

EN 55014-1:2006+A1:2009+A2:2011

EN 55014-2:1997+A1:2001+A2:2008

EN 61000-3-2:2014

EN 61000-3-3:2013

TEST REPORT

For

SUZHOU ARMOCON TECHNOLOGY CO., LTD

3-5/F No 77 SuHong Middle Road SIP Jiangsu China 215027

Tested Model: Sona

Report Type:

Original Report

Product Type:

Handhold massager

Test Engineer: Phil Zhu

Report Number: RSHA170831006 -00A

Report Date: 2017-09-06

Reviewed By: Ray. Wang
EMC Leader

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	SUZHOU ARMOCON TECHNOLOGY CO., LTD
Model	Sona
Product	Handhold massager
Rate Voltage	DC 3.7V Power From Battery and power supply DC 5V
Operating Frequency	75MHz
Dimension	55.3 mm (L) × 87.7mm (W) × 99 mm (H)

**All measurement and test data in this report was gathered from production sample serial number: 20170831006 (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2017-08-31.*

Objective

The following report is prepared on behalf of SUZHOU ARMOCON TECHNOLOGY CO., LTD in accordance with

EN 55014-1, Electromagnetic Compatibility – Requirements for household appliances, electric tools and similar apparatus Part 1: Emission.

EN 55014-2, Electromagnetic Compatibility – Requirements for household appliances, electric tools and similar apparatus Part 2: Immunity- Product family Standard.

EN61000-3-2, Limits – Limits for harmonic current emissions (equipment input current up to and including 16 A per phase), and also in accordance with EN 61000-3-3, Limits Section 3; Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <16A.

The objective of the manufacturer is to determine the compliance of the EUT with EN 55014-1, EN 55014-2, EN 61000-3-2 and EN 61000-3-3.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with CISPR 16-1-1:2015, specification for radio disturbance and immunity measuring apparatus and methods P1-1: radio disturbance and immunity measuring apparatus measuring apparatus.

CISPR 16-1-2:2014, Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Conducted disturbances.

CISPR 16-1-4:2010+A2:2017, Specification for radio disturbance and immunity measuring apparatus and methods-Part 1-4: Radio disturbance and immunity measuring apparatus -Ancillary equipment -Radiated disturbances;

CISPR 16-2-1:2014, Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity -Conducted disturbance measurements.

CISPR 16-2-3: 2016, Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity -Radiated disturbance measurements.

CISPR 16-4-2: 2011+A1-2014, Specification for radio disturbance and immunity measuring apparatus and methods -Part 4-2: Uncertainties, statistics and limit modeling -Measurement instrumentation uncertainty.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 Meters.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test mode: Continuous working.

EUT Exercise Software

No exercise software was used to test.

Equipment Modifications

No modification was made to the EUT.

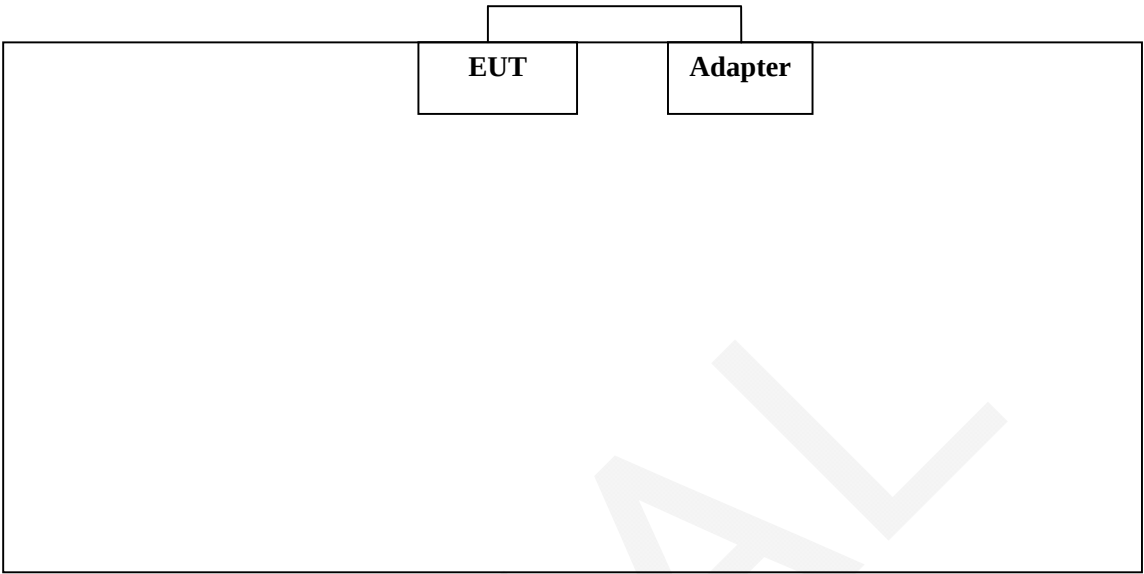
Support Equipment List and Details

Manufacturer	Description	Model	Series Model
/	Adapter	CC10-050200U	17080002603

External I/O Cable

NO.	Cable Description	Length (m)	From/Port	To
/	Power Cable	0.8	EUT	Adapter

Block Diagram of Radiated Test Setup



SUMMARY OF TEST REPORT**EN 55014-1**

Rule	Description	Results
§ 4.1.1	Terminal Voltage	Compliance
§ 4.1.2	Disturbance Power	Not Applicable
§ 4.1.2	Radiated Disturbance	Compliance
§ 4.2	Discontinuous Disturbance	Not Applicable

EN 55014-2

Rule	Description	Results
§ 5.1	Electrostatic Discharge (IEC 61000-4-2)	Compliance
§ 5.2	Fast Transients (IEC 61000-4-4)	Compliance
§ 5.4	Injected Currents (IEC 61000-4-6)	Compliance
§ 5.5	Radio Frequency Electromagnetic Fields (IEC 61000-4-3)	Compliance
§ 5.6	Surges (IEC 61000-4-5)	Compliance
§ 5.7	Voltage Dips and Interruptions (IEC 61000-4-11)	Compliance

EN 61000-3-2

Rule	Description	Results
	Harmonic Current Emissions	Compliance

EN 61000-3-3

Rule	Description	Results
	Voltage Fluctuation and Flicker	Compliance

Note:

Immunity test performance criteria refer to EN55014-2§6

EN 55014 §4.1.1-TERMINAL VOLTAGE

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

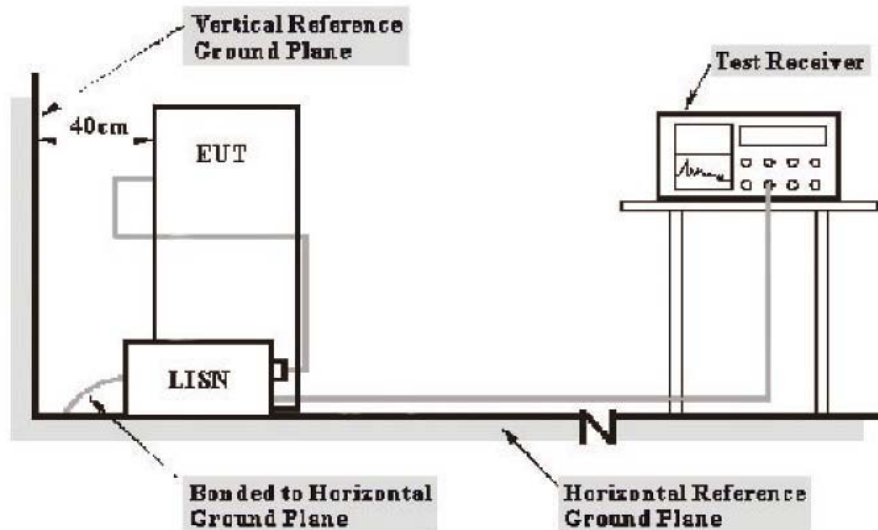
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- Non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- Non - compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Item		Measurement Uncertainty	U_{cispr}
AMN	150kHz~30MHz	3.19 dB	3.4~3.8 dB

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 30 cm from other units and other metal planes support units.

The setup of EUT is according with per EN 55014-1 measurement procedures. The specification used was with the EN 55014-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2016-10-10	2017-10-09
ROHDE&SCHWARZ	LISN	ENV216	3560655016	2016-11-25	2017-11-24
Rohde & Schwarz	CE Test software	EMC 32	100357	--	--
MICRO-COAX	Coaxial Cable	Cable-6	006	2016-09-08	2017-09-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

V_C : corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF : voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data**Environmental Conditions**

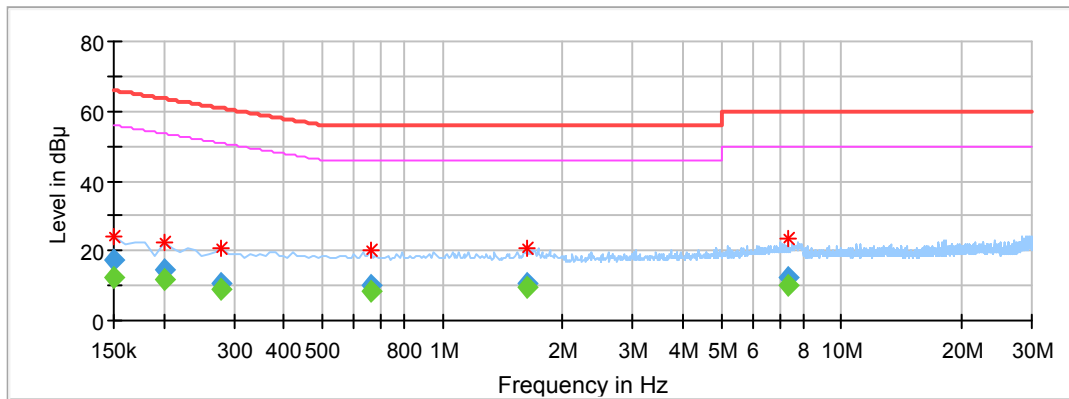
Temperature:	20.8 °C
Relative Humidity:	41%
ATM Pressure:	101.2 kPa

The testing was performed by Phil Zhu on 2017-08-15.

Test mode: Continuous working.

Line:

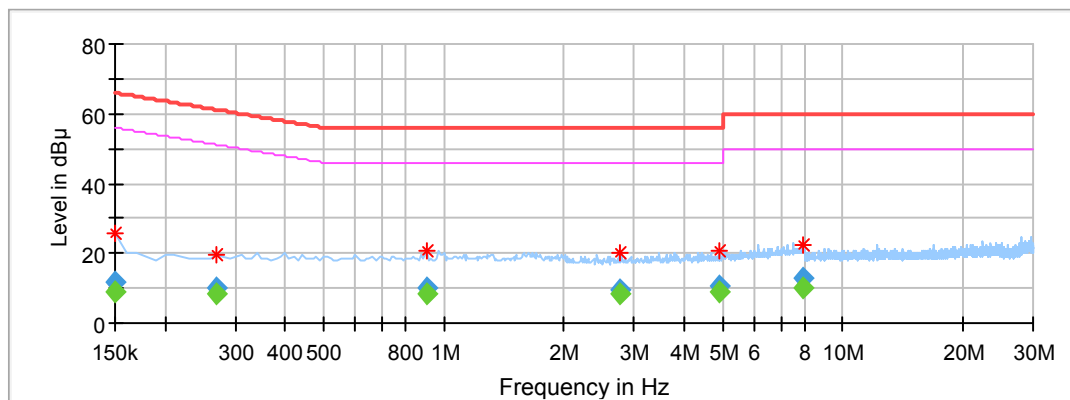
Full Spectrum



Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Corr. (dB)
0.150000	---	12.22	56.00	43.78	L1	10.1
0.150000	17.52	---	66.00	48.48	L1	10.1
0.200000	---	11.59	53.61	42.02	L1	10.2
0.200000	14.43	---	63.61	49.18	L1	10.2
0.280000	---	8.98	50.82	41.84	L1	10.1
0.280000	10.87	---	60.82	49.95	L1	10.1
0.660000	---	8.53	46.00	37.47	L1	10.0
0.660000	9.81	---	56.00	46.19	L1	10.0
1.630000	---	9.25	46.00	36.75	L1	9.9
1.630000	10.71	---	56.00	45.29	L1	9.9
7.380000	---	9.95	50.00	40.05	L1	10.0
7.380000	12.58	---	60.00	47.42	L1	10.0

Neutral:

Full Spectrum



Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Corr. (dB)
0.150000	---	9.06	56.00	46.94	N	10.1
0.150000	11.69	---	66.00	54.31	N	10.1
0.270000	---	8.37	51.12	42.75	N	10.1
0.270000	10.04	---	61.12	51.08	N	10.1
0.910000	---	8.55	46.00	37.45	N	10.0
0.910000	10.27	---	56.00	45.73	N	10.0
2.750000	---	8.50	46.00	37.50	N	9.9
2.750000	9.42	---	56.00	46.58	N	9.9
4.900000	---	9.01	46.00	36.99	N	9.9
4.900000	10.71	---	56.00	45.29	N	9.9
7.930000	---	10.10	50.00	39.90	N	9.9
7.930000	12.74	---	60.00	47.26	N	9.9

