

Jmatek Limited.

TEST REPORT

SCOPE OF WORK

EMC TESTING– TC10PCE, TC10PM

REPORT NUMBER

171031128GZU-001

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EN 55014+A2:2011 (With electronics)-b
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TEST REPORT

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Intertek Report No: 171031128GZU-001

Test standards

EN 55014-1:2006+A1:2009+A2:2011
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 55014-2:2015

Sample Description

Product : Humidifier (Air Cooler)
Model No. : TC10PCE, TC10PM
Electrical Rating : 220-240V~, 50Hz, 40W, Class II
Serial No. Not Labeled
Date Received : 1 November 2017
Date Test : 1 November 2017 - 15 November 2017
Conducted

Prepared and Checked By

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1. TEST RESULTS SUMMARY

Test Item	Standard	Result
Continuous conducted disturbance voltage	EN 55014-1:2006+A1:2009+A2:2011	Pass
Discontinuous conducted disturbance voltage	EN 55014-1:2006+A1:2009+A2:2011	Pass
Radiated disturbance power	EN 55014-1:2006+A1:2009+A2:2011	Pass
Radiated disturbance	EN 55014-1:2006+A1:2009+A2:2011 Reference: CISPR 16-2-3:2006	N/A
Harmonic of current	EN 61000-3-2:2014	Pass
Flicker	EN 61000-3-3:2013	Pass
ESD immunity	EN 55014-2: 2015 Reference: EN 61000-4-2:2009	Pass
Radiated EM field immunity	EN 55014-2:2015 Reference: EN 61000-4-3:2006+A1:2008+A2:2010	N/A
EFT immunity	EN 55014-2:2015 Reference: EN 61000-4-4:2012	Pass
Surge immunity	EN 55014-2:2015 Reference: EN 61000-4-5:2014	Pass
Inject current immunity	EN 55014-2:2015 Reference: EN 61000-4-6:2014	Pass
Voltage dips and interruption immunity	EN 55014-2:2015 Reference: EN 61000-4-11:2004	Pass

Remark:

1. The symbol "N/A" in above table means Not Applicable.
2. When determining the test results, measurement uncertainty of tests has been considered.

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2. EMC RESULTS CONCLUSION

RE: EMC Testing Pursuant to EMC Directive 2014/30/EU Performed on the Humidifier (Air Cooler), Models: TC10PCE, TC10PM.

All models have the same appearance and construction, except that TC10PCE control by PCB then TC10PM control by mechanical switch.

We tested the Humidifier (Air Cooler), Model: TC10PCE, to determine if it was in compliance with the relevant EN standards as marked on the Test Results Summary. We found that the unit met the requirements of EN 55014-1, EN 61000-3-2, EN 61000-3-3, EN 55014-2 (EN 61000-4-2), EN 55014-2 (EN 61000-4-4), EN 55014-2 (EN 61000-4-6), EN 55014-2 (EN 61000-4-5), & EN 55014-2 (EN 61000-4-11) standards when tested as received. The worst case's test data was presented in this test report.

The production units are required to conform to the initial sample as received when the units are placed on the market.

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3. LABORATORY MEASUREMENTS

Configuration Information

Support Equipment:	N/A
Rated Voltage and frequency under test:	220-240 V~; 50 Hz
Condition of Environment:	Temperature: 22~28°C Relative Humidity:35~60% Atmosphere Pressure:86~106kPa

Notes:

1. The EMI measurements had been made in the operating mode produced the largest emission in the frequency band being investigated consistent with normal applications. An attempt had been made to maximize the emission by varying the configuration of the EUT.
2. The EMS measurements had been made in the frequency bands being investigated, with the EUT in the most susceptible operating mode consistent with normal applications. The configuration of the test sample had been varied to achieve maximum susceptibility.
3. Test Location:
Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
All tests were performed at:
Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China
Except Radiated Disturbance and Radiated Susceptibility were performed at:
Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China

4. Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission (9 kHz-150 kHz)	2.51 dB
2	Conduction Emission (150 kHz-30 MHz)	2.69 dB
3	Disturbance Power (30 MHz-300 MHz)	3.21 dB
4	Radiated Emission (30 MHz-1 GHz)	4.79 dB
5	Radiated Emission (1 GHz-6 GHz)	5.02 dB
6	Radiated Emission (6 GHz-18 GHz)	5.17 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty is calculated in accordance with CISPR16-4-2:2011

The measurement uncertainty is given with a confidence of 95%, k=2.

