

Test Report

Applicant: Yongkang ShiYa Aluminum Factory

Product Name: Scooter

Brand Name: N/A

Model No.: ES-03

Date of Receipt : Jan.26, 2018

Date of Test: Jan.29-31, 2018

Date of Report: Feb.02, 2018

Prepared by: Shenzhen Most Technology Service Co., Ltd.

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

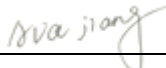


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TABLE OF CONTENTS

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 Conducted Disturbance at Mains Terminals Emission Test	10
6.2. For Radiation Test (In Anechoic Chamber)	10
6.3. For Harmonic / Flicker Test	10
6.4. For Electrostatic Discharge Immunity Test.....	10
6.5. For RF Strength Susceptibility Test	11
6.6. For Electrical Fast Transient/Burst Immunity Test	11
6.7. For Surge Test	11
6.8. For Injected Currents Susceptibility Test	11
6.9. For Magnetic Field Immunity Test.....	11
6.10. For Voltage Dips and Interruptions Test	11
7. CONDUCTED DISTURBANCE AT MAINS TERMINALS TEST.....	12
7.1. Configuration of Test System.....	12
7.2. Test Standard	12
7.3. Power Line Conducted Disturbance at Mains Terminals Limit	12
7.4. Test Procedure	12
7.5. Conducted Disturbance at Mains Terminals 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. HARMONIC CURRENT TEST.....	16
9.1. Configuration of Test System.....	16
9.2. Test Standard	16
9.3. Test Limits.....	16
9.4. Test Results	16
10. VOLTAGE FLUCTUATIONS & FLICKER TEST	17
10.1. Configuration of Test System.....	17
10.2. Test Standard	17
10.3. Test Limits.....	17
10.4. Test Results	17
11. IMMUNITY PERFORMANCE CRITERIA.....	19

12. ELECTROSTATIC DISCHARGE IMMUNITY TEST	20
12.1. Configuration of Test System.....	20
12.2. Test Standard	20
12.3. Severity Levels and Performance Criterion.....	21
12.4. Test Procedure	21
12.5. Test Results	21
13. RF FIELD STRENGTH SUSCEPTIBILITY TEST	23
13.1. Configuration of Test System.....	23
13.2. Test Standard	23
13.3. Severity Levels and Performance Criterion.....	23
13.4. Test Procedure	24
13.5. Test Results	24
14. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST	26
14.1. Configuration of Test System.....	26
14.2. Test Standard	26
14.3. Severity Levels and Performance Criterion.....	26
14.4. Test Procedure	27
14.5. Test Results	27
15. SURGE TEST	29
15.1. Configuration of Test System.....	29
15.2. Test Standard	29
15.3. Severity Levels and Performance Criterion.....	29
15.4. Test Procedure	30
15.5. Test Results	30
16. INJECTED CURRENTS SUSCEPTIBILITY TEST.....	32
16.1. Configuration of Test System.....	32
16.2. Test Standard	32
16.3. Severity Levels and Performance Criterion.....	32
16.4. Test Procedure	33
16.5. Test Results	33
17. MAGNETIC FIELD IMMUNITY TEST	35
17.1. Configuration of Test System.....	35
17.2. Test Standard	35
17.3. Severity Levels and Performance Criterion.....	35
17.4. Test Procedure	36
17.5. Test Results	36
18. VOLTAGE DIPS AND INTERRUPTIONS TEST.....	38
18.1. Configuration of Test System.....	38
18.2. Test Standard	38
18.3. Severity Levels and Performance Criterion.....	38
18.4. Test Procedure	39
18.5. Test Results	39
APPENDIX I	(2 pages)
APPENDIX II	(4 pages)
APPENDIX III (Test Photos of the EUT)	(1 page)
APPENDIX IV(Photos of the EUT)	(4 pages)

TEST REPORT DECLARATION

Report Number	MTE/AVJ/E18010261	
Applicant	Yongkang ShiYa Aluminum Factory	
	169#,FengXiang Road,GuShan Industrial zone,YongKang City,Zhejiang	
Manufacturer	Yongkang ShiYa Aluminum Factory	
	169#,FengXiang Road,GuShan Industrial zone,YongKang City,Zhejiang	
Product	Product Name	Scooter
	Model No.	ES-03
	Power Supply	DC 5V by USB port DC 3.7V by battery
Test Result	The EUT was found compliant with the requirement(s) of the standards.	
Standard	EN 61000-6-3:2007+A1:2011, EN 61000-3-2:2014, EN 61000-3-3:2017, EN 61000-6-1:2007(IEC 61000-4-2:2008, IEC 61000-4-3: 2006+A1:2007+A2:2010, IEC 61000-4-4:2012, IEC 61000-4-5:2014, IEC 61000-4-6:2013, IEC 61000-4-8:2009, IEC 61000-4-11:2004)	
<p>*Note</p> <p>The above device has been tested by Shenzhen Most Technology Service 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 Shenzhen Most Technology Service 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.</p> <p>This report applies to above tested sample only. This report shall not be reproduced except in full, without written approval of Shenzhen Most Technology Service Co., Ltd., this document may be altered or revised by Shenzhen Most Technology Service Co., Ltd., personal only, and shall be noted in the revision of the document.</p>		
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1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Scooter
Model Number	:	ES-03, ES-01, ES-02, ES-03, ES-04, ES-05
Remark	:	Used ES-03 does all tests

1.2. Operational Mode(s) of EUT

Order Number	:	Test Mode(s)
1	:	Running

1.3. Test Voltage(s) of EUT

Order Number	:	Test Voltage(s)
1	:	DC 5V by USB port
		DC 3.7V by battery

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 61000-6-3:2007+A1:2011

Electromagnetic compatibility (EMC) -- Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments.

EN 61000-3-2:2014

Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).

EN 61000-3-3:2017

Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

EN 61000-6-1:2007

Electromagnetic compatibility (EMC) -- Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments

3. LABORATORY INFORMATION

3.1. Laboratory Name

Shenzhen Most Technology Service Co., Ltd.

3.2. Location

No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, 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

4. SUMMARY OF TEST RESULTS

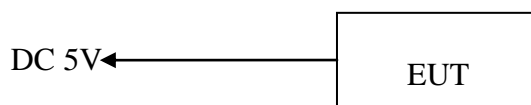
EMISSION			
Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	EN 61000-6-3:2007+ A1:2011	---	PASS
Radiated disturbance	EN 61000-6-3:2007+ A1:2011	---	PASS
Harmonic current emissions	EN 61000-3-2:2014	Class A	N/A
Voltage fluctuations & flicker	EN 61000-3-3:2017	---	PASS
IMMUNITY (EN 61000-6-1:2007)			
Test Item	Basic Standard	Performance Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	B	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006 +A1:2007+A2:2010	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	PASS
Surge (Input a.c. power ports)	IEC 61000-4-5:2014	B	PASS
Surge (Telecommunication ports)		B	N/A
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6:2013	A	PASS
Power frequency magnetic field	IEC 61000-4-8:2009	A	PASS
Voltage dips, 0% reduction	IEC 61000-4-11:2004	B	PASS
Voltage dips, 30% reduction		C	PASS
Voltage interruptions		B	PASS
N/A is an abbreviation for Not Applicable.			

5. BLOCK DIAGRAM OF TEST SETUP

The equipments are installed test to meet EN61000-6-3 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

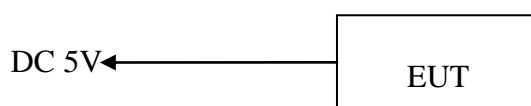
Test Mode: Running



(EUT: Scooter)

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

Test Mode: Running



(EUT: Scooter)

6. TEST INSTRUMENT USED

6.1. For Conducted Disturbance at Mains Terminals Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	100492	Mar. 10, 17	1 Year
2.	L.I.S.N.	Rohde & Schwarz	ENV216	100093	Mar. 10, 17	1 Year
3.	Coaxial Switch	Anritsu Corp	MP59B	6200283933	Mar. 07, 17	1 Year
4.	Terminator	Hubersuhner	50Ω	No.1	Mar. 07, 17	1 Year
5.	RF Cable	SchwarzBeck	N/A	No.1	Mar. 07, 17	1 Year

6.2. For Radiation Test (In Anechoic Chamber)

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

6.3. For Harmonic / Flicker Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
	AC Power Source	Kikusui	AC40MA	LM003232	Mar. 10, 17	1 Year
	Test Analyzer	Kikusui	KHA1000	LM003720	Mar. 10, 17	1 Year
	Line Impedance Network	Kikusui	LIN40MA-PCR-L	LM002352	Mar. 10, 17	1 Year

6.4. For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	Kikusui	KES4021	LM003537	Mar. 10, 17	1 Year

6.5. 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
2.	Amplifier	A&R	150W1000	301584	NCR	NCR
3.	Dual Directional Coupler	A&R	DC6080	301508	Mar. 14, 17	1 Year
4.	Power Sensor	A&R	PH2000	301193	Mar. 14, 17	1 Year
5.	Power Meter	A&R	PM2002	302799	Mar. 14, 17	1 Year
6.	Field Monitor	A&R	FM5004	300329	Mar. 14, 17	1 Year
7.	Field Probe	A&R	FP5000	300221	Mar. 14, 17	1 Year
8.	Log-periodic Antenna	A&R	AT1080	16512	Mar. 14, 17	1 Year
9.	RF Cable	MIYAZAKI	N/A	No.1/No.2	Mar. 07, 17	1 Year