EN 55014 §4.1.1- Radiated Disturbance

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

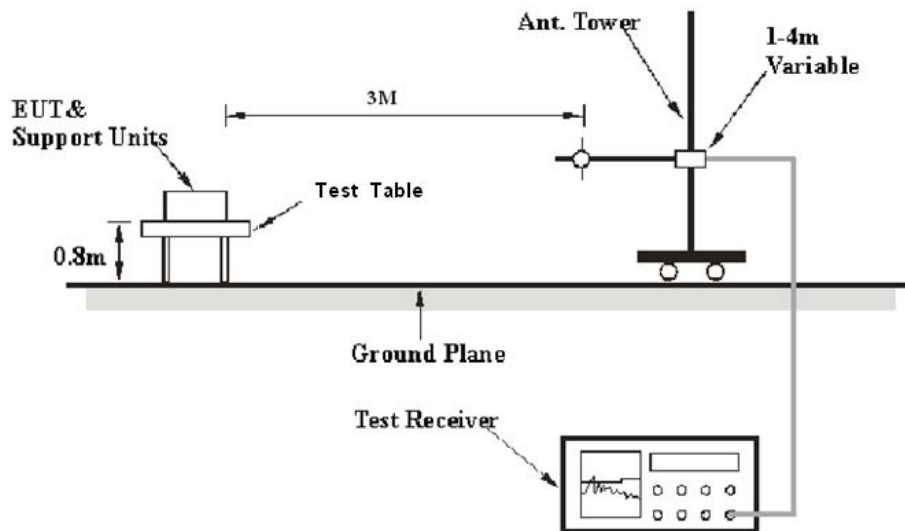
If U_{lab} is greater than U_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit.

Item		Measurement Uncertainty	U_{cisp}
Radiated Emission	30MHz~1GHz	6.11dB	6.3 dB
	1GHz~6GHz	4.45dB	5.2 dB

Test System Setup

Below 1GHz:



The radiated emission tests were performed in the 3 meters, using the setup accordance with the EN 55014-1:2006 +A1:2009 + A2:2011. The specification used was the EN 55014-1:2006 +A1:2009 + A2:2011.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	330	171377	2016-12-12	2017-12-11
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Champrotek	Chamber	Chamber A	T-KSEMC049	-	-
R&S	Auto test Software	EMC32	100361	-	-
MICRO-COAX	Coaxial Cable	Cable-8	001	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-9	002	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-10	003	2017-08-15	2018-08-14

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter reading. The basic equation is as follows:

$$\text{Corr. Amp.} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amp}$$

Test Data

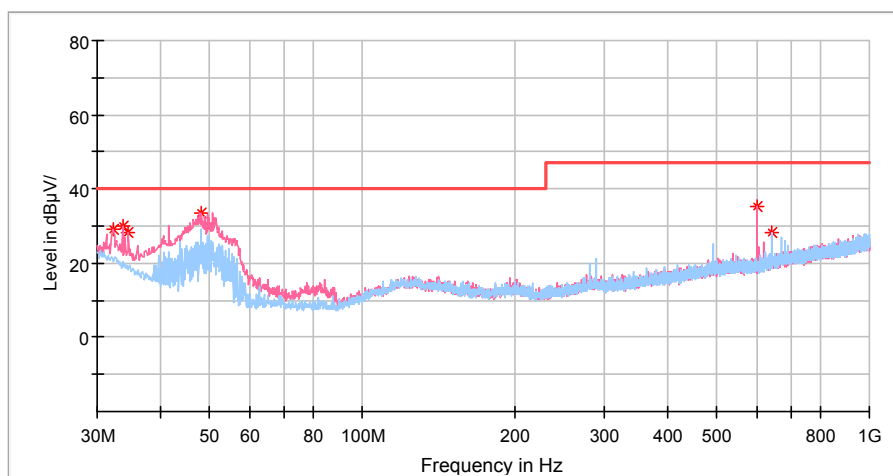
Environmental Conditions

Temperature:	24.1°C
Relative Humidity:	55%
ATM Pressure:	101.2 kPa-

* The testing was performed by Phil Zhu on 2017-09-04.

Test mode: Continuous working.

Below 1GHz

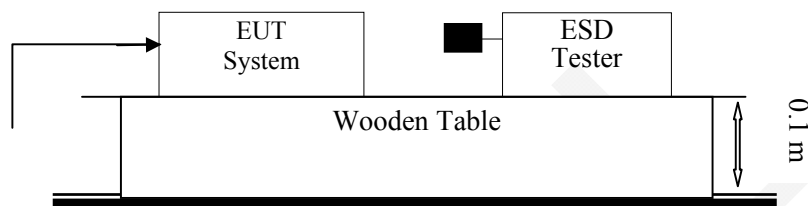


Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.182500	29.31	40.00	10.69	100.0	V	174.0	-6.3
33.637500	29.99	40.00	10.01	100.0	V	344.0	-7.4
34.607500	28.43	40.00	11.57	100.0	V	118.0	-8.2
48.187500	33.70	40.00	6.30	100.0	V	151.0	-17.1
602.300000	35.19	47.00	11.81	100.0	V	196.0	-6.0
643.888750	28.27	47.00	18.73	100.0	H	230.0	-5.0

EN 55014-2 §5.1-ELECTROSTATIC DISCHARGE (IEC 61000-4-2)**Test Equipment**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM Test	ESD Simulator	Dito	V0824103870	2016-10-11	2017-10-11

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test System Setup

Remark: ■ is the tip of the electrode

IEC 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Standard

EN 55014-2:1997 + A1:2001 + A2:2008 / IEC 61000-4-2:2008

Air Discharge at ± 2 kV, ± 4 kV, ± 8 kV

Contact Discharge at ± 2 kV, ± 4 kV

Test Level

Level	Test Voltage Contact Discharge ($\pm$ kV)	Test Voltage Air Discharge ($\pm$ kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Performance criterion: B

Test Procedure

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.

Contact Discharge:

All the procedure shall be same as Section 8.3.1. of IEC 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

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 0.1m from the EUT and with the discharge electrode touching the coupling plane.

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.