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4. EQUIPMENT USED DURING TEST

Conducted Disturbance-Mains Terminal(1)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	24/07/2018	1Y
EM006-05	LISN	ENV216	R&S	04/06/2018	1Y
SA047-79	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	07/01/2019	1Y

Click(1)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM008-01	Click Tester	DIA1512D	SCHAFFNER	24/07/2018	1Y
EM006-06	LISN	ENV216	R&S	14/09/2018	1Y
SA047-78	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y
EM004-03	EMC shield Room	8m×4m×3m	Zhongyu	07/01/2019	1Y

Disturbance Power

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	24/07/2018	1Y
EM081-04	Absorb Power Clamp	MDS-21	R&S	14/03/2018	1Y
SA047-79	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	07/01/2019	1Y

Electrostatic Discharge(1)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM077-04	ESD Simulator	NSG437	TESEQ	17/04/2018	1Y
SA047-110	Digital Temperature-Humidity Recorder	RS210	YIJIE	03/11/2018	1Y

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Electrical Fast Transient/Burst (2)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM005-10	EFT Generator	NSG3025	TESEQ	03/12/2018	1Y
EM005-10-01	Capacitive Coupling Clamp	CDN8014	TESEQ	06/04/2018	1Y
SA047-77	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y

Surge (3)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM005-09	Surge/DIP Generator	NSG3040	TESEQ	25/05/2018	1Y
SA047-77	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y

Conducted Susceptibility (2)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM019-01	Conducted Immunity Testing System	NSG4070-75	Teseq GmbH	14/09/2018	1Y
EM019-01-01	Current Electromagnetic injection clamp	KEMZ801S	Teseq GmbH	14/09/2018	1Y
EM019-01-02	Coupling&Decoupling Network	CDNM016	Teseq GmbH	14/09/2018	1Y
EM019-01-03	6dB Attenuator	ATN6075	Teseq GmbH	14/09/2018	1Y
EM019-03	Current Clamp	CIP 9136A	Teseq GmbH	30/07/2018	1Y
SA047-77	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y

Voltage Dips and Interruptions (2)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM005-09	Surge/DIP Generator	NSG3040	TESEQ	25/05/2018	1Y
EM005-09-01	Voltage Regulator	INA6501	TESEQ	25/05/2018	1Y
SA047-77	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y