6.6. For Electrical Fast Transient/Burst Immunity Test

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

6.7. For Surge Test

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

6.8. For Injected Currents Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	IFR	2032	203002/100	Mar. 10, 17	1 Year
2.	Amplifier	A&R	150W1000	301584	NCR	NCR
3.	CDN	FCC	FCC-801-M2-25	47	Mar. 10, 17	1 Year
4.	CDN	FCC	FCC-801-M3-25	107	Mar. 10, 17	1 Year
5.	EM Injection Clamp	FCC	F-203I-23mm	403	Mar. 10, 17	1 Year
6.	RF Cable	MIYAZAKI	N/A	No.1/No.2	Mar. 07, 17	1 Year

6.9. For Magnetic Field Immunity Test

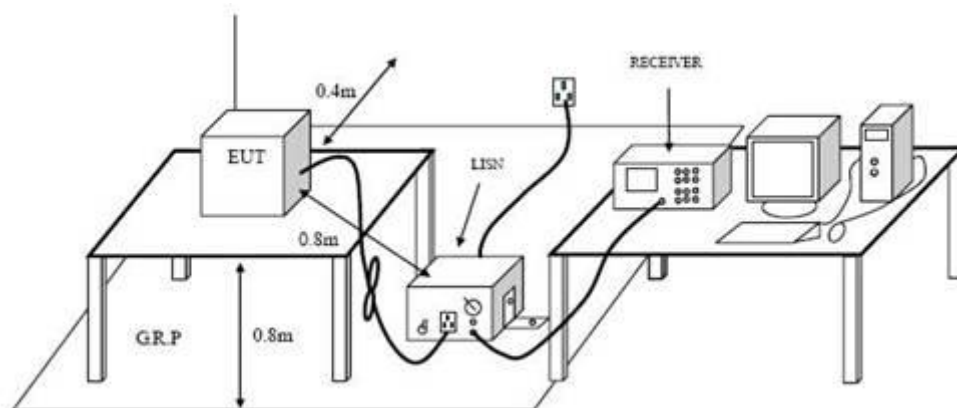
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMCPRO System	EM Test	UCS-500-M4	V0648102026	Mar. 10, 17	1 Year

6.10. For Voltage Dips and Interruptions Test

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

7. CONDUCTED DISTURBANCE AT MAINS TERMINALS TEST

7.1. Configuration of Test System



7.2. Test Standard

EN 61000-6-3:2007+A1:2011

7.3. Power Line Conducted Disturbance at Mains Terminals Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

7.4. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 61000-6-3 on conducted Disturbance test.

The bandwidth of test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 7.5.

7.5. Conducted Disturbance at Mains Terminals Test Results

7.5.1. Test Results: **PASS**

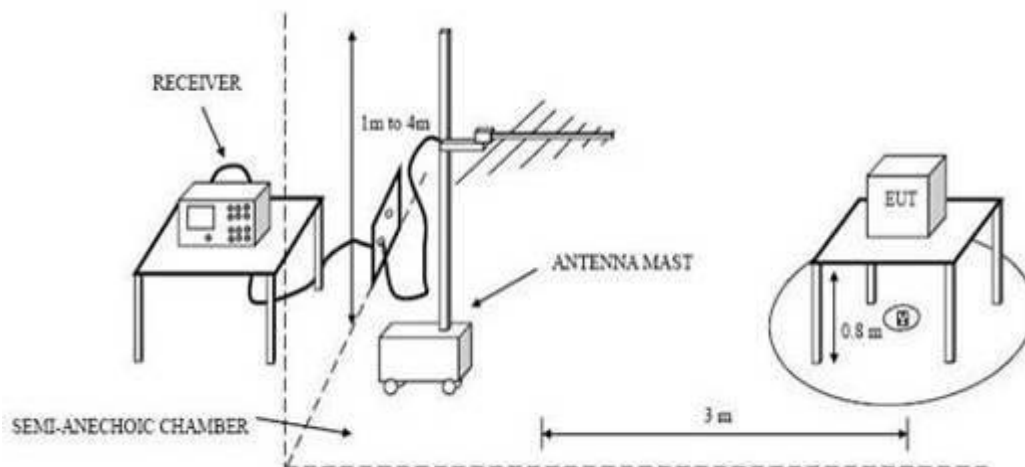
7.5.2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

7.5.3. Emission Level= Correct Factor + Reading Level.

7.5.4. The test data and the scanning waveform are attached within Appendix I.

8. RADIATED DISTURBANCE TEST

8.1. Configuration of Test System



8.2. Test Standard

EN 61000-6-3:2007+A1:2011

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 (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	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 61000-6-3 on Radiated Disturbance test.

The bandwidth setting on the test receiver is 120 kHz.

The frequency range from 30MHz to 1000MHz is checked. The test result are reported on Section 8.5.

8.5. Radiated Disturbance Test Results

8.5.1. Test Results: **PASS**

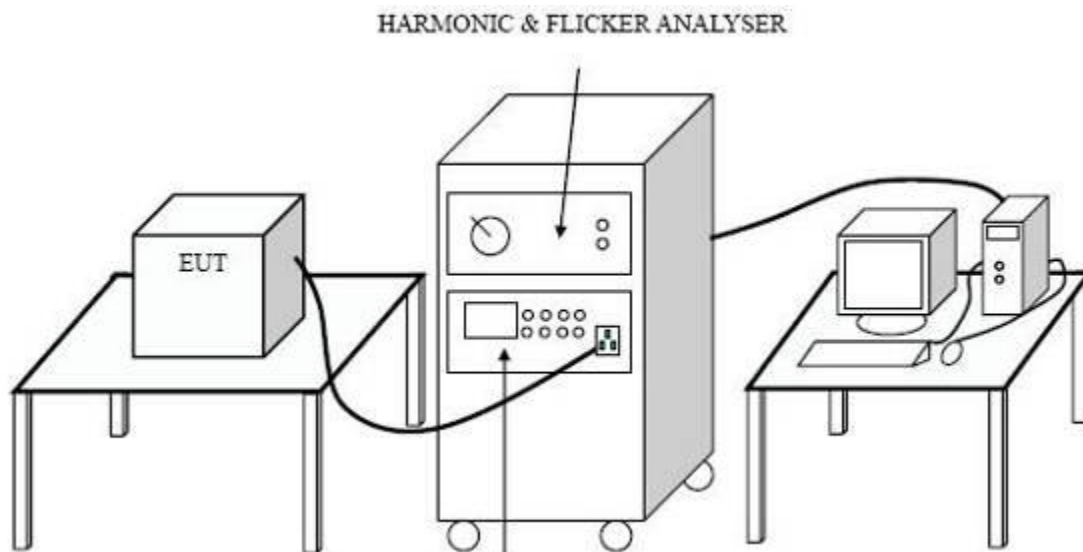
8.5.2. Emission Level = Correct Factor + Reading Level.

8.5.3. All readings are Quasi-Peak values.

8.5.4. The test data and the scanning waveform are attached within Appendix II.

9. HARMONIC CURRENT TEST

9.1. Configuration of Test System



9.2. Test Standard

EN 61000-3-2:2014; Class A

9.3. Test Limits

For Class A equipment, the harmonics of the input current shall not exceed the values given in below:

Harmonic order n	Maximum permissible Harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \frac{15}{n}$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \frac{8}{n}$

9.4. Test Results

9.4.1. Test Results: N/A

10. VOLTAGE FLUCTUATIONS & FLICKER TEST

10.1. Configuration of Test System

Same as Section 9.1.

10.2. Test Standard

EN 61000-3-3:2017

10.3. Test Limits

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, the following limits apply:

the value of P_{st} shall not be greater than 1.0;

the value of P_{lt} shall not be greater than 0.65;

the value of $d(t)$ during a voltage change shall not exceed 3.3% for more than 500ms;

the relative steady-state voltage change, dc , shall not exceed 3.3%;

the maximum relative voltage change d_{max} , shall not exceed

a) 4% without additional conditions;

b) 6% for equipment which is:

Switched manually, or

Switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

c) 7% for equipment which is

Attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or

switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

10.4. Test Results

10.4.1. Test Results: **PASS**

10.4.2. All test data on the following pages.

Voltage Fluctuation and Flicker TEST REPORT

Company	PC Partner	Test Engineer	LPH
Model name	ZOTAC AMP BOX		
Type	ZT-TB3BOX-BB		
Serial No.		Type of test	EN61000-3-3:2013 *IEC61000-3-3:2013
Operating mode	Running PC System+ping		EN61000-4-15:2011 *IEC61000-4-15:2010
Date of test	2018/1/30 14:23:38		
Climatic condition	T:26;H:53%	Power analyzer	KHA1000,Ver1.50
Memo		Supply Source	AC 230V/50HZ
		Reference Impedance	

Test Data of Voltage Fluctuation and Flicker

FINAL TEST RESULT	PASS
Nominal Voltage	230V
Nominal Frequency	50Hz
Pit Test duration	600s
Flicker Margin	100%
d Measurement Margin	100%

	Pst	dc(%)	dmax(%)	d(t)>3.3%(ms)	Judge
Limit	1.000	3.300	4.000	500	
Seg. 1	0.010	0.004	0.035	0	Pass
Seg. 2	-	-	-	-	
Seg. 3	-	-	-	-	
Seg. 4	-	-	-	-	
Seg. 5	-	-	-	-	
Seg. 6	-	-	-	-	
Seg. 7	-	-	-	-	
Seg. 8	-	-	-	-	
Seg. 9	-	-	-	-	
Seg.10	-	-	-	-	
Seg.11	-	-	-	-	
Seg.12	-	-	-	-	

	Pit	Judge
Limit	0.650	
Measurement	0.004	Pass

11. 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.

