

Test Report #	17A-003857-4	Date of Report Issue:	November 15, 2017
Date of Sample Received:	October 11, 2017	Pages:	Page 1 of 32
Applicant:	Mid Ocean Brands B.V.		
Product Name:	Hanging light		
Brand Name:	N/A		
Model No.	MO9255		
Date of Receipt : Date of Test: Date of Report:	Nov.20,2017 Nov.21-23, 2017 Nov. 29, 2017		

Prepared by:

Hangzhou Asiainspection Testing Technology Co.,Ltd.

# The EMC testing has been performed on the submitted samples and found in compliance with the council EMC directive 2014/30/EU.

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages:

November 15, 2017 Page 2 of 32

#### TABLE OF CONTENTS

Description	Page
Test Report Declaration	4
1. GENERAL INFORMATION	5
1.1. Description of Device (EUT)	5
1.2. Operational Mode(s) of EUT	5
1.3. Test Voltage(s) of EUT	5
2. DESCRIPTION OF TEST STANDARD	6
3. LABORATORY INFORMATION	7
3.1. Laboratory Name	7
3.2. Location	7
3.3. Test facility	7
3.4. Measurement Uncertainty	7
4. SUMMARY OF TEST RESULTS	8
5. BLOCK DIAGRAM OF TEST SETUP	9
5.1. Block Diagram of connection between EUT and simulation-EMI	9
5.2. Block Diagram of connection between EUT and simulation-EMS	9
6. TEST INSTRUMENT USED	10
6.1. For Magnetic Test (In Shielding Room)	10
6.2. For Radiation Test (In Anechoic Chamber)	10
6.3. For Electrostatic Discharge Immunity Test	10
6.4. For RF Strength Susceptibility Test	10
6.5. For Magnetic Field Immunity Test	11
7. MAGNETIC TEST	
7.1. Configuration of Test System	12
7.2. Test Standard	12
7.3. Magnetic Field Emission Limit	
7.4. Test Procedure	12
7.5. Radiated Disturbance Test Results	13
8. RADIATED DISTURBANCE TEST	14
8.1. Configuration of Test System	14
8.2. Test Standard	14
8.3. Radiated Disturbance Limit	14
8.4. Test Procedure	14
8.5. Radiated Disturbance Test Results	15
9. IMMUNITY PERFORMANCE CRITERIA	
10.ELECTROSTATIC DISCHARGE IMMUNITY TEST	17
10.1. Configuration of Test System	17
10.2. Test Standard	17
10.3. Severity Levels and Performance Criterion	18
10.4. Test Procedure	18
10.5. Test Results	
11. RF FIELD STRENGTH SUSCEPTIBILITY TEST	20

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages:

November 15, 2017 Page 3 of 32

11.1. Configuration of Test System	20
11.2. Test Standard	
11.3. Severity Levels and Performance Criterion	20
11.4. Test Procedure	21
11.5. Test Results	21
12. MAGNETIC FIELD IMMUNITY TEST	23
12.1. Configuration of Test System	23
12.2. Test Standard	23
12.3. Severity Levels and Performance Criterion	23
12.4. Test Procedure	
12.5. Test Results	24

APPENDIX I APPENDIX II (Test Photos) APPENDIX III(Photos of the EUT)

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17A-003857-4 October 11, 2017 Date of Report Issue:

Pages:

November 15, 2017 Page 4 of 32

#### TEST REPORT DECLARATION

Report Number	MTE/AVJ/B17112369/1
Applicant Mid Ocean Brands B.V.	
Address	Unit 201,2/F, Laford Centre, 838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, HongKong
Product Name Hanging light	
Model No. MO9255	
Power Supply	DC 4.5V
Test Result	The EUT was found compliant with the requirement(s) of the standards.
Standard	EN 55015:2013+A1:2015, EN 61547:2009 (IEC 61000-4-2:2008, IEC 61000-4-3:2006+A1:2007+A2:2010, IEC 61000-4-8:2009)

\*Note

The above device has been tested by Hangzhou AsiaInspection Technology Co., Ltd To determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test record, data evaluation & Equipment Under Test (EUT) configurations represented are contained in this test report and Hangzhou AsiaInspection Technology Co., Ltd Is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced except in full, without written approval of Hangzhou AsiaInspection Technology Co., Ltd, this document may be altered or revised by Hangzhou AsiaInspection Technology Co., Ltd, personal only, and shall be noted in the revision of the document.

