



EMC TEST REPORT

LED strobe arm band

Model No. : UF5190(U289), UF5185

Prepared for :

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Report No. : A001E140103014E

Date of Test : Jan.03-08, 2014

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TEST REPORT DECLARATION

Applicant :

EUT Description: LED strobe arm band

(A) Model No. : UF5190(U289), UF5185

(B) Serial No. : E2014010903J

(C) Power Supply : DC 6.0V

Test Procedure Used:

EMI: EN55015:2006+A1:2007+A2:2009,

EMS: EN61547: 2009 (EN61000-4-2: 2009, EN61000-4-3: 2006+A1:2008+A2:2010

EN61000-4-8: 2010)

The devices described above have been tested by **Shenzhen AOV Testing Technology Co., Ltd** to determine the maximum emission levels emanating from the device, the severe levels that the device can endure and EUT'S performance criterion. The test results are contained in this test report. **Shenzhen AOV Testing Technology Co., Ltd.** is assumed of full responsibility for the accuracy and completeness of these tests. Also, this report shows that the EUT is technically compliant with the EN55015 and EN61547 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of **Shenzhen AOV Testing Technology Co., Ltd**.

Date of Test:	Jan.03-08, 2014	
Prepared by:	Tessie	
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	Technical Director	





1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description : LED strobe arm band

Model Number : UF5190(U289), UF5185

They are quite same in circuit design and PCB layout, so all tests of this report are perform on model **UF5190(U289)**.

Applicant

Date of Test : Jan.03-08, 2014





1.2. Test Summary

Test Items	Standards	Status
Magnetic Field Emission test	EN55015:2006+A1:2007+ A2:2009	Complied
Power line conducted emission test	EN55015:2006+A1:2007+ A2:2009	N/A
Radiated emission test	EN55015:2006+A1:2007+ A2:2009	Complied
Harmonic Current Emission test	EN61000-3-2:2006+A1:2009+A2:2009	N/A
Voltage fluctuations & flicker test	EN61000-3-3:2008	N/A
Electrostatic discharge Test	EN61000-4-2:2009	Complied
RF Field strength susceptibility Test	EN61000-4-3:	Complied
	2006+A1:2008+A2:2010	
Electrical fast transient/Burst Test	EN61000-4-4: 2004+A1:2010	N/A
Surge Test	EN61000-4-5:2006	N/A
Injected currents susceptibility test	EN61000-4-6:2009	N/A
Magnetic Field Immunity Test	EN61000-4-8:2010	Complied
Voltage dips and interruptions test	EN61000-4-11:2004	N/A

1.3. Test Facility

Test Firm : ACCURATE TECHNOLOGY CO.,LTD

Address : F1,Bldg.A,Changyuan New Material Port Keyuan Rd.,

Science&Industry Park, Nanshan ShenZhen, P.R. China

Tel : 0755-26503290/0755-26507022

Fax : 0755-26503396

1.4. Test Uncertainty

Conducted Emission Uncertainty =±2.66dB

Magnetic Field Emission Uncertainty =±2.66dB

Radiated Emission Uncertainty =±4.26dB



2. TEST INSTRUMENT USED

No.	Equipment	Manufacturer	Model No.	S/N	Cal. Date	Next Cal. Date
1	ESD TESTER	HAEFELY	PESD1610	H401552	2013.12.10	2014.12.09
2	MAGNETIC FIELD TESTER	HAEFELY	MAG100	150577	2013.12.10	2014.12.09
3	5kVA AC POWER SOURCE	CALIFORNIA INSTRUMENTS	5001ix-400	55692	2013.12.10	2014.12.09
4	HARMONICS/FLICKER TEST ANALYZER	CALIFORNIA INSTRUMENTS	PACS-1	72254	2013.12.10	2014.12.09
5	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200283933	2013.12.10	2014.12.09
6	CONICAL HOUSING	ATC	N/A	N/A	N/A	N/A
7	VOLTAGE PROBE	SCHWARZBECK	TK9416	N/A	2013.12.10	2014.12.09
8	RF CURRENT PROBE	ROHDE& SCHWARZ	EZ-17	100048	2013.12.10	2014.12.09
9	BILOG ANTENNA	SCHWARZBECK	VULB9163	194	2013.12.10	2014.12.09
10	SPECTRUM ANALYZER	ANRITSU	MS2651B	N/A	2013.12.10	2014.12.09
11	PRE-AMPLIFIER	AGILENT	8447D	294A10619	2013.12.10	2014.12.09
12	RF COAXIAL CABLE(844 CHAMBER)	SCHWARZBECK	N-5m	NO.1	2013.12.10	2014.12.09
13	THERMO-HYGROMETER	OREGON SCIENTIFIC	JB913R	GZ-WS004	2013.12.10	2014.12.09
14	1# SHIELDING ROOM	CHANGZHOU ZHONGYU	843	N/A	N/A	N/A
15	2# SHIELDING ROOM	CHANGZHOU ZHONGYU	843	N/A	N/A	N/A
16	3m Semi-ANECHOIC CHAMBER	CHANGZHOU ZHONGYU	844	N/A	N/A	N/A
17	ANTENNA/TURNTABLE CONTROLLER	INNCO	CO2000	CO2000/077/730 1203/L	N/A	N/A
18	101 LCR METER	YANGZHI	YD2810B	20101170	2013.12.10	2014.12.09
19	RF COAXIAL CABLE(844 CHAMBER)	NTGS8017	N-1m	NO.6	2013.12.10	2014.12.09
20	RF COAXIAL CABLE(844 CHAMBER)	NTGS8017	N-1m	NO.7	2013.12.10	2014.12.09
21	AUDIO GENERATOR	GW	GAG-809	EG835424	N/A	N/A
22	THERMO-HYGROMETER	OREGON SCIENTIFIC	JB913R	GZ-WS002	2013.12.10	2014.12.09