Criterion A:

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacture, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level of the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Criterion B:

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacture, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level of the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

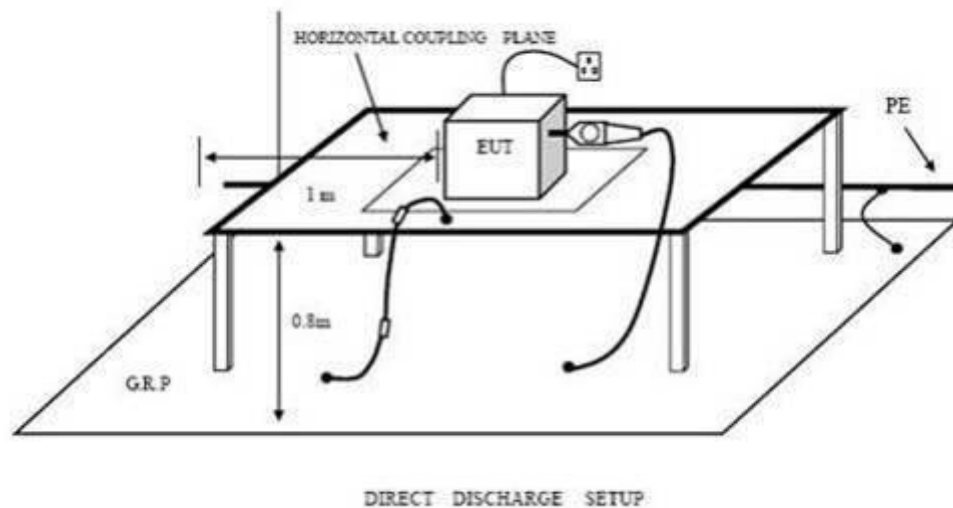
Criterion C:

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

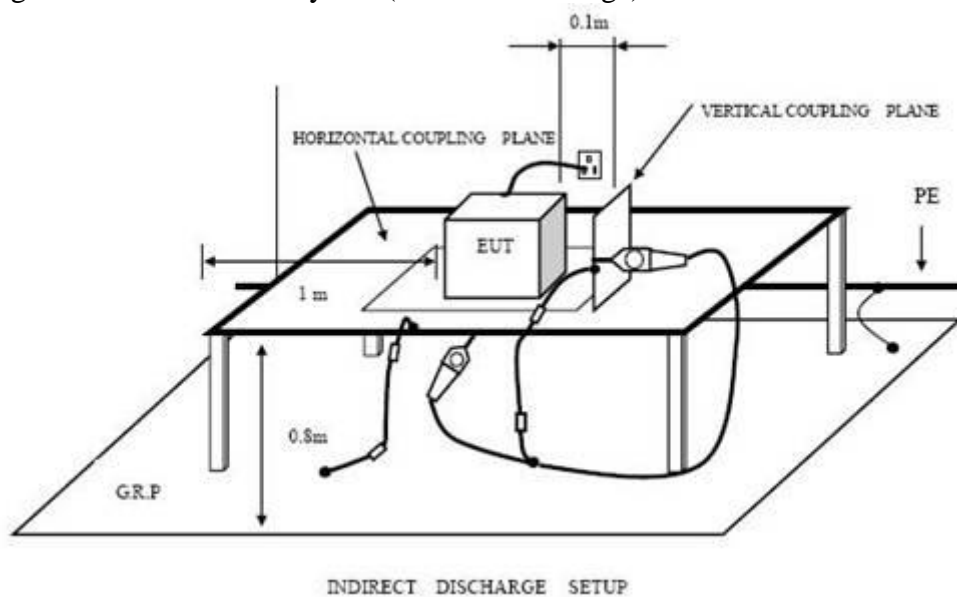
12.ELECTROSTATIC DISCHARGE IMMUNITY TEST

12.1.Configuration of Test System

12.1.1. Configuration of ESD Test System(Direct Discharge)



12.1.2.Configuration of ESD Test System(Indirect Discharge)



12.2.Test Standard

EN 61000-6-1:2007 (IEC 61000-4-2:2008)
 (Severity Level 3 for Air Discharge at 8KV,
 Severity Level 2 for Contact Discharge at 4KV)

12.3. Severity Levels and Performance Criterion

12.3.1. 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

12.3.2. Performance criterion : **B**

12.4. Test Procedure

12.4.1. 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 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed

12.4.2. Contact Discharge:

All the procedure was same as Section 12.4.1. except that the generator was re-triggered for a new single discharge and repeated 50 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated.

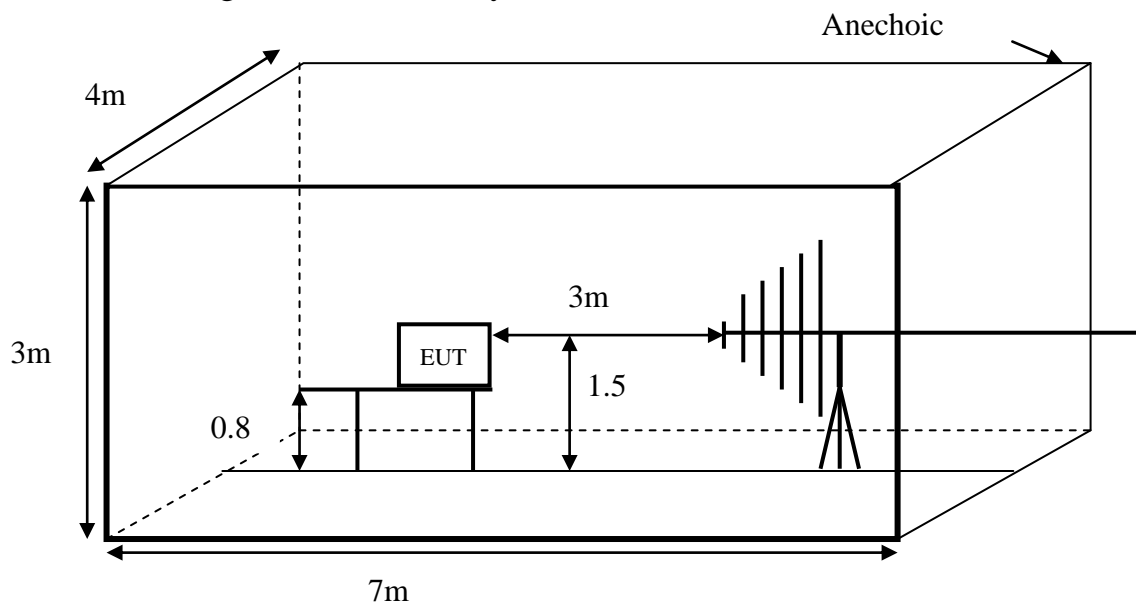
12.5. Test Results

12.5.1. Test Results: **PASS**

12.5.2. Test data on the following pages.

13. RF FIELD STRENGTH SUSCEPTIBILITY TEST

13.1. Configuration of Test System



13.2. Test Standard

EN 61000-6-1:2007 (IEC 61000-4-3:2006+A1:2007+A2:2010)
 (Severity Level: 2 at 3V / m, 1 at 1V/m)

13.3. Severity Levels and Performance Criterion

13.3.1. Severity level

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

13.3.2. Performance criterion : A

13.4. Test Procedure

Testing was performed in a Fully anechoic chamber as recommended by IEC 61000-4-3. The EUT was placed on an 80 cm high non-conductive table located in the area of field uniformity. The radiating antenna was placed 3m in front of the EUT and Support system, and dwell time of the radiated interference was controlled by an automated, computer-controlled system. The signal source was stepped through the applicable frequency range at a rate no faster than 1% of the fundamental. The signal was amplitude modulated 80% over the frequency range 80 MHz to 1GHz and 1.4GHz to 2GHz at a level of 3 V/m, 2.0GHz to 2.7GHz at a level of 1V/m. The dwell time was set at 1.5 s. Field presence was monitored during testing via a field probe placed in close proximity to the EUT. Throughout testing, the EUT was closely monitored for signs of susceptibility. The test was performed with the antennae oriented in both a horizontal and vertical polarization.

All the scanning conditions are as follows :

Condition of Test	Remarks
1. Test Fielded Strength	3 V/m (Severity Level 2) 1V/m(Severity Level 1)
2. Radiated Signal	80% amplitude modulated with a 1kHz sine wave
3. Scanning Frequency	80 - 1000 MHz, 1.4GHz-2.7GHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	1.5 Sec.

13.5. Test Results

13.5.1. Test Results: **PASS**

13.5.2. Test data on the following pages.

RF Field Strength Susceptibility Test Results

Shenzhen Most Technology Service Co., Ltd.