Test Data

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	50 %
ATM Pressure:	100 kPa

The testing was performed by Phil Zhu on 2017-09-05.

Test mode: Continuous working.

	Contact discharge				Air discharge			
Test Points	±2kV	±4kV	±6kV	±8kV	±2kV	±4kV	±8kV	±15kV
VCP	A	A	/	/	/	/	/	/
HCP	A	A	/	/	/	/	/	/
1	A	A	/	/	/	/	/	/
2	/	/	/	/	A	A	A	/

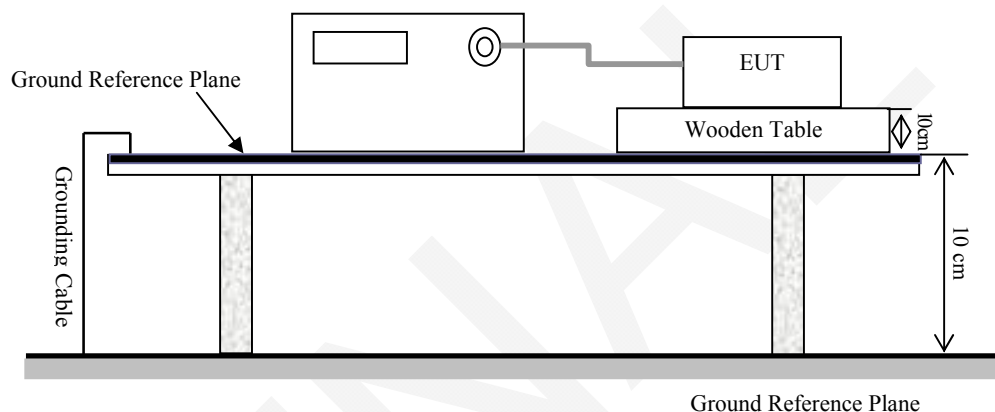
Test point as follows:



EN 55014-2 §5.2-FAST TRANSIENTS (IEC 61000-4-4)**Test Equipment**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Auto Transformer	MV2616	V0939105172	NCR	NCR
EM TEST	Ultra Compact Generator	UCS 500 N5	P1406130994	2017-07-24	2018-07-23

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test System Setup**Test Standard**

EN 55014-2:1997 + A1:2001 + A2:2008/ IEC 61000-4-4:2012
Test Level 2 at 1 kV

Test Level

Open Circuit Output Test Voltage $\pm 10\%$				
Level	Power ports, earth port(PE)		Signal and control ports	
	Voltage(kV)	Repetition frequency(kHz)	Voltage(kV)	Repetition frequency(kHz)
1	0.5	5 or 100	0.25	5 or 100
2	1		0.5	
3	2		1	
4	4		2	
X	Special	Special	Special	Special

Performance criterion: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meters by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0-meter ground rod. The ground rod is connected to the test facility's electrical earth.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2017-09-05.

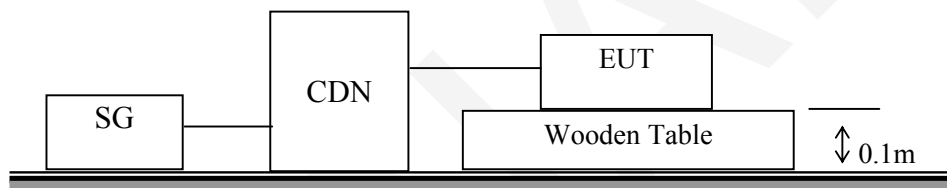
Test mode: Continuous working.

EN 61000-4-4 Test Points		Test Levels (kV) ; Repetition frequency(5kHz)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Mains Power Input Ports	L/ N	/	/	A	A	/	/	/	/
	L/ PE	/	/	/	/	/	/	/	/
	N/PE	/	/	/	/	/	/	/	/
	L/N/PE								
Signal Port	/	/	/	/	/	/	/	/	/

EN 55014-2 §5.3-INJECTED CURRENTS (IEC 61000-4-6)**Test Equipment**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Signal Generator	8648C	3537A01810	2017-07-24	2018-07-23
R&S	Power Amplifier	500A100M2	18117	NCR	NCR
Dressler	Attenuator	ATT 6/75	510020010004	NCR	NCR
EM TEST	CDN	CDN M2/M3	0707-13	2016-11-25	2017-11-24
COM-POWER	CDN	CDN M225E	511098	2017-01-19	2018-01-19
COM-POWER	CDN	CDN M325E	521164	2017-01-19	2018-01-19

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Setup**Test Standard**

EN 55014-2:1997 + A1:2001 + A2:2008/ IEC 61000-4-6:2014
 Test level 2 at 3V (r.m.s.), 0.15 MHz ~ 80 MHz

Test Level

Level	Voltage Level (r.m.s.) (V)
1	1
2	3
3	10
X	Special

Performance criterion: A

Test Procedure

- 1) Let the EUT work in test mode and test it.
- 2) The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m 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).
- 3) The disturbance signal described below is injected to EUT through CDN.
- 4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 5) The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
- 6) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2017-09-05.

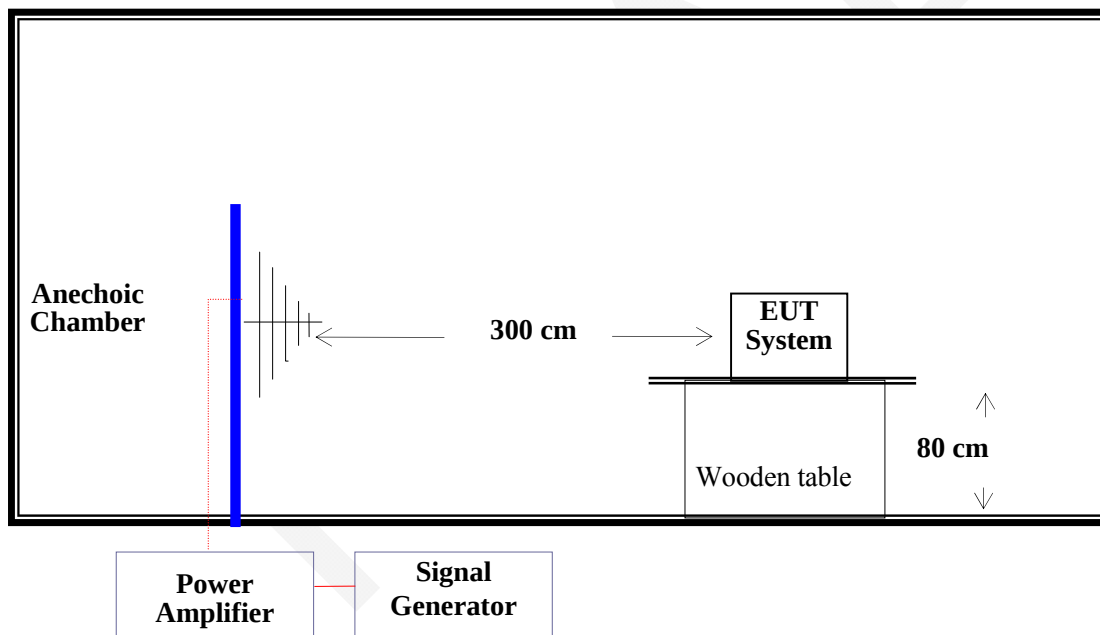
Test mode: Continuous working.