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Test Report #17A-003857-4Date of Report Issue:November 15, 2017Date of Sample Received:October 11, 2017Pages:Page 5 of 32

# **1. GENERAL INFORMATION**

#### 1.1. Description of Device (EUT)

Description	:	Hanging light
Model Number	:	MO9255
Remark	:	N/A

#### 1.2. Operational Mode(s) of EUT

Order Number	:	Test Mode(s)
1	:	ON

### 1.3. Test Voltage(s) of EUT

Order Number	:	Test Voltage(s)		
1	:	DC 4.5V by Battery		

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 6 of 32

### 2. DESCRIPTION OF TEST STANDARD

The intention of this publication is to establish uniform requirements for the radio disturbance level of the equipment contained in the scope, to fix limits of disturbance, to describe methods of measurement and to standardize operating conditions and interpretation of results.

The following referenced standard are indispensable for the application of this report.

Referenced Description below:

EN 55015:2013+A1:2015

Limits and methods of measurement of radio disturbance characteristics of electrical Torching and similar equipment.

EN 61547:2009 Equipment for general Torching purposes - EMC immunity requirements.



17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 7 of 32

# 3. LABORATORY INFORMATION

3.1. Laboratory Name

Hangzhou Asiainspection Testing Technology Co.,Ltd.

3.2. Location

5th Floor, A2 Building, No. 1213, Huo Ju South Road, Binjiang District, Hangzhou, China

#### 3.3. Test facility **3m Anechoic Chamber** Nov.28, 2012 File on Federal : **Communication Commission Registration Number:490827** Shielding Room : Nov.28, 2012 File on Federal **Communication Commission** Registration Number:490827 EMC Lab. Accredited by TUV Rheinland Shenzhen : Audit Report: UA 50149851 Mar. 12, 2009 Accredited by Industry Canada Registration Number: 7103A-1 Oct. 22, 2012 Accredited by TIMCO Registration Number: Q1460 March 28, 2010

#### 3.4. Measurement Uncertainty

No.	Item	Uncertainty
1.	Uncertainty for Conducted Disturbance Test	1.25dB
2.	Uncertainty for Radiated Disturbance Test	3.15dB

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages:

November 15, 2017 Page 8 of 32

#### 4. SUMMARY OF TEST RESULTS

Test Item	Standard	Limits	Results	
Conducted disturbance at mains terminals	EN 55015:2013+A1:2015		N/A	
Magnetic test	EN 55015:2013+A1:2015		PASS	
Radiated disturbance	EN 55015:2013+A1:2015		PASS	
*Harmonic current emissions	EN 61000-3-2:2014	N/A	N/A	
Voltage fluctuations & flicker	EN 61000-3-3:2013	N/A	N/A	
	IMMUNITY (EN 61547:2009)	· · ·		
Test Item	Basic Standard	Performance Criteria	Results	
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	В	PASS	
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006 +A1:2007+A2:2010	А	PASS	
Electrical fast transient (EFT)	IEC 61000-4-4:2012	В	N/A	
Surge (Input a.c. power ports)	IEC 61000-4-5:2014	В	N/A	
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6:2013	А	N/A	
Power frequency magnetic field	IEC 61000-4-8:2009	А	PASS	
Voltage dips, 100% reduction	IEC 61000-4-11:2004	В	N/A	
voltage alps, 10070 reduction			N/A	

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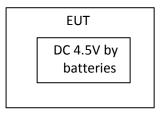


17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 9 of 32

### 5. BLOCK DIAGRAM OF TEST SETUP

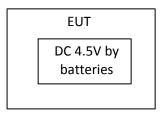
The equipments are installed test to meet EN 55015 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. EUT was tested in normal configuration (Please See following Block diagrams)

5.1. Block Diagram of connection between EUT and simulation-EMI



# (EUT: Hanging light)

5.2. Block Diagram of connection between EUT and simulation-EMS



(EUT: Hanging light)

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages:

November 15, 2017 Page 10 of 32

# **6. TEST INSTRUMENT USED**

# 6.1. For Magnetic Test (In Shielding Room)

ltem	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCS30	100307	Mar. 10, 17	1 Year
2.	Loop Antenna	Laplace	RF300	8006	Mar. 10, 17	1 Year
3.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100305	Mar. 10, 17	1 Year
4.	Coaxial Switch	Anritsu Corp	MP59B	6200283933	Mar. 07, 17	1 Year