<i>Test Voltage</i> :	1	<i>Test Date</i> :	Jan.31, 2018
<i>Test Mode</i> :	1	<i>Criterion</i> :	A
<i>Field Strength</i> :	3 V/m	<i>Frequency Range</i> :	80-1000MHz, 1.4GHz-2GHz
<i>Temperature</i> :	26 °C	<i>Humidity</i> :	54%

Modulation: AM Pulse none 1 kHz 80%

Test Results Description

Frequency Rang 1:
80MHz - 1000 MHz, 1400MHz – 2000MHz

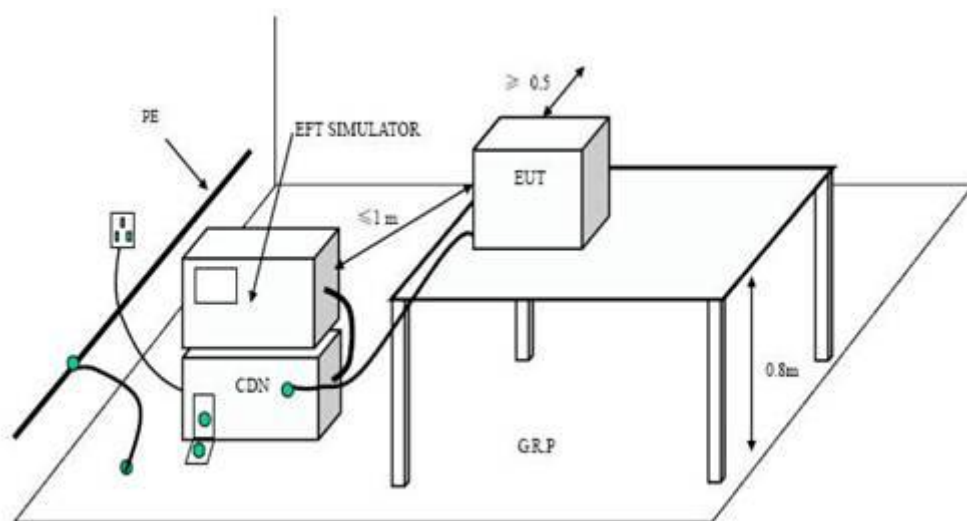
<i>Steps</i>	<i>1%</i>	<i>1%</i>
	<i>Horizontal</i>	<i>Vertical</i>
<i>Front</i>	PASS	PASS
<i>Right</i>	PASS	PASS
<i>Rear</i>	PASS	PASS
<i>Left</i>	PASS	PASS

Note: No function loss

Reviewer : *Sunny*

14.ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

14.1.Configuration of Test System



14.2.Test Standard

EN 61000-6-1:2007(IEC 61000-4-4:2012)
(Severity Level 2 at 1KV)

14.3.Severity Levels and Performance Criterion

14.3.1.Severity level

Open Circuit Output Test Voltage $\pm 10\%$		
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

14.3.2.Performance criterion : **B**

14.4. Test Procedure

The EUT and its simulators were placed on a the ground reference plane and were insulated from it by an wood support $0.1\text{m} \pm 0.01\text{m}$ thick. The ground reference plane was $1\text{m} \times 1\text{m}$ metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m . All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

14.4.1. For input and AC power ports:

The EUT was connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage was applied during compliance test and the duration of the test can't less than 2mins.

14.4.2. For signal lines and control lines ports:

It's unnecessary to test.

14.4.3. For DC input and DC output power ports:

It's unnecessary to test.

14.5. Test Results

14.5.1. Test Results: PASS

14.5.2. Test data on the following pages.

Electrical Fast Transient/Burst Test Results

Shenzhen Most Technology Service Co., Ltd.

<i>Test Voltage :</i>	<i>1</i>	<i>Test Date:</i>	<i>Jan.31, 2018</i>
<i>Test Mode :</i>	<i>1</i>	<i>Criterion :</i>	<i>B</i>
<i>Temperature:</i>	<i>25 °C</i>	<i>Humidity:</i>	<i>55%</i>

Test Results Description

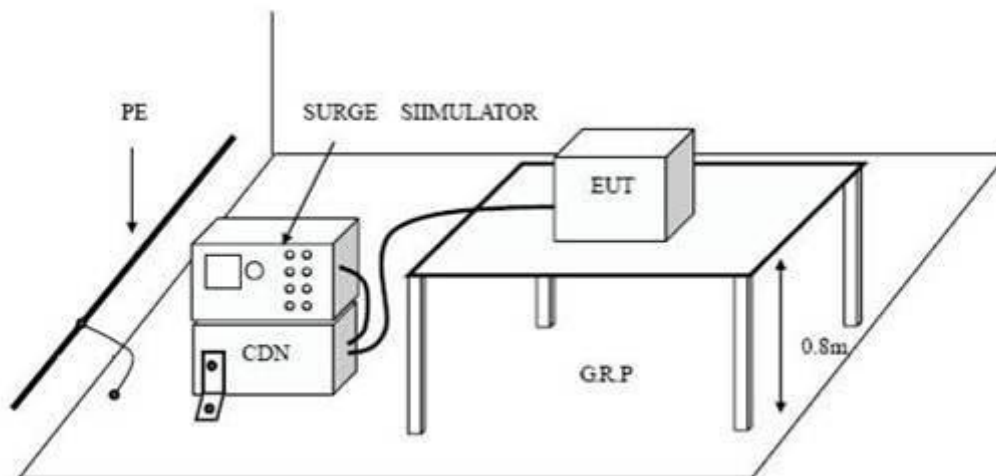
<i>Inject Line</i>	<i>Voltage KV</i>	<i>Inject Time(s)</i>	<i>Inject Method</i>	<i>Results</i>	<i>Inject Line</i>	<i>Voltage KV</i>	<i>Inject Time(s)</i>	<i>Inject Method</i>	<i>Results</i>
<i>L</i>	<i>±1</i>	<i>120</i>	<i>Direct</i>	<i>PASS</i>					
<i>N</i>	<i>±1</i>	<i>120</i>	<i>Direct</i>	<i>PASS</i>					
<i>LN</i>	<i>±1</i>	<i>120</i>	<i>Direct</i>	<i>PASS</i>					

Remark:

Reviewer : _____ *Sunny*

15.SURGE TEST

15.1.Configuration of Test System



15.2.Test Standard

EN 61000-6-1:2007(IEC 61000-4-5:2014)
 (Severity Level : Line to Line was Level 2 at 1KV
 Line to PE was Level 3 at 2KV)

15.3.Severity Levels and Performance Criterion

15.3.1.Severity level

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

15.3.2.Performance criterion : **B**

15.4. Test Procedure

- 15.4.1. Set up the EUT and test generator as shown on Section 15.1.
- 15.4.2. For line to line coupling mode, provide a 1KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral line to ground are same except test level is 2KV.
- 15.4.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
- 15.4.4. Different phase angles are done individually.
- 15.4.5. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

15.5. Test Results

- 15.5.1. Test Results: **PASS**
- 15.5.2. Test data on the following pages.

Surge Immunity Test Results

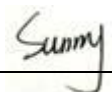
Shenzhen Most Technology Service Co., Ltd.

<i>Test Voltage</i> :	1	<i>Test Date:</i>	Jan.31, 2018
<i>Test Mode</i> :	1	<i>Criterion</i>	B
<i>Temperature:</i>	25 °C	<i>Humidity:</i>	55%

Test Results Description

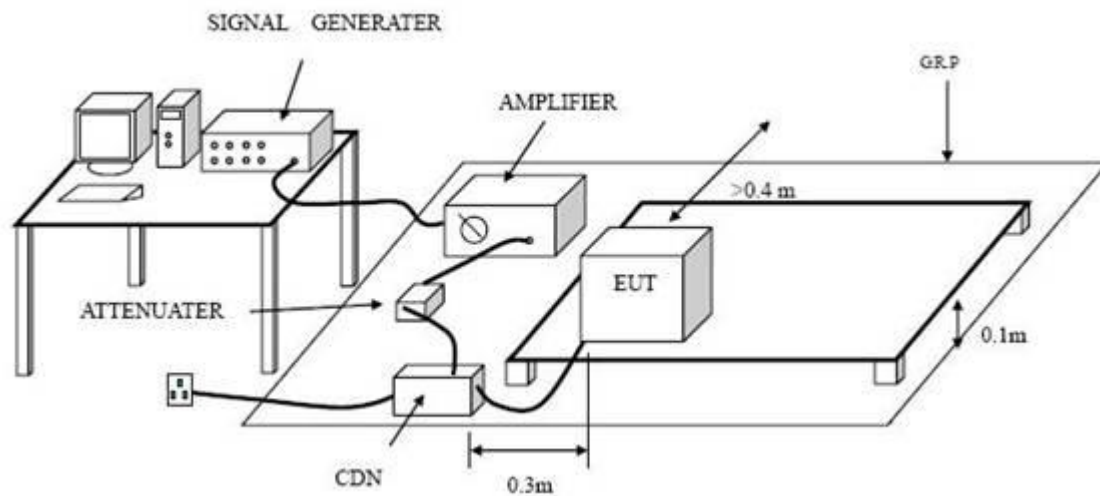
<i>Location</i>	<i>Polarity</i>	<i>Phase Angle</i>	<i>No of Pulse</i>	<i>Pulse Voltage (KV)</i>	<i>Result</i>
L-N	±	0	5	1.0	PASS
	±	90	5	1.0	PASS
	±	180	5	1.0	PASS
	±	270	5	1.0	PASS

Remark:

Reviewer :  _____

16. INJECTED CURRENTS SUSCEPTIBILITY TEST

16.1. Configuration of Test System



16.2. Test Standard

EN 61000-6-1:2007(IEC 61000-4-6:2013)

(Severity Level 2 at 3V (r.m.s.) and frequency is from 0.15MHz to 80MHz)

16.3. Severity Levels and Performance Criterion

16.3.1. Severity level

Level	Voltage Level (e.m.f.) V
1.	1
2.	3
3.	10
X	Special

16.3.2. Performance criterion: A

16.4. Test Procedure

- 16.4.1. Set up the EUT, CDN and test generators as shown on Section 16.1.
- 16.4.2. Let the EUT work in test mode and test it.
- 16.4.3. 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).
- 16.4.4. The disturbance signal description below is injected to EUT through CDN.
- 16.4.5. The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 16.4.6. The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
- 16.4.7. The rate of sweep shall not exceed $1.5 \cdot 10^{-3}$ 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.
- 16.4.8. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

16.5. Test Results

- 16.5.1. Test Results: **PASS**
- 16.5.2. Test data on the following pages.