EN61000-4-6 Test Ports	Test equipment	Frequency Range (MHz)	Voltage Level (e.m.f.) U ₀			
			1V	3V	10V	X
AC mains power input ports	M2	0.15-80	/	A	/	/
	M3	0.15-80	/	/	/	/

**EN 55014-2 §5.5 - RADIO FREQUENCY ELECTROMAGNETIC FIELDS
(IEC 61000-4-3)****Test Equipment**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	E4421B	US38440505	2015-11-25	2017-11-24
Amplifier Research	Power Amplifier	200W1000M3A	18062	NCR	NCR
Sunol Sciences	Bi-log Antenna	JB3	A040904-1	2016-01-09	2019-01-08
Amplifier Research	Power Amplifier	10S1GRM1	18060	NCR	NCR

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test System Setup**Test Standard**

EN 55014-2: 1997 + A1: 2001 + A2:2008/IEC 61000-4-3: 2006 + A2:2010
Test level 2 at 3V/m (unmodulated, r.m.s.)

Test Level

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

Performance Criterion: A**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 polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera and an artificial ear, sound level meter are used to monitor the EUT and the sound pressure level. RF communication test set is used to monitor the noise level.

Note: According to the applicant's requirement, hand free mode was not tested.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m (Test level 2)
2. Radiated Signal	AM 80%, 1 kHz Modulation
3. Scanning Frequency	80 – 1000 MHz
4. Scanning Frequency Step	1%
5. Dwell Time	3 sec.

Test Data and Setup Photo**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	100 kPa

The testing was performed by Phil Zhu on 2017-09-05.

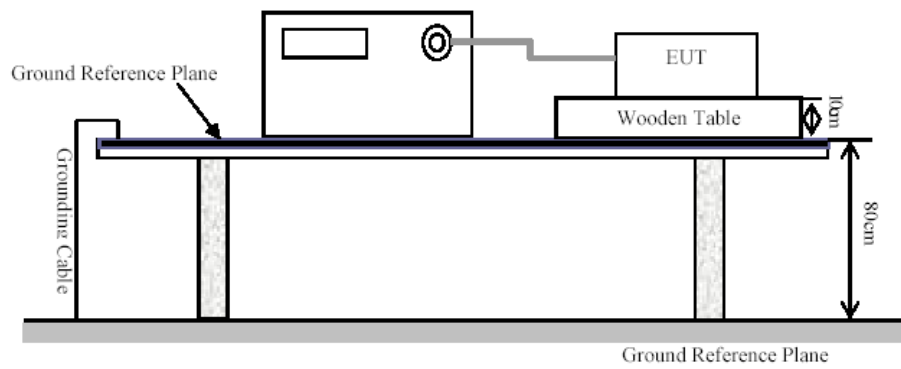
Test mode: Continuous working.

Frequency Range (MHz)	Front Side (3V/m)		Rear Side (3V/m)		Left Side (3V/m)		Right Side (3V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A

EN 55014-2 §5.6 SURGES (IEC 61000-4-5)**Test Equipment**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Auto Transformer	MV2616	V0939105172	N/A	N/A
EM TEST	Ultra Compact Generator	UCS500-N	P1406130994	2017-07-24	2018-07-23

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test system Setup**Test Standard**

EN 55014-2: 1997 + A1: 2001 + A2:2008 (IEC 61000-4-5:2014)

AC Mains: L-N: Test level 2 at 1 kV

L-PE, N-PE: Test level 3 at 2 kV

Test level

Level	Open Circuit Output Test Voltage $\pm 10\%$	Performance Criterion	
		AC Mains	Signal Port
1	0.5 kV	B	B
2	1 kV	B	B
3	2 kV	B	B
4	4 kV	B	B
X	Special	/	/

Performance criterion: B

Test Procedure

- 1) Provide disturbance signal described below is injected to EUT.
- 2) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 3) Different phase angles are done individually.
- 4) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25°C
Relative Humidity:	50 %
ATM Pressure:	100.4 kPa

The testing was performed by Phil Zhu on 2017-09-05.

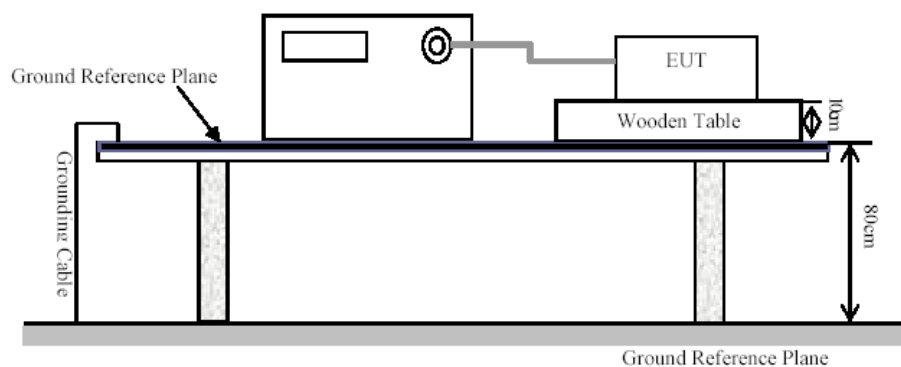
Test mode: Continuous working.