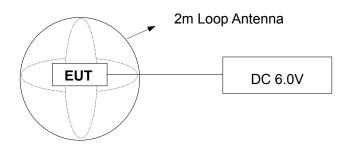


No	Equipment 29	Manufacturer	Model No.	S/N	Cal. Date	Next Cal. Date
23	EMCPRO SYSTEM (IMMUNITY TESTER)	THERMO	PRO-BASE	0403271	2013.12.10	2014.12.09
24	CAPACITIVE CLAMP (EFT)	THERMO	PRO-CCL	0403272	2013.12.10	2014.12.09
25	COUPLER DECOUPLER FOR TELECOM LINES	THERMO	CM-TEL-CD	0403273	2013.12.10	2014.12.09
26	L.I.S.N.	ROHDE& SCHWARZ	ESH3-Z5	100305	2013.12.10	2014.12.09
27	EMI TEST RECEIVER	ROHDE& SCHWARZ	ESPI-3	100396/003	2013.12.10	2014.12.09
28	SIGNAL GENERATOR	ROHDE& SCHWARZ	SML01	101161	2013.12.10	2014.12.09
29	EMI TEST RECEIVER	ROHDE& SCHWARZ	ESPI-3	101526/003	2013.12.10	2014.12.09
30	SPECTRUM ANALYZER	AGILENT	E7405A	MY45115511	2013.12.10	2014.12.09
31	L.I.S.N.	SCHWARZBECK	NSLK8126	8126431	2013.12.10	2014.12.09
32	PULSE LIMITER (FOR ESPI3)	ROHDE& SCHWARZ	ESH3-Z2	100815	2013.12.10	2014.12.09
33	PRE-AMPLIFIER	ROHDE& SCHWARZ	CBLU1183540-01	3791	2013.12.10	2014.12.09
34	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200506474	2013.12.10	2014.12.09
35	BILOG ANTENNA	SCHWARZBECK	VULB9163	9163-323	2013.12.10	2014.12.09
36	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D-655	2013.12.10	2014.12.09
37	HORN ANTENNA	SCHWARZBECK	BBHA9170	9170-359	N/A	N/A
38	LOOP ANTENNA	SCHWARZBECK	FMZB1516	1516131	2013.12.10	2014.12.09
39	ULTRA COMPACT SIMULATOR	EM TEST	UCS 500 N5	V0928104968	2013.12.10	2014.12.09
40	CAPACITIVE CLAMP	EM TEST	HFK	0509-34	2013.12.10	2014.12.09
41	Transformer	EM TEST	V4780S2	0109-44	N/A	N/A
42	Conducted Immunity Test System	FRANKONIA	CIT-10	126B1121	2013.12.10	2014.12.09
43	CDN	FRANKONIA	CDN-M2/3	A3027020	2013.12.10	2014.12.09
44	EM Injection Clamp	FCC	F-203I-23mm	091824	2013.12.10	2014.12.09
45	LISN	AFJ	LS16C	16010946249	2013.12.10	2014.12.09
46	CLICK METER	AFJ	CL55C	55040947164	2013.12.10	2014.12.09



3. MAGNETIC FIELD EMISSION TEST

3.1. Block Diagram of Test Setup



(EUT: LED strobe arm band)

3.2. Test Standard

EN55015:2006+A1:2007+A2:2009

3.3. Magnetic Field Emission 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.

3.4. EUT Configuration on Test

The EN55015 regulations test method must be used to find the maximum emission during Magnetic Field Emission test.