Injected Currents Susceptibility Test Results

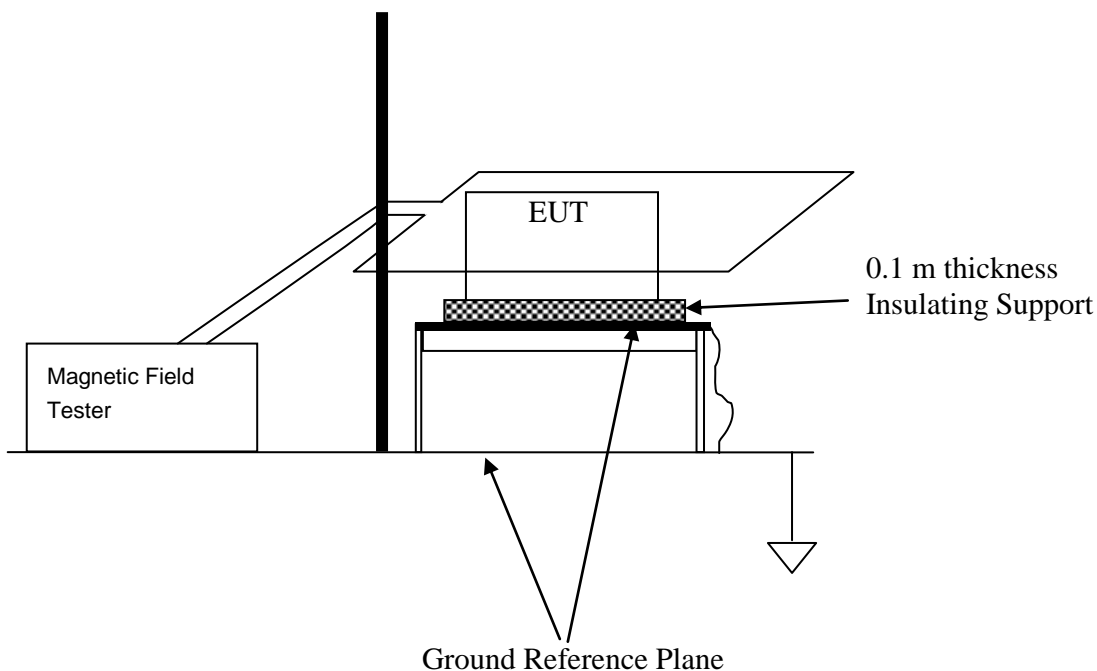
Shenzhen Most Technology Service Co., Ltd.

<i>Test Voltage</i> :	<i>1</i>	<i>Test Date:</i>	<i>Jan.31, 2018</i>	
<i>Test Mode</i> :	<i>1</i>	<i>Criterion</i> :	<i>A</i>	
<i>Temperature:</i>	<i>26 °C</i>	<i>Humidity:</i>	<i>55%</i>	
<i>Test Results Description</i>				
<i>Frequency Range (MHz)</i>	<i>Injected Position</i>	<i>Voltage Level (e.m.f.)</i>	<i>Criterion</i>	<i>Result</i>
<i>0.15 ~ 80</i>	<i>AC Mains</i>	<i>3V(rms), Unmodulated</i>	<i>A</i>	<i>PASS</i>
<i>Remark : No function loss</i>				

Reviewer : *Sunny*

17.MAGNETIC FIELD IMMUNITY TEST

17.1.Configuration of Test System



17.2.Test Standard

EN 61000-6-1:2007 (IEC 61000-4-8:2009)
(Severity Level 2 at 3A/m)

17.3.Severity Levels and Performance Criterion

17.3.1.Severity level

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

17.3.2.Performance criterion : A

17.4. 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 17.1. The induction coil was then rotated by 90° in order to expose the EUT to the test field with different orientations.

17.5. Test Results

17.5.1. Test Results: **PASS**

17.5.2. Test data on the following pages.

Magnetic Field Immunity Test Results

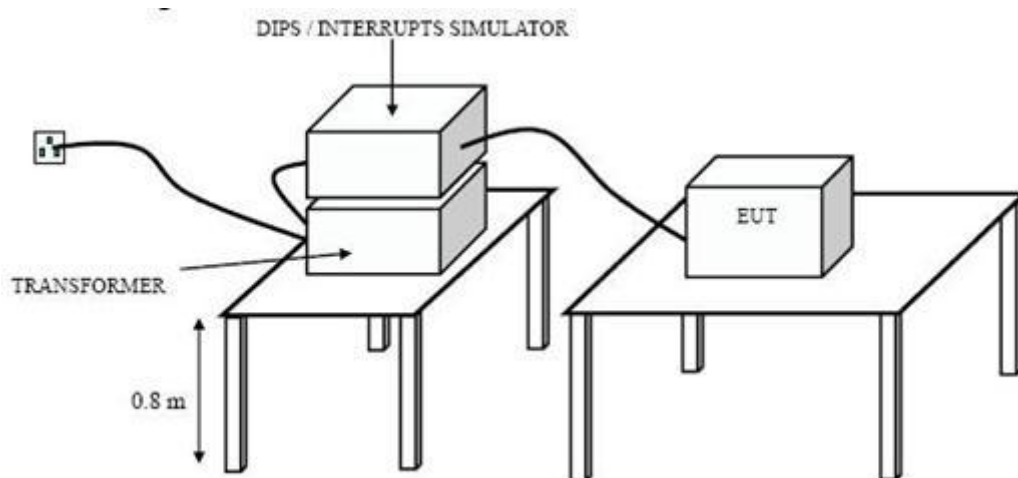
Shenzhen Most Technology Service Co., Ltd.

Test Voltage :	1	Test Date:	Jan.31, 2018	
Test Mode :	1	Criterion	A	
Temperature:	25 °C	Humidity:	56%	
<i>Test Results Description</i>				
<i>Test Level</i>	<i>Testing Duration</i>	<i>Coil Orientation</i>	<i>Criterion</i>	<i>Result</i>
<i>3A/m(50Hz/60Hz)</i>	<i>5 mins</i>	<i>X</i>	<i>A</i>	<i>PASS</i>
<i>3A/m(50Hz/60Hz)</i>	<i>5 mins</i>	<i>Y</i>	<i>A</i>	<i>PASS</i>
<i>3A/m(50Hz/60Hz)</i>	<i>5 mins</i>	<i>Z</i>	<i>A</i>	<i>PASS</i>
<i>Remark: No function loss</i>				

Reviewer :  _____

18. VOLTAGE DIPS AND INTERRUPTIONS TEST

18.1. Configuration of Test System



18.2. Test Standard

EN 61000-6-1:2007(IEC 61000-4-11:2004)
 (Severity level: 0% 250/300 periods
 0% 1.0/0.5 periods
 70% 25/30 periods)

18.3. Severity Levels and Performance Criterion

18.3.1. Severity level

Test Level %U _T	Voltage dip and short interruptions %U _T	Performance Criterion	Duration (in period)
0	100	B	1.0/0.5
70	30	C	25(at 50Hz)
			30(at 60Hz)
0	100	C	250(at 50Hz)
			300(at 60Hz)

18.3.2. Performance criterion : B & C

18.4. Test Procedure

18.4.1. The EUT and test generator were setup as shown on Section 18.1.

18.4.2. The interruptions is introduced at selected phase angles with specified duration.

18.4.3. Record any degradation of performance.

18.5. Test Results

18.5.1. Test Results: **PASS**

18.5.2. Test data on the following pages.

Voltage Dips And Interruptions Test Results

Shenzhen Most Technology Service Co., Ltd.

Test Voltage :	1	Test Date:	Jan.31, 2018
Test Mode :	1	Criterion	B&C
Temperature:	25 °C	Humidity:	55%

Test Results Description

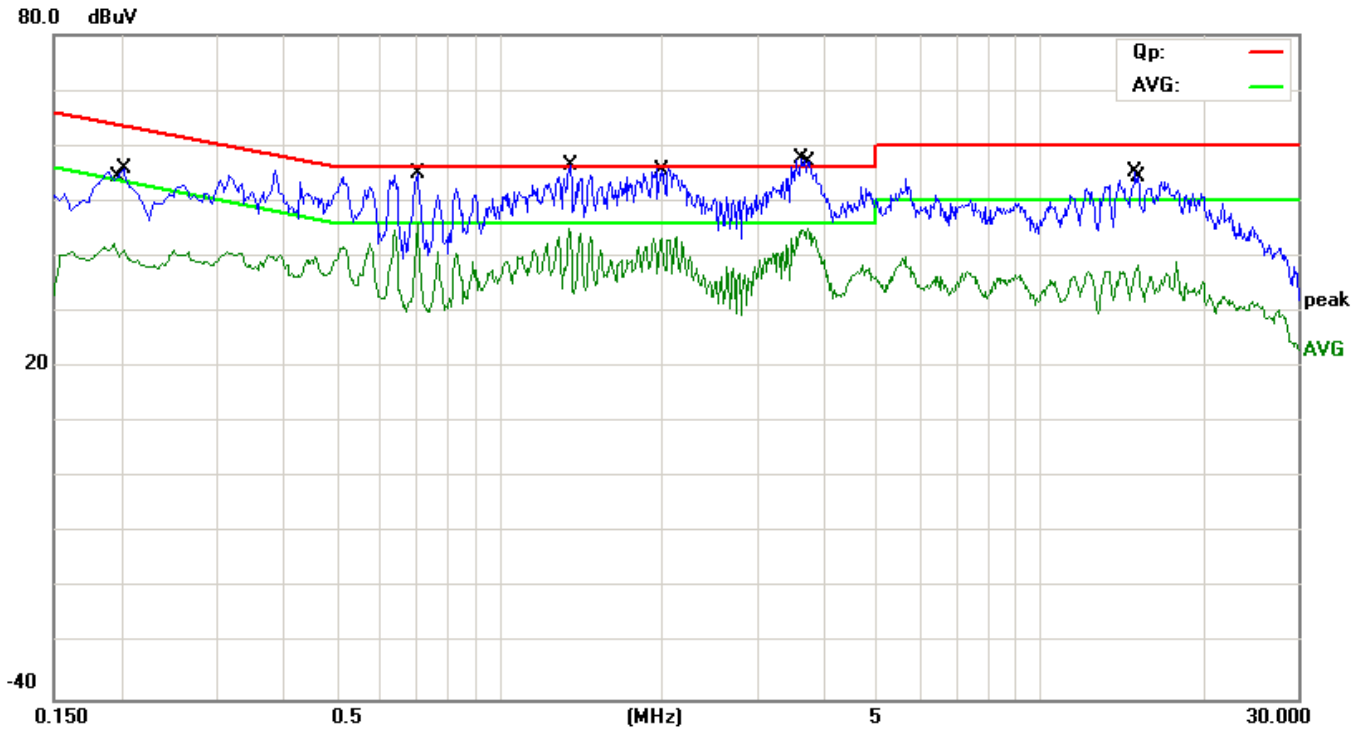
Test Level % U_T	Voltage Dips & Short Interruptions % U_T	Duration (in period)	Phase Angle	Criterion	Result
0	100	1P/0.5P	0 ~360 °	B	PASS
70	30	25P(at 50Hz)	0 ~360 °	C	PASS
		30P(at 60Hz)			
0	100	250P(at 50Hz)	0 ~360 °	C	PASS
		300P(at 60Hz)			