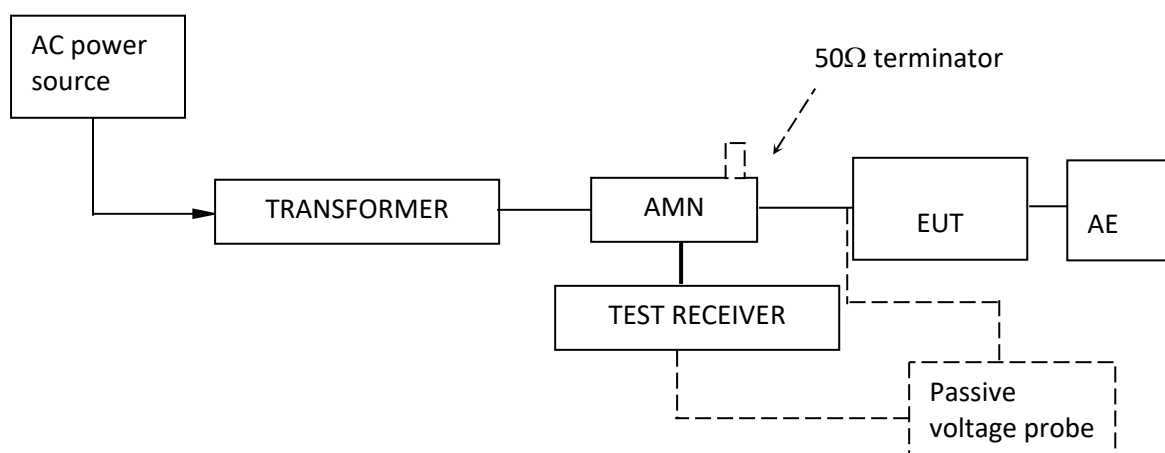
TEST REPORT

5. EMI TEST

5.1 EN 55014-1 Continuous Conducted Disturbance Voltage Test

Test Result: Pass

5.1.1 Block Diagram of Test Setup



5.1.2 Test Setup and Procedure

The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance. Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.4m high non-metallic table above earthed ground plane (Ground Reference Plane). And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

When measurements of disturbance are being made, the appliance shall be operated under the conditions defined in clause 7.

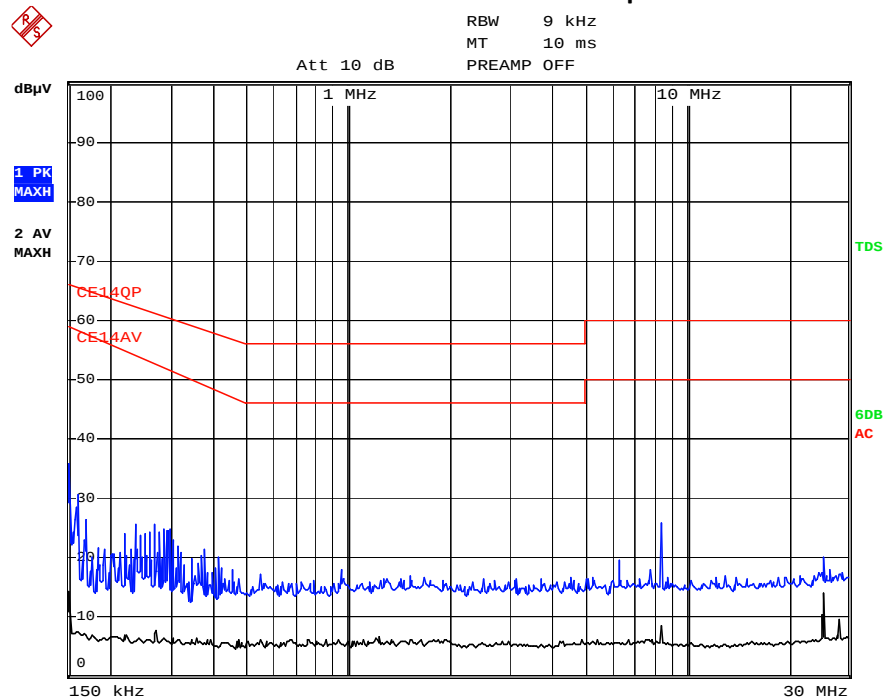
TEST REPORT

5.1.3 Test Data and curve

At mains terminal:

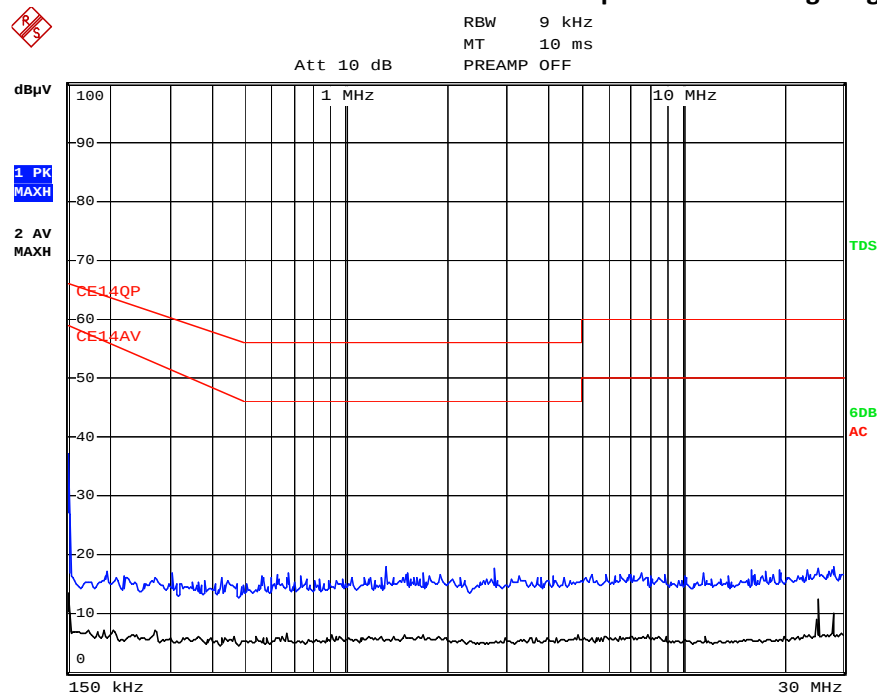
Tested Wire: Live

Operation Mode: all function on



Tested Wire: Neutral

Operation Mode: lighting



All emission levels are more than 10 dB below the limit.

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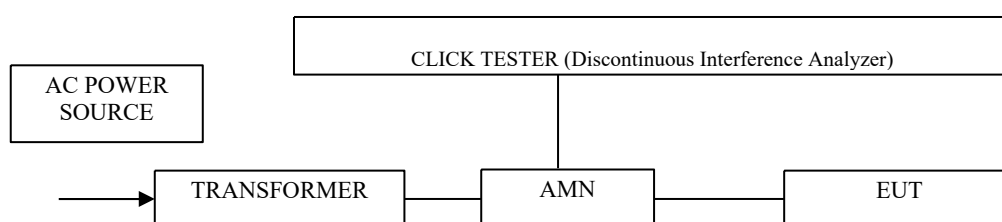
At load/control terminal:

Not Applicable.

5.2 EN 55014-1 Discontinuous Conducted Disturbance Voltage

Test Result: Pass

5.2.1 Block Diagram of Test Setup



5.2.2 Test Setup and Procedure

The EUT was placed on a 0.8m high non-metallic table in shielded room, the wall of shielded room used as Ground Reference Plane (GRP), and keeps a distance of at least 0.8m from any of the other metallic surface.

The EUT was connected to an artificial mains network and at a distance of 0.8m from it, the excess lead of EUT was bundled with a length of 0.3m to 0.4m parallel to the main lead. The number of counted clicks above the permitted limit for continuous interference and their duration, spacing and rate were measured during the observation time. When relevant, a permitted(relaxed) limit for clicks was calculated and a second measurement was performed. Determination of compliance with the permitted limit according to the upper quartile method was applied. The frequency 150kHz, 500 kHz, 1.4 MHz and 30 MHz was checked.

When measurements of disturbance are being made, the appliance shall be operated under the conditions defined in clause 7.

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5.2.3 Test Data and curve

Frequency (MHz)	0.15	0.50	1.40	30.00
Permitted limit for continuous interference (dB μ V)	66	56	56	60
Short Clicks [T<10ms]	0	0	0	0
Mid. Clicks [10ms<T<20ms]	0	0	0	0
Long Clicks [T>20ms]	0	0	0	0
Total clicks (number)	0	0	0	0
Switching operation (number)	--			
Factor	--			
Observation time (min.)	120			
Click rate, N	0	0	0	0
Value to be added (dB)	--	--	--	--
Counted clicks allowed to exceed the permitted limit (number)	--	--	--	--
Permitted limit for clicks (dB μ V)	--	--	--	--
Counted clicks exceeding the limit (number)	--	--	--	--
Complies with the limit (Pass/Fail)	Pass	Pass	Pass	Pass

The appliance was deemed to comply with the limits if fulfilling the three conditions below:

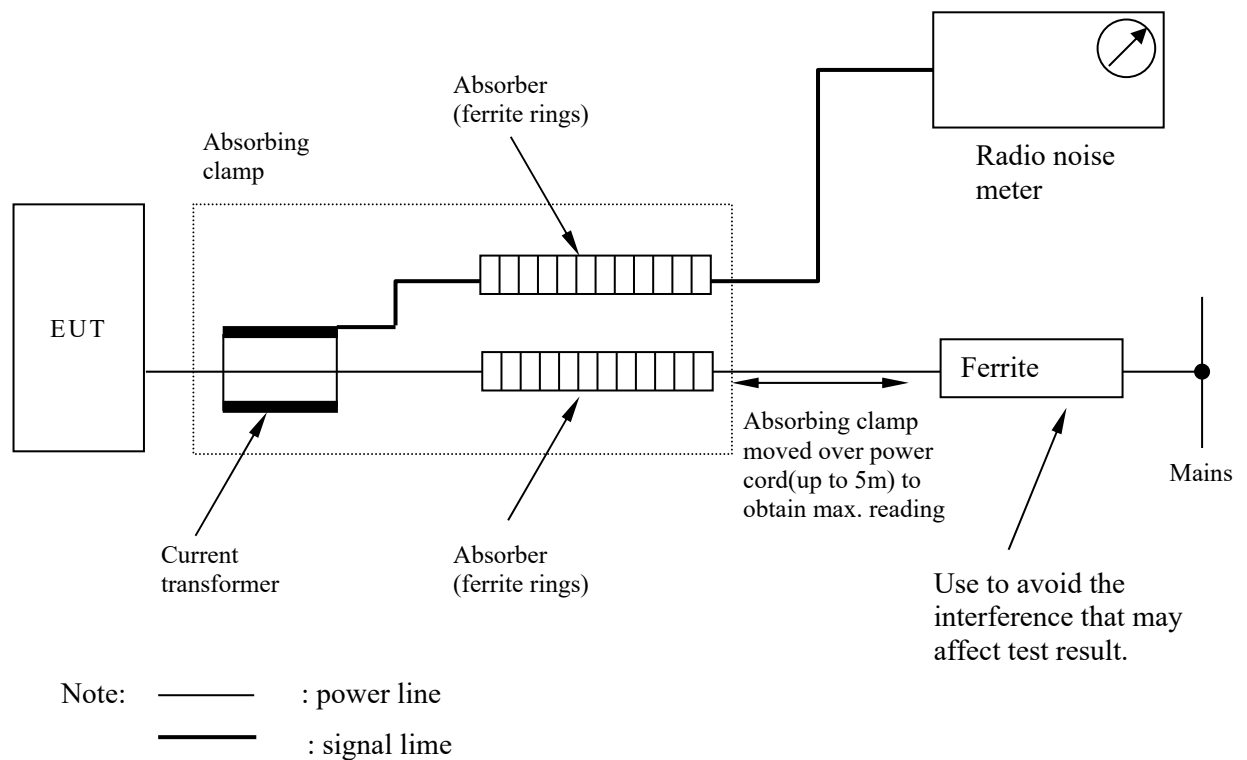
- the click rate is not more than 5.
- none of the caused clicks has a duration longer than 20 ms.
- 90 % of the caused clicks have a duration less than 10 ms.

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5.3 EN 55014-1 Radiated Disturbance Power

Test Result: Pass

5.3.1 Block Diagram of Test Setup



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5.3.2 Test Setup and Procedure

The disturbance power was measured with the EUT in a shielded room. The height of the table shall be $0,1\text{ m} \pm 0,025\text{ m}$ for appliances primarily intended to be positioned on the floor in normal use, and $0,8\text{ m} \pm 0,05\text{ m}$ for other appliances. The EUT was placed on a non-metallic table at least 0.8m from other metallic surface and the mains lead of EUT was extended to about 6m long. The auxiliary lead longer than 0.25m but shorter than twice length of absorbing clamp was extend to twice length of clamp and those longer than twice length was extend to 6 meters.

The absorbing clamp was moved along the lead to obtain maximum disturbance. The EUT was set to achieve the maximum emission level, and for each point which appears a relevant high emission level, the absorbing clamp was moved around the lead to get the maximum disturbance value.

The bandwidth of test receiver was set at 120 kHz. The frequency range from 30MHz to 300MHz was checked.