3.4.1.LED strobe arm band (EUT)

(A) Model No. : UF5190(U289)(B) Serial No. : E2014010903J





3.5. Operating Condition of EUT

- 3.5.1. Setup the EUT as shown in Section 3.1.
- 3.5.2. Turn on the power of all equipments.
- 3.5.3.Let the EUT work in test mode (ON) and test it.

3.6. 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 coax switch.

The frequency range from 9 KHz to 30MHz is investigated. The receiver is measured with the quasi-peak detector. For frequency band 9 KHz to 150 KHz, the bandwidth of the field strength meter (R&S test receiver ESCI) is set at 100Hz. For frequency band 150 KHz to 30MHz, the bandwidth is set at 9 KHz.

All the test results are listed in Section 3.7

3.7. Test Results

PASS.

The frequency range from 9 KHz to 30MHz is investigated. As the peak value is too low against the limit, so the Quasi-peak value has been omitted.



4. RADIATED EMISSION TEST

4.1. Block Diagram of Test Setup

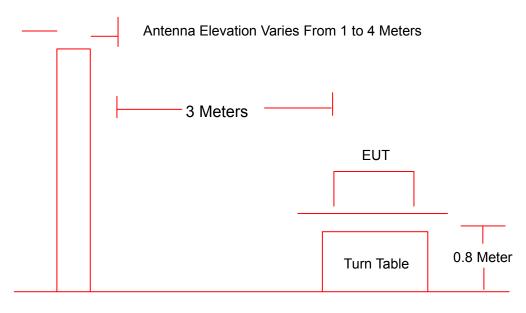
4.1.1.Block Diagram of EUT Test Setup



(EUT: LED strobe arm band)

4.1.2. Anechoic Chamber Setup Diagram

Antenna Tower



Ground Plane

(EUT: LED strobe arm band)

4.2. Test Standard

EN55015:2006+ A1:2007+A2:2009





4.3. Radiated Emission Limit

Frequency	Distance	Field Strengths Limits
MHz	(Meter/s)	dB(μ V)/m
30 ~ 230	3	40.0
230 ~ 300	3	47.0

- Remark: (1) Emission level (dB (μ V)/m) = 20 log Emission level (μ V/m)
 - (2) The smaller limit shall apply at the cross point between two frequency bands.
 - (3) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.

4.4. EUT Configuration on Test

The configuration of the EUT is same as Section 3.4.

4.5. Operating Condition of EUT

- 4.5.1. Setup the EUT and simulators as shown in Section 4.1.
- 4.5.2. Turn on the power of all equipments.
- 4.5.3.Let the EUT work in test mode and test it.





4.6. Test Procedure

The EUT and its simulators are placed on a turned table that is 0.8 meter above the ground. The turned 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 that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find the maximum emission levels, the interface cable must be manipulated according to EN55015 on radiated emission test.

The bandwidth setting on the field strength meter (R & S Test Receiver ESPI) is set at 120 KHz.

The frequency range from 30 MHz to 300 MHz is investigated. The test data are listed in the Section 4.7 and the scanning waveform are attached within Appendix I.

4.7. Radiated Emission Test Result

PASS.

The frequency spectrum from 30MHz to 300MHz is investigated.

Detail information, please see the appendix (I) file.



5. ELECTROSTATIC DISCHARGE TEST

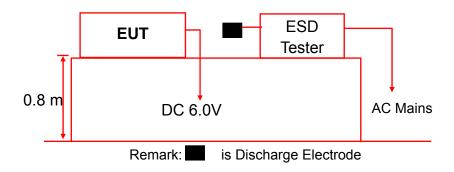
5.1. Block Diagram of Test Setup

5.1.1.Block Diagram of the EUT



(EUT: LED strobe arm band)

5.1.2.Block Diagram of ESD Test Setup



5.2. Test Standard

EN61547: 2009 (EN61000-4-2: 2009) Severity Level 3 for Air Discharge at 8KV Severity Level 2 for Contact Discharge at 4KV

5.3. Severity Levels and Performance Criterion

5.3.1.Severity level

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

5.3.2.Performance criterion: B





5.4. EUT Configuration on Test

The configuration of EUT is listed in Section 3.4.