EN61000-4-5 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC power ports	L1+N	/	/	A	A	/	/	/	/
	L1 + PE	/	/	/	/	/	/	/	/
	N + PE	/	/	/	/	/	/	/	/
	L1 +N + PE								

EN 55014-2 §5.7-VOLTAGE DIPS AND INTERRUPTIONS (IEC 61000-4-11)**Test Equipment**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Auto Transformer	MV2616	V0939105172	N/A	N/A
EM TEST	Ultra Compact Generator	UCS500-N5	P1406130994	2017-07-24	2018-07-23

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test setup**Test Standard**

EN 55014-2: 1997 + A1: 2001 + A2:2008 (IEC 61000-4-11:2004)

Test Levels and Performance Criterion

Test Level	Td (Periods)	Phase Angle	Performance criterion:
Voltage interruptions : 0 % residual voltage	0.5	0/90/180/270	C
Voltage dip : 40 % residual voltage	10	0/90/180/270	C
Voltage dip : 70 % residual voltage	50	0/90/180/270	C

Test Procedure

- 1) The interruption is introduced at selected phase angles with specified duration.
- 2) Record any degradation of performance.

Test Data and Setup Photo**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	100.4 kPa

The testing was performed by Phil Zhu on 2017-09-05.

Test mode: Continuous working.

Voltage Tips/Interruptions Test

Test Level	Td (Periods)	Phase Angle	Result
Voltage interruptions : 0 % residual voltage	0.5	0/90/180/270	A
Voltage dip : 40 % residual voltage	10	0/90/180/270	A
Voltage dip : 70 % residual voltage	50	0/90/180/270	A

EN 61000-3-2- HARMONIC CURRENT EMISSIONS

According to EN 61000-3-2:2014 section 7: Equipment with a rated power of 75 W or less, other than discharge lighting equipment, are not included in this standard.

FINAL

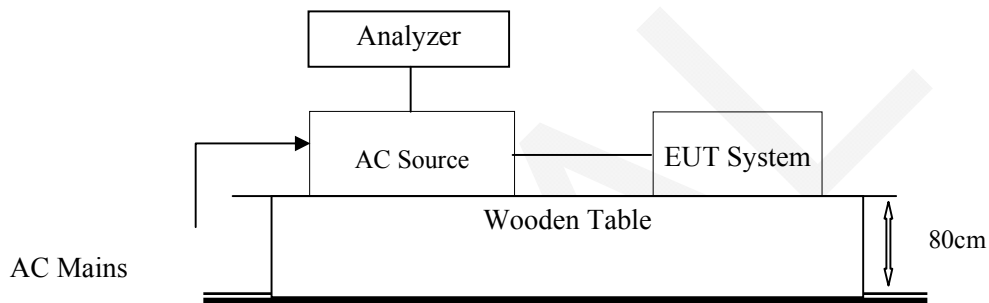
EN 61000-3-3 VOLTAGE FLUCTUATIONS AND FLICKER

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Harmonic & Flicker Analyzer	DPA 500N	P1402129120	2016-11-25	2017-11-24
EM TEST	AC Power Source	ACS 500N	P1251107475	2016-11-25	2017-11-24

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test System Setup



Test Standard

EN 61000-3-3:2013

Flicker Test Limits :

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.

The following limits apply:

- the value of Pst shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3,3 %;
- the maximum relative voltage change dmax, 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.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0,65.

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.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	100 kPa

Date of test:	15:56 04.Sep 2017
Tester:	Phil Zhu
Standard used:	EN/IEC 61000-3-2 Equipment class B
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2002)
Customer:	SUZHOU ARMOCON TECHNOLOGY CO., LTD
E. U. T.:	Handhold massager
Model:	Sona
Test Mode	<i>Test mode: Continuous working.</i>

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.033	1.00	PASS
Plt	0.033	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.195	4.00	PASS
dt [s]	0.000	0.50	PASS