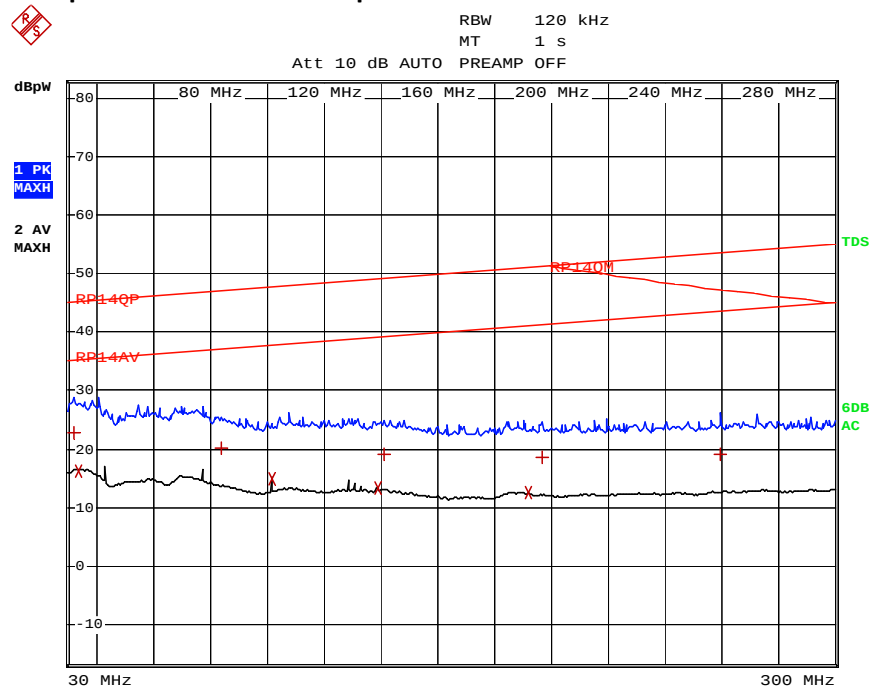
When measurements of disturbance are being made, the appliance shall be operated under the conditions defined in clause 7.

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5.3.3 Test Data and curve

Test port: AC main

Operation Mode: all function on



EDIT PEAK LIST (Final Measurement Results)				
Trace1:	RP14QP			
Trace2:	RP14AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBpw	DELTA	LIMIT dB
1 Quasi Peak	32.28 MHz	22.82 L1	-22.26	
2 Average	33.72 MHz	16.27 L1	-18.86	
1 Quasi Peak	84.16 MHz	20.03 L1	-26.97	
2 Average	101.72 MHz	14.99 L1	-22.66	
2 Average	138.92 MHz	13.30 L1	-25.73	
1 Quasi Peak	141.4 MHz	19.18 L1	-29.94	
2 Average	192 MHz	12.58 L1	-28.41	
1 Quasi Peak	197.08 MHz	18.48 L1	-32.70	
1 Quasi Peak	259.28 MHz	19.11 L1	-34.37	

The measurement quasi-peak data of disturbance power is lower than applicable limit reduced by the margin (0 to 10dB) at frequency range 200 to 300 MHz and the maximum clock frequency is less than 30MHz

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5.4 EN 55014-1 Radiated Disturbance