# 6.2. For Radiation Test (In Anechoic Chamber)

ltem	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESPI	101202	Mar. 10, 17	1 Year
2.	Bilog Antenna	Sunol	JB3	A121206	Mar. 14, 17	1 Year
3.	Cable	Resenberger	N/A	NO.1	Mar. 07, 17	1 Year
4.	Cable	SchwarzBeck	N/A	NO.2	Mar. 07, 17	1 Year
5.	Cable	SchwarzBeck	N/A	NO.3	Mar. 07, 17	1 Year
6.	DC Power Filter	DuoJi	DL2[]30B	N/A	N/A	N/A
7.	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	N/A	N/A
8.	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	N/A	N/A

### 6.3. For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.		Cal. Interval
1.	ESD Tester	Zhongsheng	ESD-203AX	023K14538	Mar. 07, 17	1 Year

#### 6.4. For RF Strength Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.
						Interval
1.	Signal Generator	IFR	2032	203002/100	Mar. 14, 17	1 Year
1.	Amplifier	A&R	150W1000	301584	NCR	NCR
2.	Dual Directional	A&R	DC6080	301508	Mar. 14, 17	1 Year
3.	Power Sensor	Anritsu	MA2491A	32263	Mar. 14, 17	1 Year
4.	Power Meter	R&S	NRVS	100444	Mar. 14, 17	1 Year
5.	Field Monitor	A&R	FM5004	300329	Mar. 14, 17	1 Year
6.	Field Probe	A&R	FP5000	300221	Mar. 14, 17	1 Year
7.	Log-periodic	A&R	AT1080	16512	Mar. 14, 17	1 Year
8.	RF Cable	MIYAZAKI	N/A	No.1/No.2	Mar. 07, 17	1 Year

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 11 of 32

6.5. For Magnetic Field Immunity Test

ltem	Equipment	Manufacturer	Model No.	Serial No.		Cal. Interval
1.	EMCPRO System	EM Test	UCS-500-M4	V0648102026	Mar. 10, 17	1 Year

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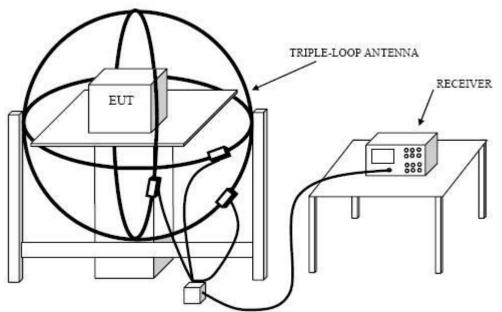


17A-003857-4 October 11, 2017 Date of Report Issue: I Pages: I

November 15, 2017 Page 12 of 32

# 7. MAGNETIC TEST

7.1. Configuration of Test System



# 7.2. Test Standard EN 55015:2013+A1:2015

7.3. Magnetic Field Emission Limit

Frequency	Limits for loop diameter (dBuA)
(MHz)	2m
0.009~0.07	88
0.07~0.15	88~58*
0.15~3.00	58~22*
3.00~30.0	22

Note: 1.At the transition frequency the lower limit applies.

2. \*decreasing linearly with logarithm of the frequency.

7.4. 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 200Hz. For frequency band 150 KHz to 30MHz, the bandwidth is set at 9 KHz.

The test result are reported on Section 7.5.

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17A-003857-4 October 11, 2017 Date of Report Issue:NovemPages:Page 1

November 15, 2017 Page 13 of 32

7.5. Radiated Disturbance Test Results 7.5.1.Test Results: PASS

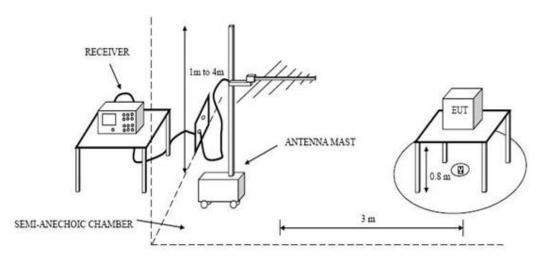
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17A-003857-4 October 11, 2017 Date of Report Issue:November 15, 2017Pages:Page 14 of 32

### 8. RADIATED DISTURBANCE TEST

# 8.1. Configuration of Test System



8.2. Test Standard

EN 55015:2013+A1:2015

8.3. Radiated Disturbance Limit

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

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dBμV/m)
30 ~ 230	3	40
230 ~ 300	3	47

Note: 1. The lower limit shall apply at the transition frequencies.