EXHIBIT A - EUT PHOTOGRAPHS

EUT – Top View



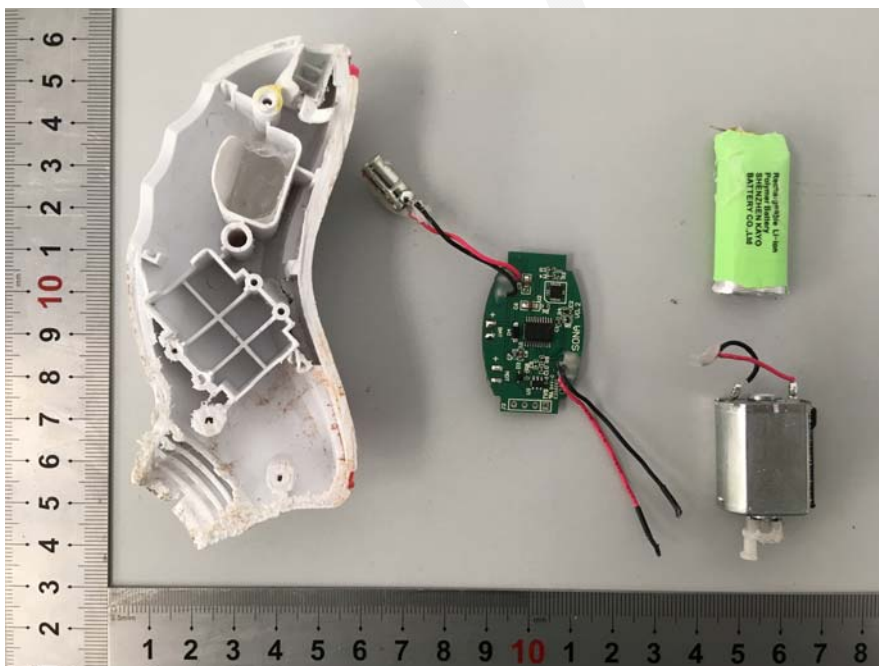
EUT –Bottom View



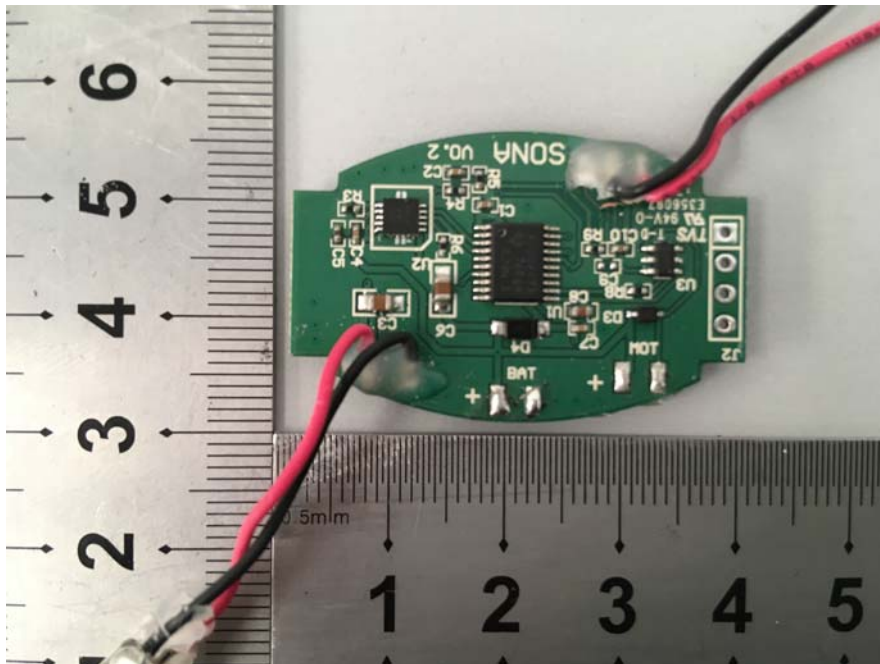
EUT- Cable View



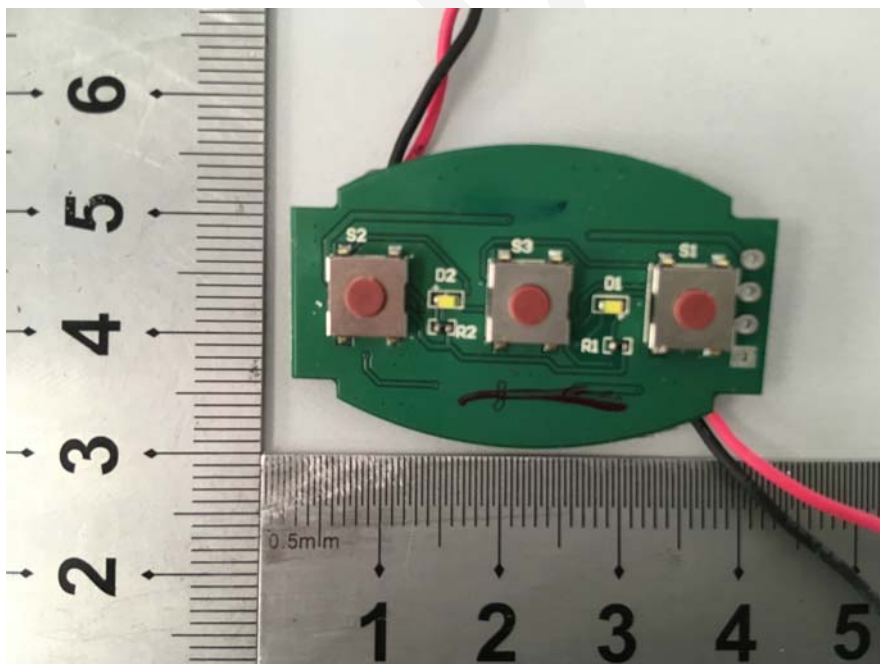
EUT -Cover off View



EUT –PCB Top View



EUT –PCB Bottom View



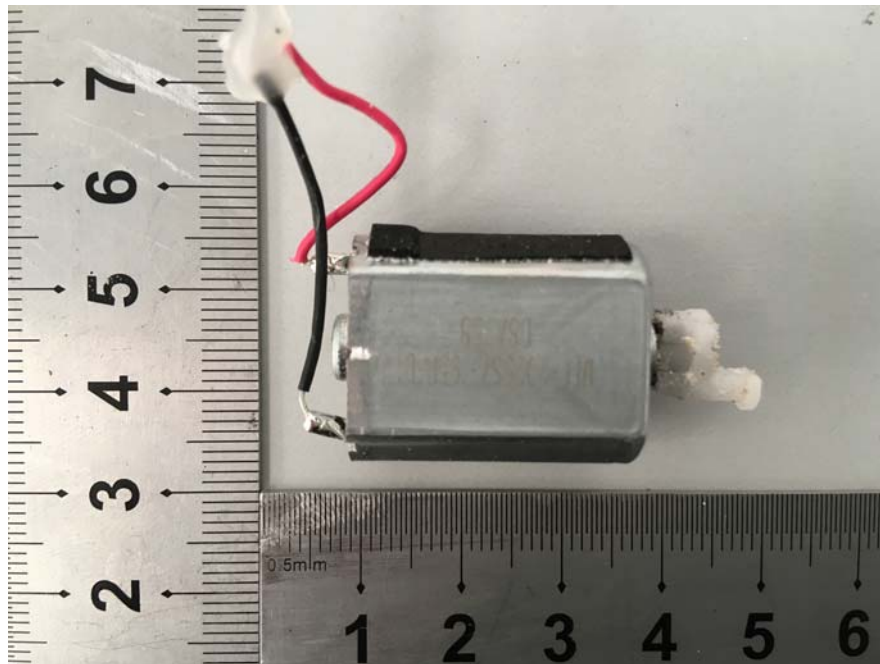
EUT-Battery Top View



EUT-Battery Bottom View



EUT-Motor Top View



EUT-Motor Bottom View

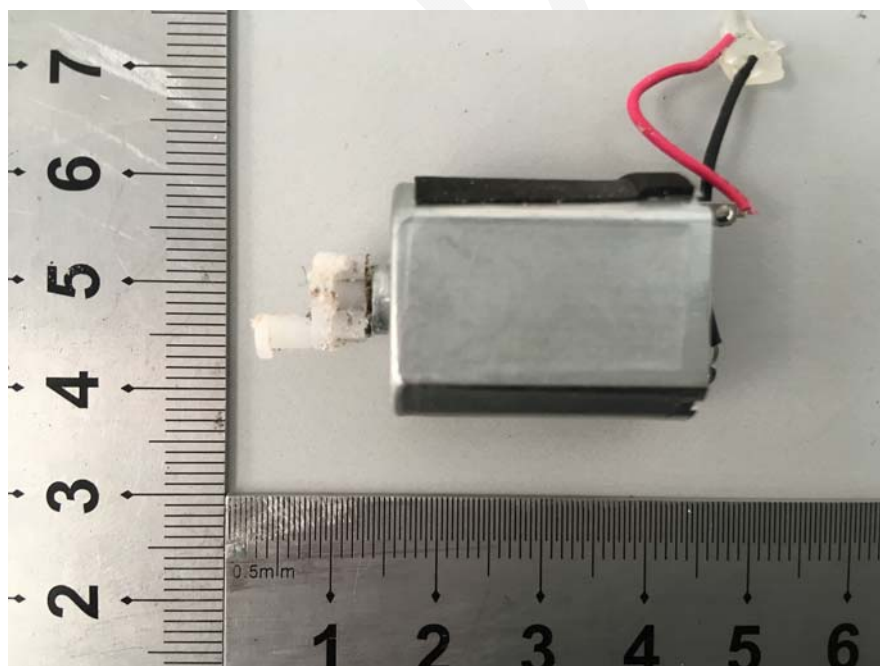


EXHIBIT B - TEST SETUP PHOTOGRAPHS