Remark: U_T is the rated voltage for the equipment.

Reviewer : Sunny

APPENDIX I

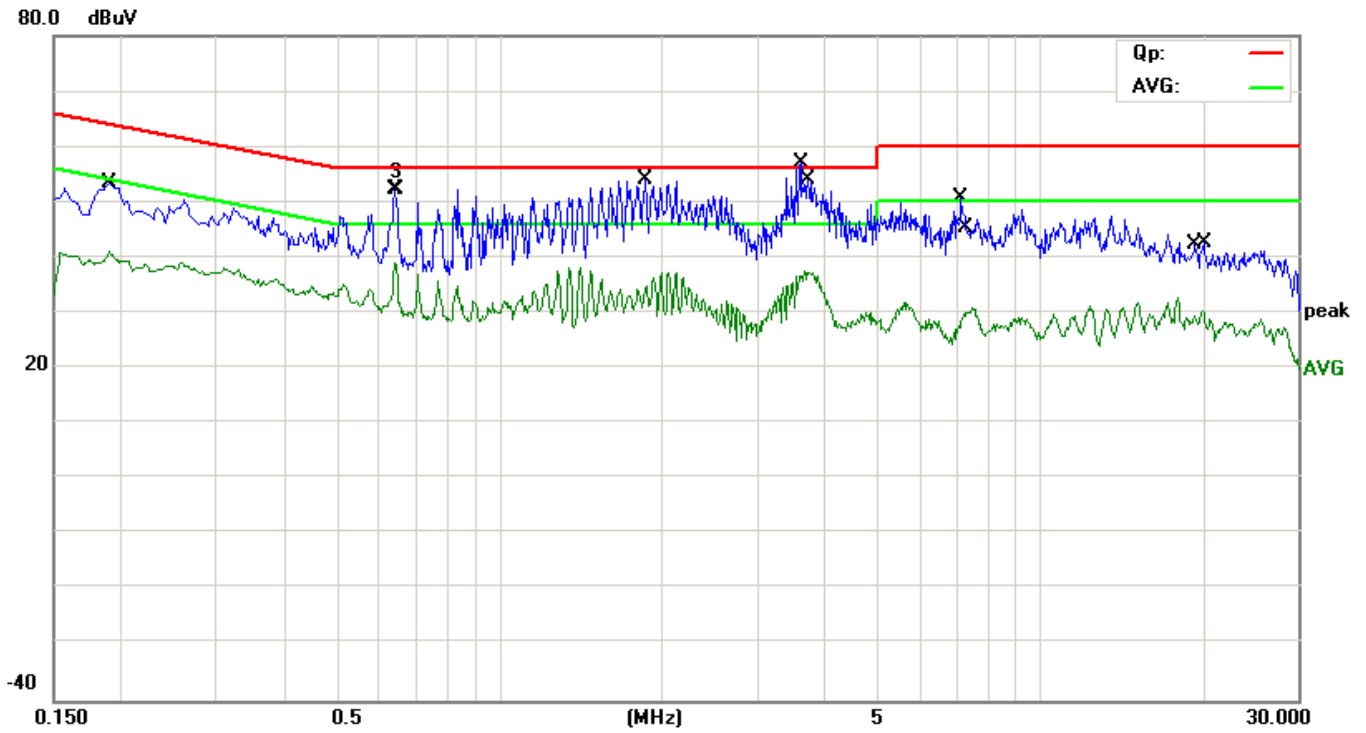
EUT:	Scooter	M/N:	ES-03
Mode:	Running	Phase:	L1
Tested by:	Joe	Power:	DC 5V by USB port
Temperature: / Humidity	25°C/ 53%	Test date:	2018-01-31



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1940	32.74	9.60	42.34	53.86	-11.52	AVG	
2		0.2020	46.21	9.60	55.81	63.53	-7.72	QP	
3		0.7060	41.80	9.60	51.40	56.00	-4.60	QP	
4	*	0.7060	33.10	9.60	42.70	46.00	-3.30	AVG	
5		1.3500	32.10	9.60	41.70	46.00	-4.30	AVG	
6		1.3540	43.10	9.60	52.70	56.00	-3.30	QP	
7		1.9980	42.50	9.60	52.10	56.00	-3.90	QP	
8		1.9980	31.80	9.60	41.40	46.00	-4.60	AVG	
9		3.6060	41.20	9.62	50.82	56.00	-5.18	QP	
10		3.7300	32.90	9.62	42.52	46.00	-3.48	AVG	
11		15.0340	45.47	9.70	55.17	60.00	-4.83	QP	
12		15.2260	28.60	9.70	38.30	50.00	-11.70	AVG	

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

EUT:	Scooter	M/N:	ES-03
Mode:	Running	Phase:	N
Tested by:	Joe	Power:	DC 5V by USB port
Temperature: / Humidity	25°C/ 53%	Test date:	2018-01-31

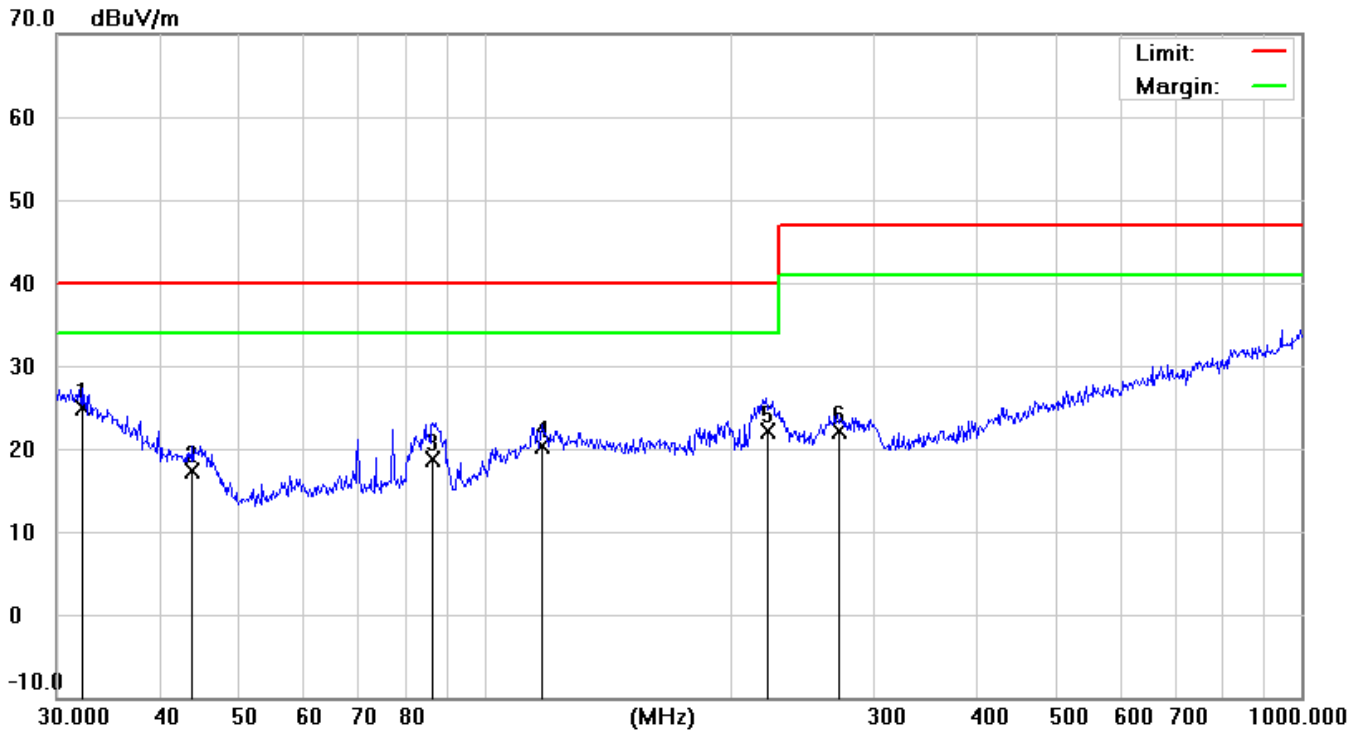


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1900	43.95	9.60	53.55	64.04	-10.49	QP	
2		0.1900	31.41	9.60	41.01	54.04	-13.03	AVG	
3	*	0.6420	42.56	9.59	52.15	56.00	-3.85	peak	
4		0.6420	29.49	9.59	39.08	46.00	-6.92	AVG	
5		1.8660	36.20	9.60	45.80	56.00	-10.20	QP	
6		1.8740	25.29	9.60	34.89	46.00	-11.11	AVG	
7		3.6060	37.70	9.62	47.32	56.00	-8.68	QP	
8		3.6660	27.00	9.62	36.62	46.00	-9.38	AVG	
9		7.1660	41.18	9.65	50.83	60.00	-9.17	QP	
10		7.3380	20.45	9.65	30.10	50.00	-19.90	AVG	
11		19.4020	32.49	9.73	42.22	60.00	-17.78	QP	
12		19.9780	20.62	9.73	30.35	50.00	-19.65	AVG	