5.5. Operating Condition of EUT

- 5.5.1. Setup the EUT as shown in Section 5.1.
- 5.5.2. Turn on the power of all equipments.
- 5.5.3.Let the EUT work in test mode (ON) and test it.

5.6. Test Procedure

5.6.1.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.

5.6.2. Contact Discharge:

All the procedure shall be same as Section 5.6.1 except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

5.6.3. Indirect discharge for horizontal coupling plane

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

5.6.4. Indirect discharge for vertical coupling plane

At least 20 single discharges 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.

5.7. Test Results

PASS.

Please refer to the following page.





Electrostatic Discharge Test Results

EUT : LED strobe arm band Temperature : 25° C

M/N : UF5190(U289) Humidity : 55%

Power Supply: DC 6.0V Test Mode: ON

Air Discharge: ±8KV For each point positive 10 times and negative 10 times discharge.

Contact Discharge: ±4KV

Location	Kind A-Air Discharge C-Contact Discharge	Result
Slot	A	PASS
HCP	С	PASS
VCP	С	PASS

Remark:

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

Test Equipment: See Clause 2.



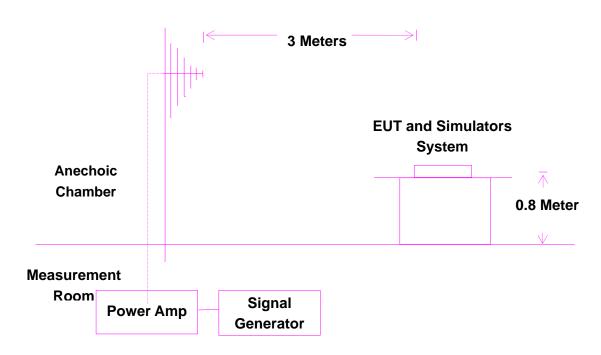
6. RF FIELD STRENGTH SUSCEPTIBILITY TEST

6.1. Block Diagram of Test Setup

6.1.1.Block Diagram of the EUT and the simulators

(EUT: LED strobe arm band)

6.1.2.R/S Test Setup



6.2. Test Standard

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

6.3. Severity Levels and Performance Criterion

6.3.1.Severity level

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

6.3.2.Performance criterion: A



6.4. EUT Configuration on Test

The configuration of EUT is listed in Section 3.4.

6.5. Operating Condition of EUT

- 6.5.1. Setup the EUT as shown in Section 6.1.
- 6.5.2. Turn on the power of all equipments.
- 6.5.3.Let the EUT work in test mode (ON) and test it.

6.6. Test Procedure

The EUT and its simulators are placed on a turned table that is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna that is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is 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 the EUT.

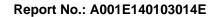
All the scanning conditions are as follows:

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

6.7. Test Results

PASS.

Please refer to the following page.





RF Field Strength Susceptibility Test Results

EUT:	LED strobe arm band			Temperature:	25℃		
M/N:	UF5190(U289)			Humidity:	55%		
Power Supply:	DC 6.0V			Test Mode:	ON		
Field Strength:	3 V/m			Frequency Range	e: 80 MHz to 1000 MHz		
Modulation:		AM	Pulse	none 1 K	Hz 80%		
Test Mode: ON	١						
			Freque	ncy Range: 80-1000 MHz			
Steps			#	1	%		
		Horizontal		Vertical			
Front		Pass		Pass			
Right		Pass		Pass			
Rear		Pas	SS	Pass			
Left		Pass		Pass			
Test Equipme	nt:						
See Clause 2							
Note:							



7. MAGNETIC FIELD IMMUNITY TEST

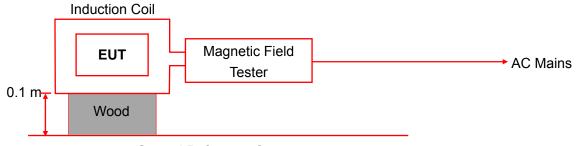
7.1. Block Diagram of Test Setup

7.1.1.Block Diagram of the EUT



(EUT: LED strobe arm band)

7.1.2.Block Diagram of Test Setup



Ground Reference Support

7.2. Test Standard

EN61547: 2009 (EN61000-4-8: 2010)

Severity Level 2 at 3 A/m

7.3. Severity Levels and Performance Criterion

7.3.1. Severity level

Level	Magnetic Field Strength A/m
1.	1
2.	3
3.	10
4.	30
5.	100
X.	Special

7.3.2.Performance criterion: A

7.4. EUT Configuration on Test

The configuration of EUT is listed in Section 3.4.





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 test it.