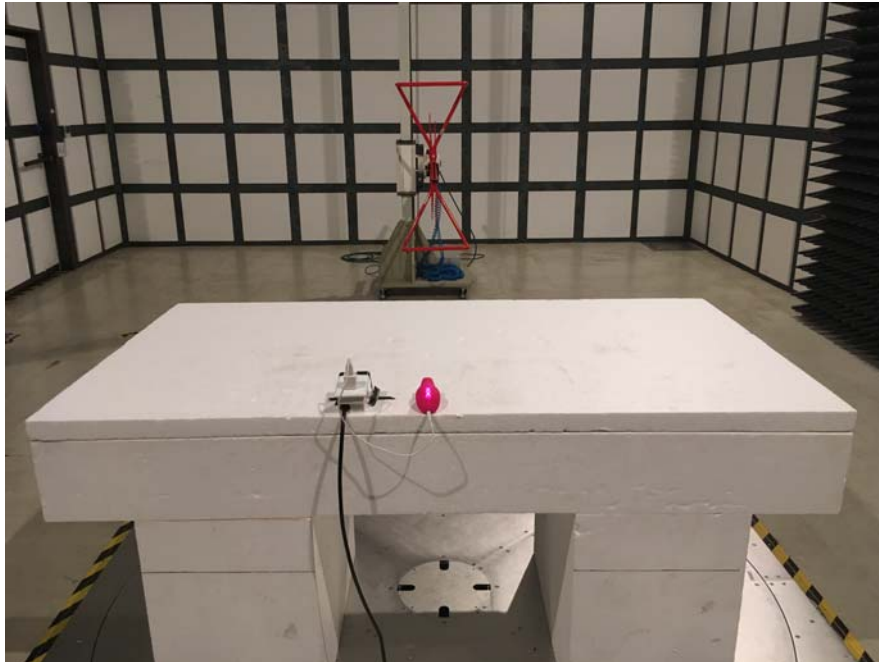
Terminal Voltage - Front View



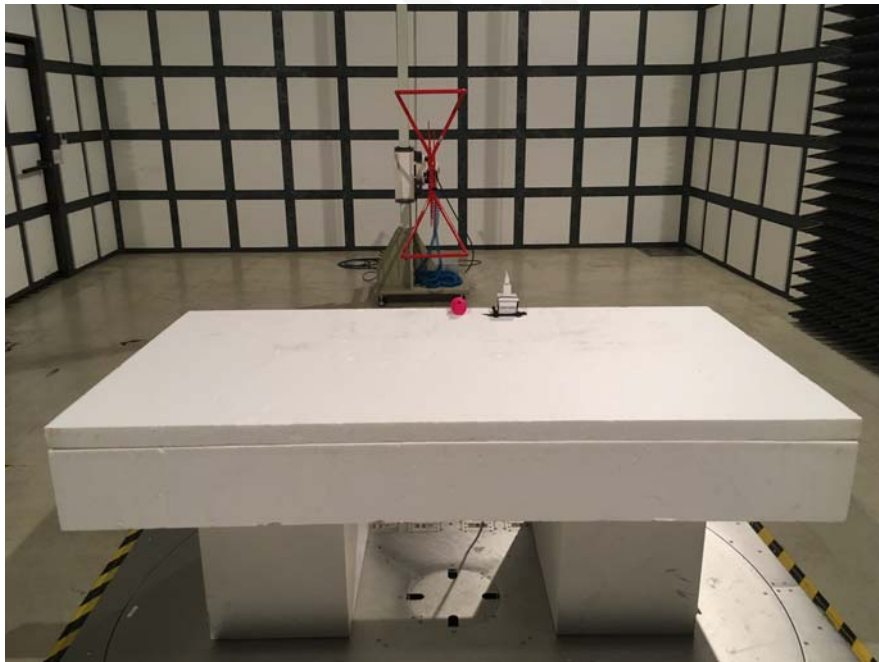
Terminal Voltage - Rear View



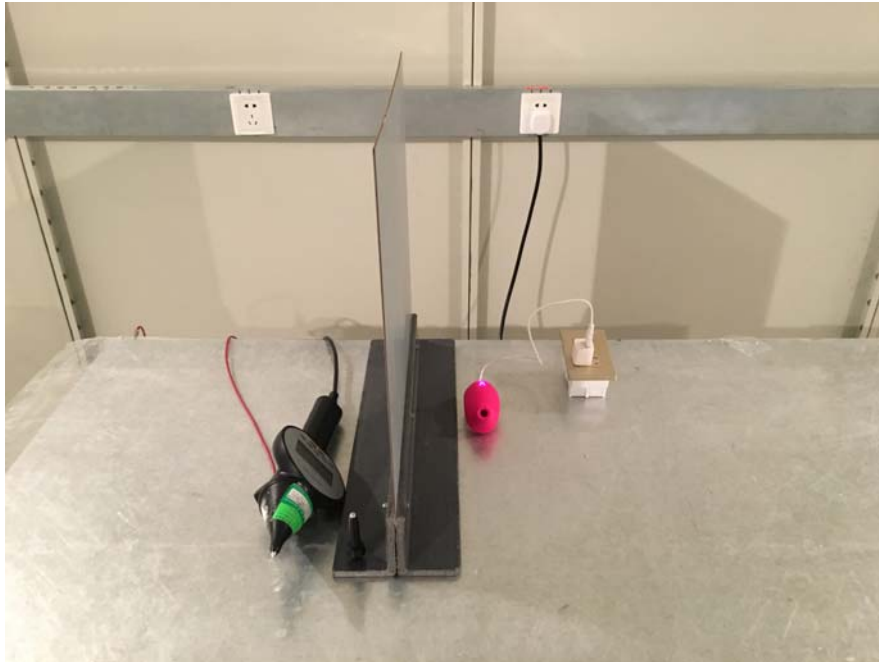
Radiated Disturbance - Front View



Radiated Disturbance - Side View



ESD Test Setup Photo



EFT Test Setup Photo



CS Test Setup Photo



RS Test Setup Photo



SURGE Test Setup Photo



DIPS Test Setup Photo



Flicker Test Setup Photo



******END OF REPORT******