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

APPENDIX II

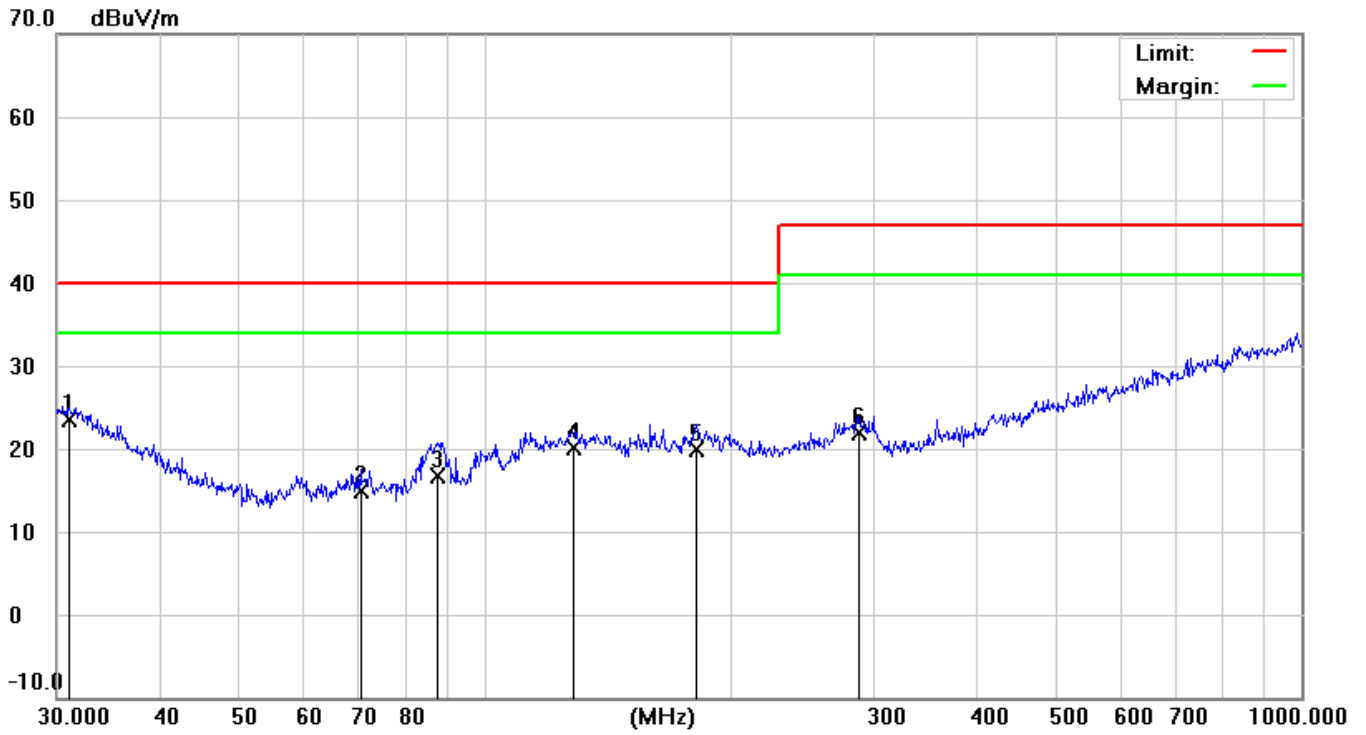
EUT:	Scooter	M/N:	ES-03
Mode:	Running	Polarization	Vertical
Tested by:	Joe	Power:	DC 5V by USB port
Temperature: / Humidity	24°C/ 51%	Test date:	2018-01-31



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	32.2925	3.26	21.55	24.81	40.00	-15.19	QP		
2		43.9658	3.62	13.74	17.36	40.00	-22.64	QP		
3		86.5027	7.25	11.40	18.65	40.00	-21.35	QP		
4		117.7725	3.12	17.19	20.31	40.00	-19.69	QP		
5		221.3921	5.69	16.33	22.02	40.00	-17.98	QP		
6		270.3748	3.26	18.92	22.18	47.00	-24.82	QP		

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

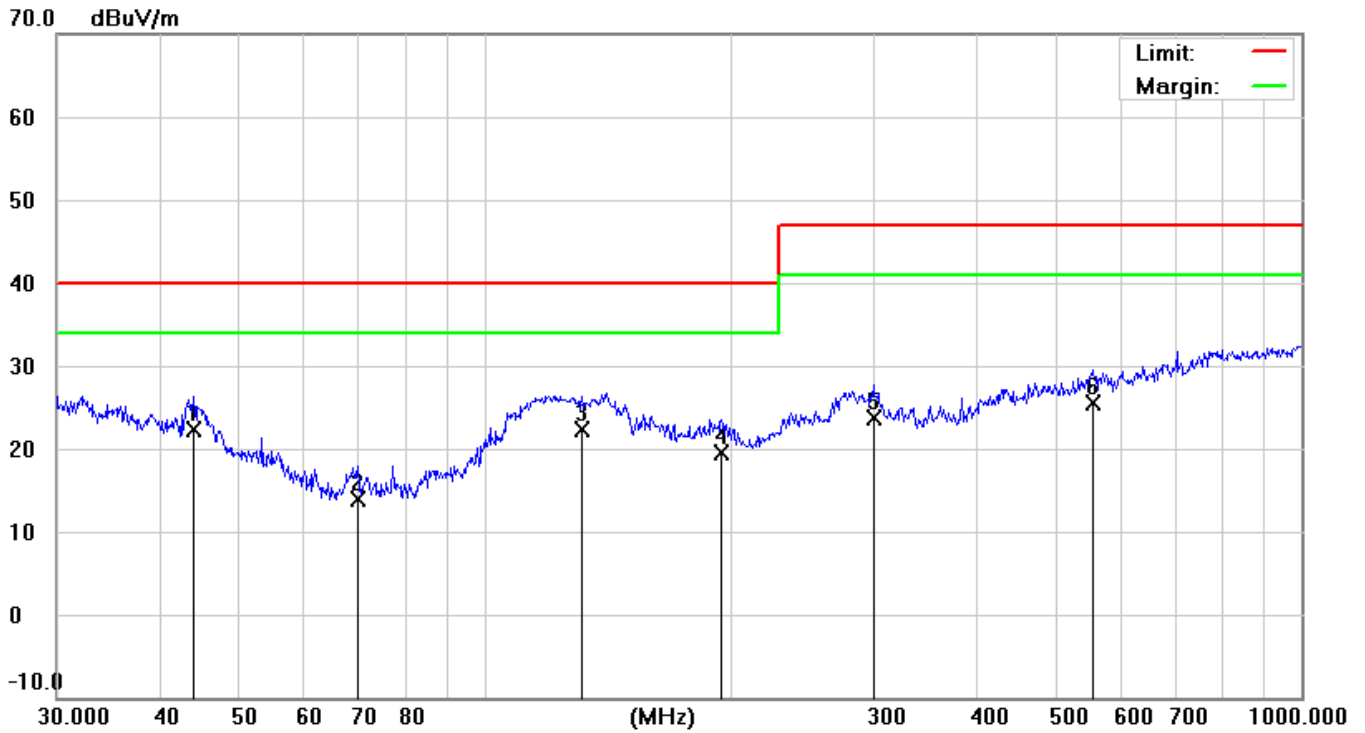
EUT:	Scooter	M/N:	ES-03
Mode:	Running	Polarization	Horizontal
Tested by:	Joe	Power:	DC 5V by USB port
Temperature: / Humidity	24°C/ 51%	Test date:	2018-01-31



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	*	31.0706	2.14	21.37	23.51	40.00	-16.49	QP			
2		70.5835	3.18	11.68	14.86	40.00	-25.14	QP			
3		87.7246	5.36	11.40	16.76	40.00	-23.24	QP			
4		128.1129	2.49	17.66	20.15	40.00	-19.85	QP			
5		181.9202	3.24	16.68	19.92	40.00	-20.08	QP			
6		287.9904	2.45	19.40	21.85	47.00	-25.15	QP			