2. Distance refers to the distance in meters between the test antenna and the closed point of any part of the EUT.

8.4. Test Procedure

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

The bandwidth setting on the test receiver is 120 kHz.

The frequency range from 30MHz to 300MHz is checked. The test result are reported on Section 8.5.

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 15 of 32

8.5.Radiated Disturbance Test Results

- 8.5.1.Test Results: PASS
- 8.5.2.Emission Level= Correct Factor + Reading Level.
- 8.5.3.All reading are Quasi-Peak values.
- 8.5.4.The test data and the scanning waveform are attached within Appendix I.

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 16 of 32

### 9. IMMUNITY PERFORMANCE CRITERIA

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

Definition related to the performance level: Based on the used product standard Based on the declaration of the manufacturer, requestor or purchaser

# 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.

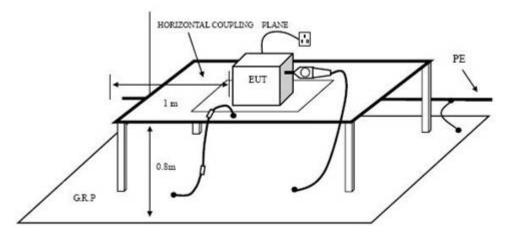


17A-003857-4 October 11, 2017 Date of Report Issue: Pages:

### **10. ELECTROSTATIC DISCHARGE IMMUNITY TEST**

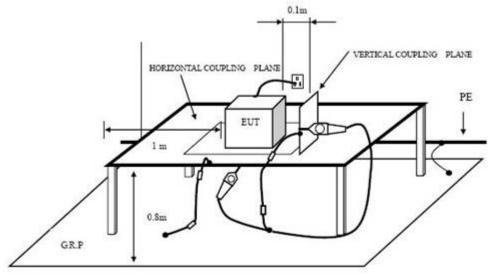
10.1. Configuration of Test System

10.1.1. Configuration of ESD Test System(Direct Discharge)





# 10.1.2.Configuration of ESD Test System(Indirect Discharge)



INDIRECT DISCHARGE SETUP

10.2.Test Standard

EN 61547:2009 (IEC 61000-4-2:2008) (Severity Level 3 for Air Discharge at 8KV, Severity Level 2 for Contact Discharge at 4KV)

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17A-003857-4 October 11, 2017 Date of Report Issue:November 15, 2017Pages:Page 18 of 32

# 10.3. Severity Levels and Performance Criterion

#### 10.3.1.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
Х	Special	Special

10.3.2.Performance criterion : B

# 10.4.Test Procedure

# 10.4.1.Air Discharge:

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

# 10.4.2.Contact Discharge:

All the procedure was same as Section 13.4.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch was operated.

# 10.4.3. 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 positions vertically at a distance of 0.1mfrom the EUT and with the discharge electrode touching the coupling plane.

#### 10.4.4.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.

#### 10.5.Test Results

10.5.1.Test Results: PASS

#### 10.5.2.Test data on the following pages.

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages:

November 15, 2017 Page 19 of 32

# **Electrostatic Discharge Test Results**

Test Voltage :	1		Test Date:		Oct.18,2017	
Test Mode :	1		Criterion	:	В	
Temperature:	<b>26</b> ℃		Humidity:		54%	
			charge each Point Positive 10 times and 10 times discharge.			
Contact Discharge:	±4KV	# For Contac	# For Contact Discharge each point positive 10 times and			
		negative	e 10 times discharge.			
		Test Results D	escription			
	Location			<b>Kind</b> A-A Dischar C-Conta Dischar	ge <b>Result</b>	
Gaps				А	PASS	
Switch				А	PASS	
Screw				С	PASS	
НСР				С	PASS	
VCP of Front				с	PASS	
VCP of Rear				С	PASS	
VCP of Left				С	PASS	
VCP of Right				С	PASS	
Remark :						

