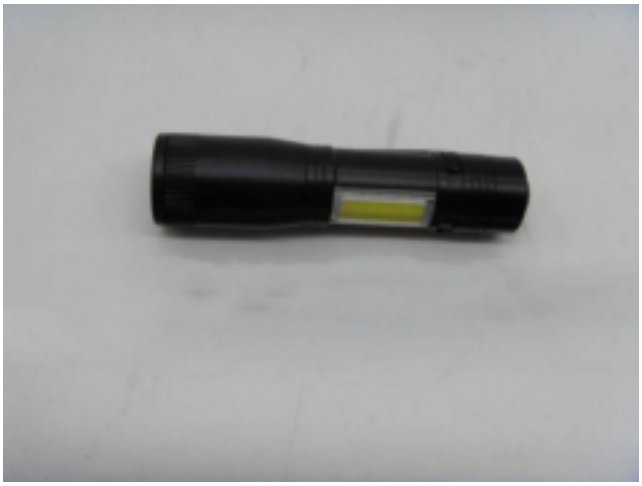
GS-7016B

GS-7020

GS-7023

GS-7027

GS-7028



GS-7029

GS-7030

GS-7030A

GS-7031

GS-7032

GS-8001

GS-8005

GS-8008

GS-8013

GS-8015B

GS-8016

GS-8016S

GS-8017

GS-8024

GS-8027A

GS-8028

GS-8036A

GS-8039

GS-8040

GS-8040A

GS-8041

GS-8042

GS-8042A

GS-8043

GS-8045

GS-8046

GS-8049

GS-8062

GS-8063

GS-8065

GS-8066

GS-8068

GS-8085

GS-8087

GS-8088

GS-8300

GS-9003

GS-9016

GS-9016A

GS-9016B

GS-9021-2AA

GS-9021-2C

GS-9021-3C

GS-9016

GS-9016A

GS-9016B

GS-9021-2AA

GS-9021-2C

GS-9021-3C

GS-9048-2AA

GS-9050

GS-9052

GS-9053

GS-9059

GS-9069

GS-9080

GS-9081

GS-9087

GS-9097

GS-9099

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GS-9504

GS-9805

GS-9100

End of the Report