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

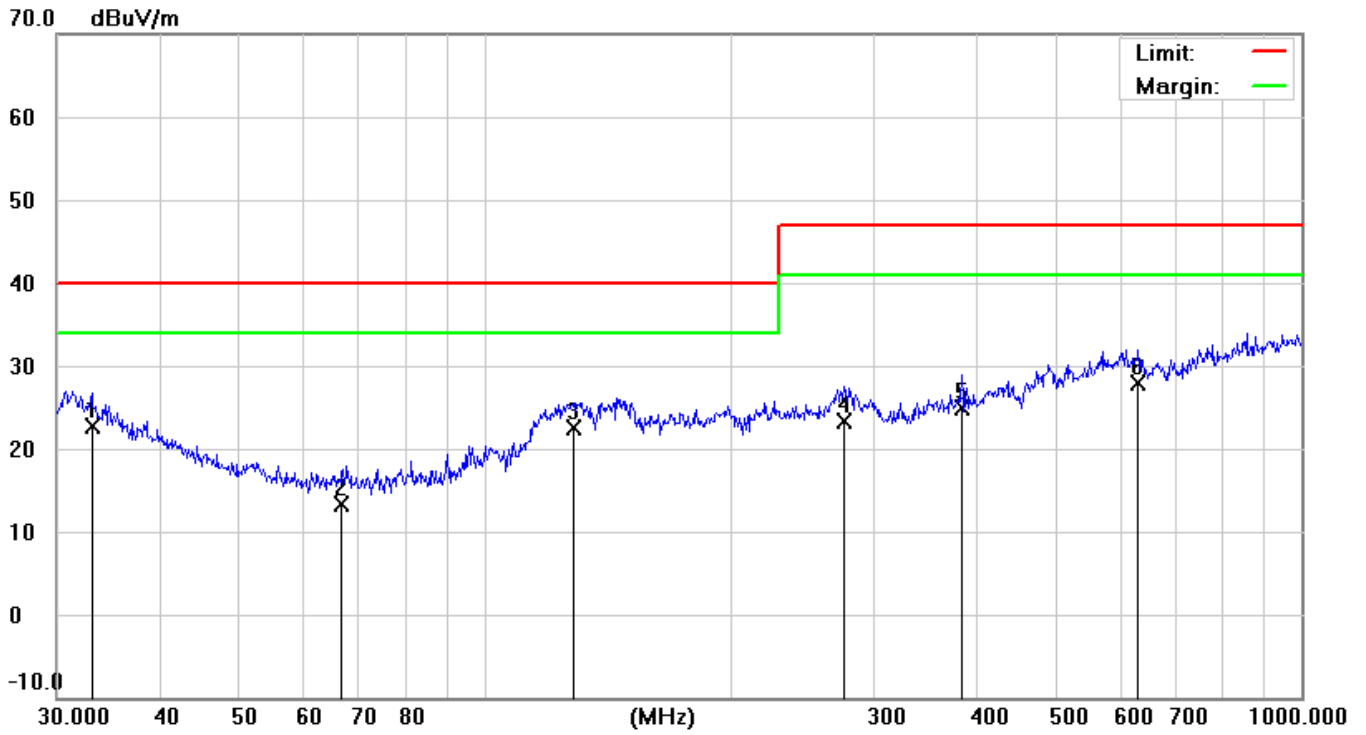
EUT:	Scooter	M/N:	ES-03
Mode:	Running	Polarization	Vertical
Tested by:	Joe	Power:	DC 5V by USB port
Temperature: / Humidity	24°C/ 51%	Test date:	2018-01-31



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		44.1202	8.60	13.65	22.25	40.00	-17.75	QP		
2		70.0902	2.24	11.70	13.94	40.00	-26.06	QP		
3	*	131.7574	4.70	17.61	22.31	40.00	-17.69	QP		
4		195.1363	2.42	17.01	19.43	40.00	-20.57	QP		
5		299.3158	4.37	19.31	23.68	47.00	-23.32	QP		
6		554.8254	2.89	22.60	25.49	47.00	-21.51	QP		

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

EUT:	Scooter	M/N:	ES-03
Mode:	Running	Polarization	Horizontal
Tested by:	Joe	Power:	DC 5V by USB port
Temperature: / Humidity	24°C/ 51%	Test date:	2018-01-31



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	*	33.0949	2.64	19.99	22.63	40.00	-17.37	QP			
2		66.9669	1.82	11.43	13.25	40.00	-26.75	QP			
3		128.5629	4.76	17.67	22.43	40.00	-17.57	QP			
4		275.1570	4.13	19.16	23.29	47.00	-23.71	QP			
5		383.9318	6.78	18.18	24.96	47.00	-22.04	QP			
6		631.6883	4.08	23.83	27.91	47.00	-19.09	QP			

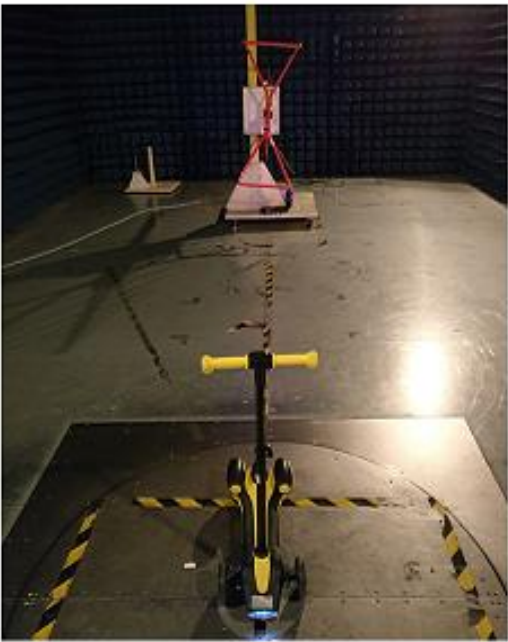
*:Maximum data x:Over limit !:over margin

APPENDIX III
(Test Photos)

Conducted Test Setup Photograph



Radiated Test Setup Photograph



APPENDIX IV
(Photos of the EUT)

Figure 1
General Appearance of the EUT



Figure 2
General Appearance of the EUT



Figure 3
General Appearance of the EUT



Figure 4
General Appearance of the EUT



Figure 5
Components side of the PCB

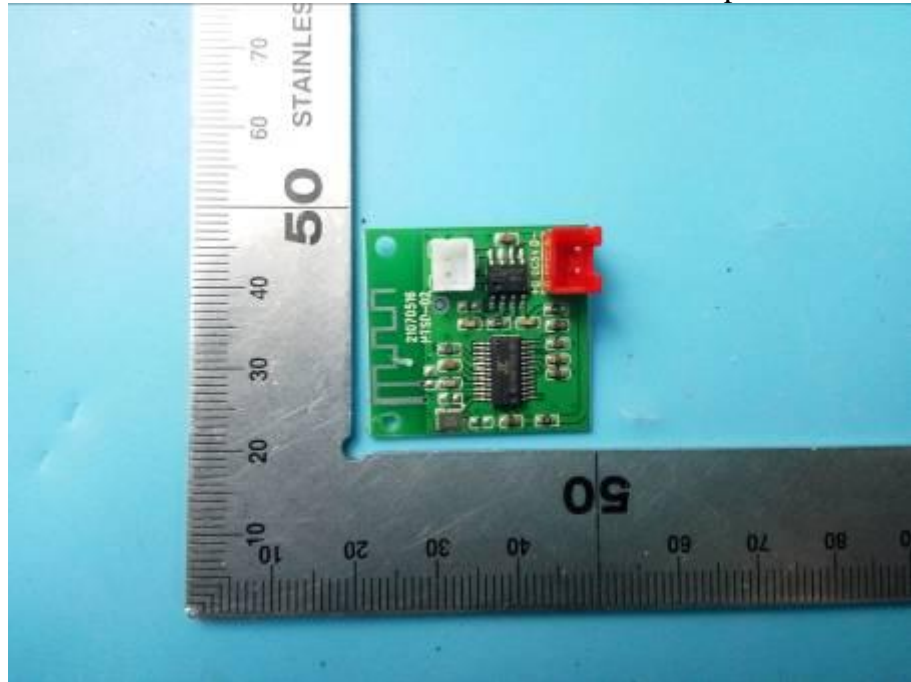


Figure 6
Components side of the PCB

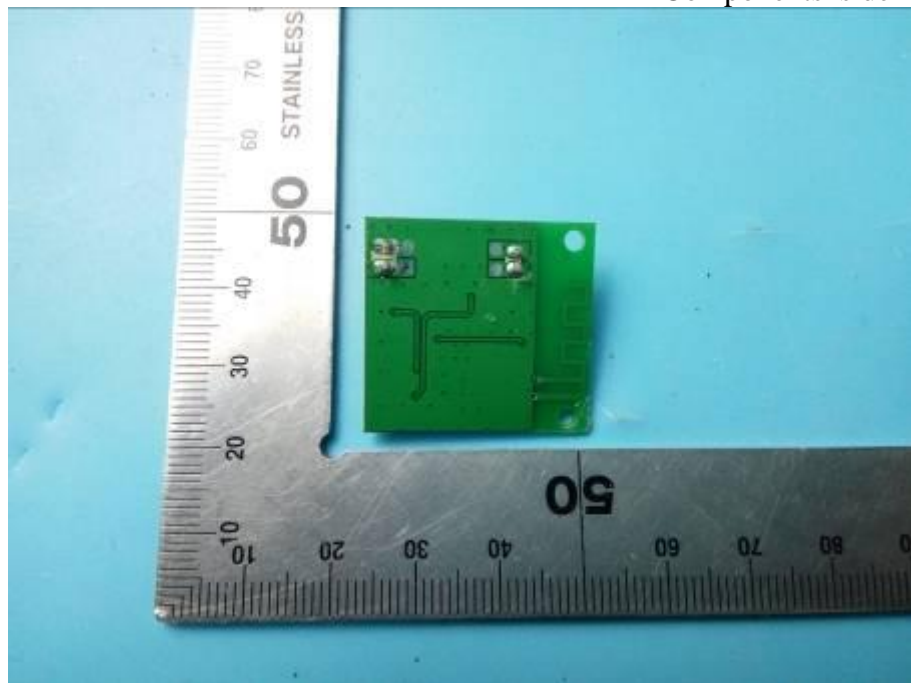


Figure 7
Components side of the PCB



Figure 8
Components side of the PCB