7.6. Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 7.1. The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

7.7. Test Results

PASS.

Please refer to the following page.





Magnetic Field Immunity Test Results

EUT:	LED strobe arm band				Temperature:	25 ℃
M/N:	UF5190(U289)				Humidity:	55%
Power Supply:	DC 6.0V	Test Mode:	ON			
Test Model: ON	I					
Test Level	Testir	entation	Criterion	Result		
3A/M		5 mins	Horiz	contal	А	PASS
3A/M	Ę	5 mins	Ver	tical	А	PASS
Remark:			Test Eq See Cla	uipment: iuse 2.		



8. PHOTOGRAPHS OF TEST SETUP

8.1. Photo of Radiated Emission Test

Front View





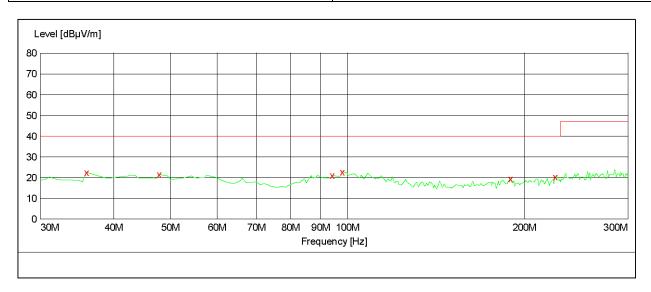
APPENDIX I

Radiated Emission Test Data



Radiated Emission

Engineer : Andy	
EUT : LED strobe arm band	Time : 2014/01/07
Limit : EN55015	Comment : 25 ℃/55%
MN: UF5190(U289)	Note : Hor
Power : DC 6.0V	



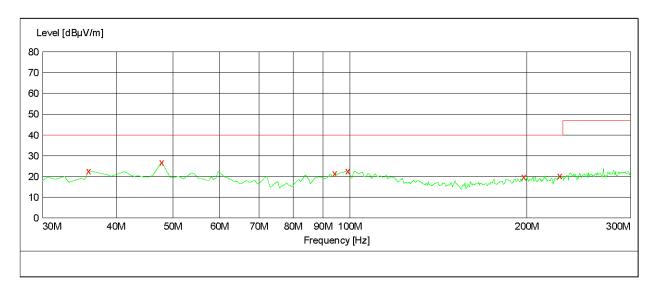
MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
35.940000	22.60	14.7	40.0	17.4		100.0	0.00	HORIZONTAL
47.820000	21.60	15.8	40.0	18.4		100.0	0.00	HORIZONTAL
94.260000	21.20	16.9	40.0	18.8		100.0	0.00	HORIZONTAL
98.040000	22.90	17.4	40.0	17.1		100.0	0.00	HORIZONTAL
189.300000	19.60	14.7	40.0	20.4		100.0	0.00	HORIZONTAL
225.480000	20.50	15.8	40.0	19.5		100.0	0.00	HORIZONTAL



Radiated Emission

Engineer : Andy	
EUT : LED strobe arm band	Time : 2014/01/07
Limit : EN55015	Comment : 25 ℃/55%
MN: UF5190(U289)	Note : Ver
Power : DC 6.0V	



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
35.940000	22.80	14.7	40.0	17.2		100.0	0.00	VERTICAL
47.820000	27.00	15.8	40.0	13.0		100.0	0.00	VERTICAL
94.260000	21.70	16.9	40.0	18.3		100.0	0.00	VERTICAL
99.120000	22.80	17.5	40.0	17.2		100.0	0.00	VERTICAL
197.400000	20.00	14.8	40.0	20.0		100.0	0.00	VERTICAL
227.100000	20.30	15.9	40.0	19.7		100.0	0.00	VERTICAL



APPENDIX II

Photographs of the EUT



FIGURE 1General Appearance of the EUT

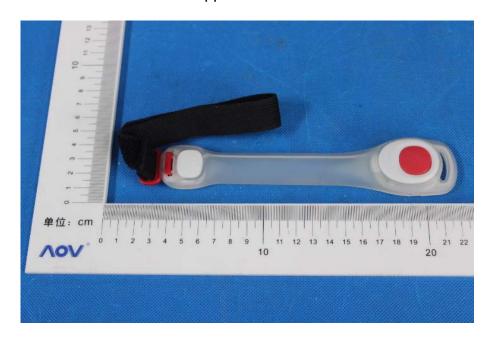


FIGURE 2
Others Model of the EUT (M/N: UF5190(U289))





FIGURE 3
Others Model of the EUT(M/N: UF5185)