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

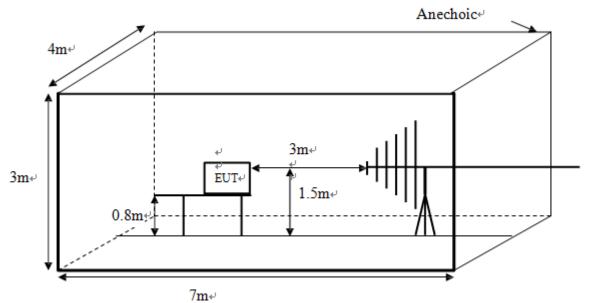
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17A-003857-4 October 11, 2017 Date of Report Issue:November 15, 2017Pages:Page 20 of 32

# **11. RF FIELD STRENGTH SUSCEPTIBILITY TEST**

11.1.Configuration of Test System



#### 11.2.Test Standard

EN 61547:2009 (IEC 61000-4-3:2006+A1:2007+A2:2010) (Severity Level: 2 at 3V / m)

- 11.3. Severity Levels and Performance Criterion
  - 11.3.1.Severity level

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

11.3.2.Performance criterion : A

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 21 of 32

# 11.4.Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which 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
---------

80% amplitude modulated with a

3 V/m (Severity Level 2)

1kHz sine wave

80 - 1000 MHz

1.5 Sec.

0.0015 decade/s

1.	Test Fielded Strength	
	0	

- 2. Radiated Signal
- 3. Scanning Frequency
- 4. Sweeping time of radiated
- 5. Dwell Time

# 11.5.Test Results

11.5.1.Test Results: PASS

11.5.2.Test data on the following pages.



Test Report #

17A-003857-4 Date of Sample Received: October 11, 2017 Date of Report Issue: November 15, 2017 Pages:

Page 22 of 32

# **RF Field Strength Susceptibility Test Results**

Test Voltage :	est Voltage : 1		Test Date:	Nov.23,2017	
Test Mode:	le: 1		Frequency Range:	80-1000MHz	
Field Strength:	d Strength : 3 V/m		Criterion :	А	
Temperature:	<b>25</b> ℃	<b>25</b> ℃		55%	
Modulation:	<u>∏</u> Ø AM	🗌 🗆 Pulse	e 🗌 🗌 none 1 k	Hz 80%	
		Test Resu	Its Description		
			cy Rang 1: 1000 MHz		
Ste	eps	1	%	1%	
		Horizontal		Vertical	
Fro	ont	PASS		PASS	
Ri	ght	PASS		PASS	
Re	ear	PASS		PASS	
Le	eft	PASS		PASS	
Note: No function	n loss				

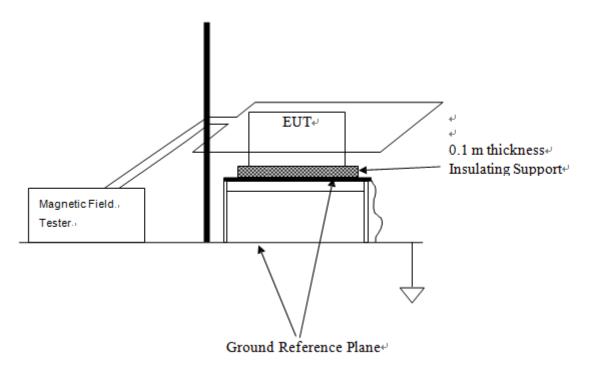
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Test Report #17A-003857-4Date of Report Issue:November 15, 2017Date of Sample Received:October 11, 2017Pages:Page 23 of 32

### **12. MAGNETIC FIELD IMMUNITY TEST**

#### 12.1.Configuration of Test System



- 12.2.Test Standard EN 61547:2009 (IEC 61000-4-8:2009) (Severity Level 2 at 3A/m)
- 12.3. Severity Levels and Performance Criterion
  - 12.3.1.Severity level

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

#### 12.3.2.Performance criterion : A

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17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 24 of 32

# 12.4.Test Procedure

The EUT was subjected to the test magnetic field by using the induction coil of standard dimensions (1m\*1m) and shown in Section 18.1. The induction coil was then rotated by 90° in order to expose the EUT to the test field with different orientations.

# 12.5.Test Results

- 12.5.1.Test Results: PASS
- 12.5.2.Test data on the following pages.



Test Report #

Date of Sample Received:

17A-003857-4 October 11, 2017 Date of Report Issue: November 15, 2017 Pages:

Page 25 of 32

### **Magnetic Field Immunity Test Results**

3A/m(50Hz/60Hz)     5 mins     Y     A     PA										
Test Level     Testing Duration     Coil Orientation     Criterion     Res       3A/m(50Hz/60Hz)     5 mins     X     A     PA       3A/m(50Hz/60Hz)     5 mins     Y     A     PA										
Test LevelTesting DurationCoil OrientationCriterionRes3A/m(50Hz/60Hz)5 minsXAPA3A/m(50Hz/60Hz)5 minsYAPA										
Duration         Duration           3A/m(50Hz/60Hz)         5 mins         X         A         PA           3A/m(50Hz/60Hz)         5 mins         Y         A         PA	Test Results Description									
3A/m(50Hz/60Hz)         5 mins         Y         A         PA	ult									
	SS									
3A/m(50Hz/60Hz) 5 mins Z A PA	PASS									
	SS									
Remark: No function loss										

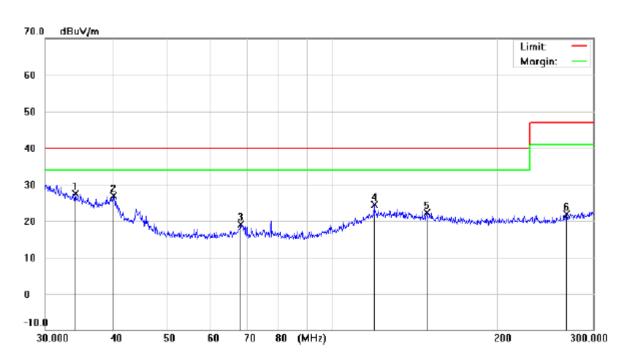
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Test Report #	17A-003857-4	Date of Report Issue:	November 15, 2017
Date of Sample Received:	October 11, 2017	Pages:	Page 26 of 32

#### **APPENDIX I**

EUT:	Hanging light	M/N:	MO9255
Mode:	ΟΝ	Phase:	Vertical
Test by:	Joe	Power.	DC 4.5V by Battery
Temperature:/Humidity	24.0°C/ 51%	Test date:	2017-11-23



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	34.0503	9.38	18.15	27.53	40.00	-12.47	QP			
2		39.9136	13.02	13.86	26.88	40.00	-13.12	QP			
3		68.0959	10.97	8.17	19.14	40.00	-20.86	QP			
4	1	119.4322	10.92	13.68	24.60	40.00	-15.40	QP			
5	1	148.6351	9.60	12.80	22.40	40.00	-17.60	QP			
6	2	267.3753	9.51	12.39	21.90	47.00	-25.10	QP			

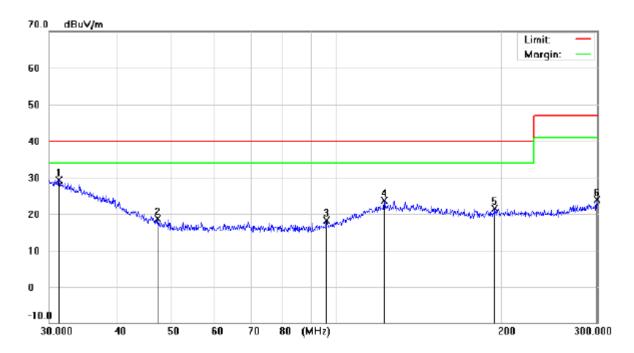
#### :Maximum data x:Over limit !:over margin

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Test Report #	17A-003857-4	Date of Report Issue:	November 15, 2017
Date of Sample Received:	October 11, 2017	Pages:	Page 27 of 32

EUT:	Hanging light	M/N:	MO9255
Mode:	ON	Phase:	Horizontal
Test by:	Joe	Power.	DC 4.5V by Battery
Temperature:/Humidity	24.0°C/ 51%	Test date:	2017-11-23



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBu∀/m	dB	Detector	cm	degree	Comment
1	*	31.2695	9.33	20.04	29.37	40.00	-10.63	QP			
2		47.2195	9.26	9.43	18.69	40.00	-21.31	QP			
3		95.9669	9.45	8.91	18.36	40.00	-21.64	QP			
4		122.4958	9.73	13.90	23.63	40.00	-16.37	QP			
5		195.0389	9.43	12.05	21.48	40.00	-18.52	QP			
6	1	299.3100	10.35	13.48	23.83	47.00	-23.17	QP			

\*:Maximum data x:Over limit !:over margin

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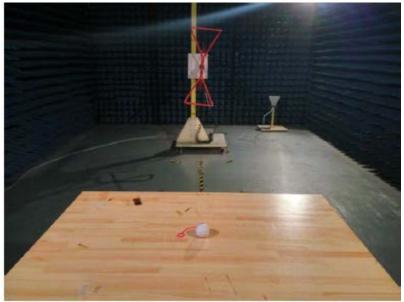
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17A-003857-4 October 11, 2017 Date of Report Issue: Pages: November 15, 2017 Page 28 of 32

### **APPENDIX II(Test Photos)**

# Radiated Test Setup Photograph



# ESD Test Setup Photograph



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17A-003857-4 October 11, 2017 Date of Report Issue:NovembPages:Page 29

November 15, 2017 Page 29 of 32

#### **APPENDIX III (Photos of the EUT)**

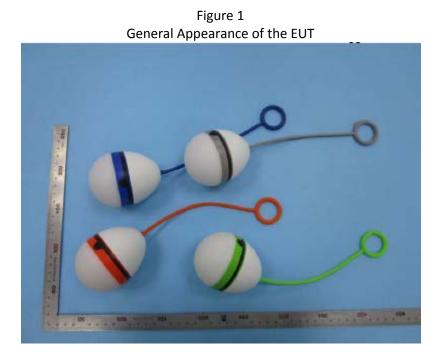
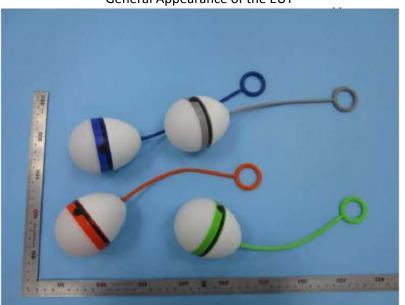


Figure 2 General Appearance of the EUT



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17A-003857-4 October 11, 2017 Date of Report Issue: Pages:

November 15, 2017 Page 30 of 32

Figure 3 General Appearance of the EUT

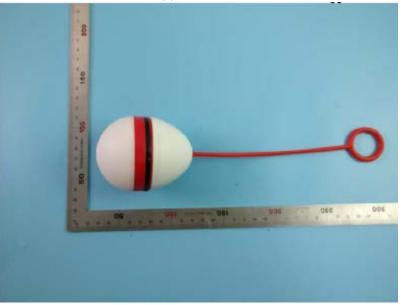
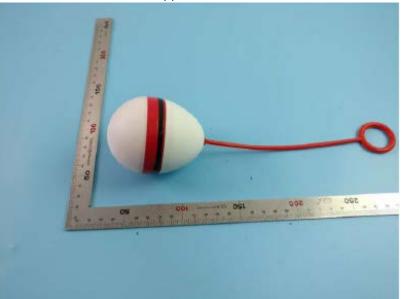


Figure 4 General Appearance of the ETU



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17A-003857-4 October 11, 2017 Date of Report Issue: Nov Pages: Pag

November 15, 2017 Page 31 of 32

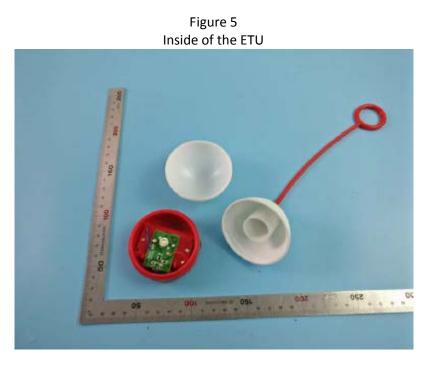


Figure 6 Components Side of the PCB



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17A-003857-4 October 11, 2017 Date of Report Issue: Pages:

November 15, 2017 Page 32 of 32

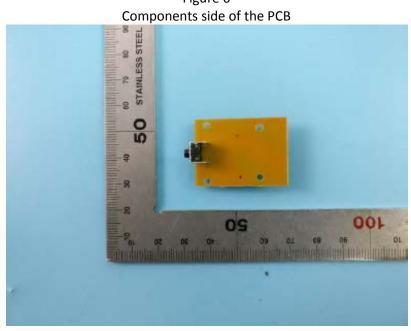


Figure 6

\*\*\*\*\* End of Report \*\*\*\*\*

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