Test Result: Not Applicable

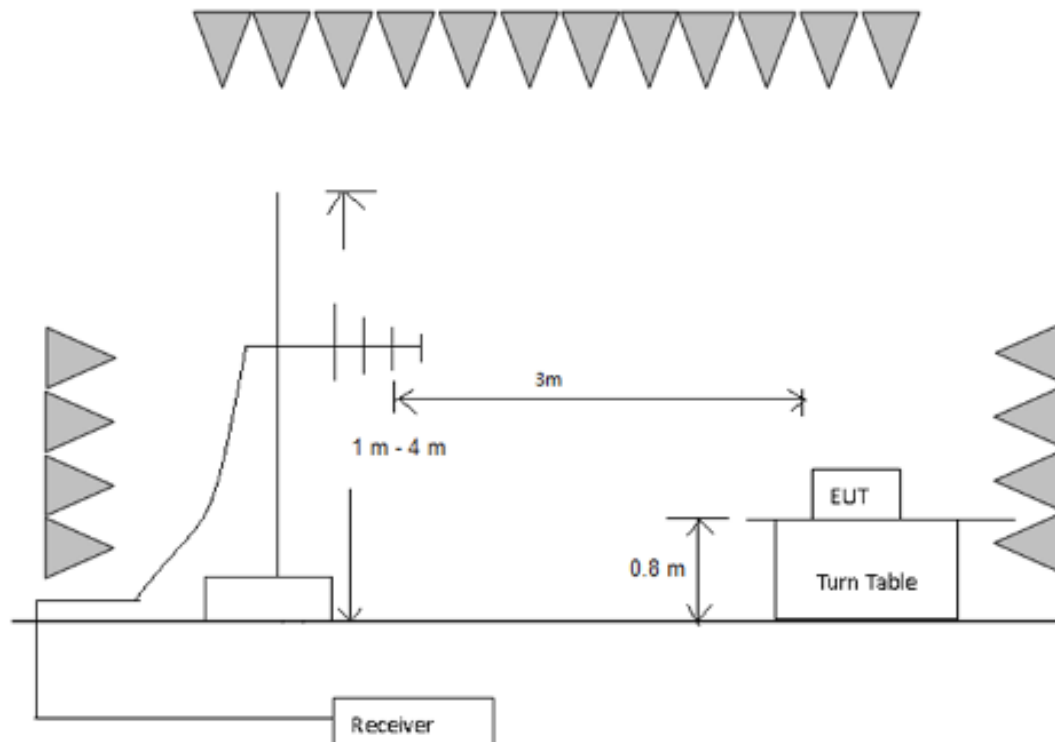
Remark:

☒ Radiated disturbance shall not be conducted, if the measurement quasi-peak data of disturbance power is lower than applicable limit reduced by the margin (0 to 10dB) at frequency range 200 to 300 MHz and the maximum clock frequency is less than 30MHz,.

☐ Radiated disturbance (300-1000MHz) shall be conducted, if the measurement quasi-peak data of disturbance power is between the limit and limit reduced by the margin (0 to 10dB) at frequency range 200 to 300 MHz or the maximum clock frequency is not less than 30MHz,.

☐ Radiated disturbance(30-1000MHz) is applied to battery-operated appliance

5.4.1 Block Diagram of Test Setup



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5.4.2 Test Setup and Procedure

The measurement was applied in a semi-anechoic chamber(SAC). Table-top equipment is placed on a non-conductive setup table with height $0,8\text{ m} \pm 0,01\text{ m}$ above the ground plane. Floor-standing equipment is placed on a non-conductive support at a height of 5 cm to 15 cm above the ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to CISPR 16-2-3 requirement during radiated test.

The bandwidth setting on R&S Test Receiver was 120 kHz.

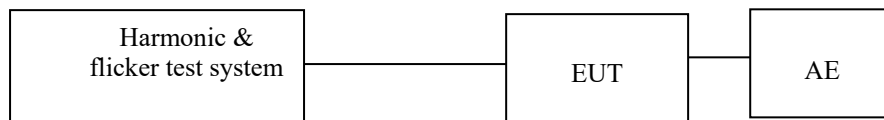
The frequency range from 30 MHz to 1000 MHz was checked

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6. Harmonics of current

Test Result: Pass

6.1 Block Diagram of Test Setup



6.2 Test Setup and Procedure

Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

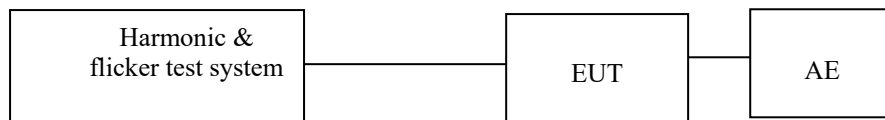
☒ This product is not defined as lighting equipment, and rated power is less than 75W, therefore, no limit applies according to EN 61000-3-2.

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7. Flicker

Test Result: Pass

7.1 Block Diagram of Test Setup



7.2 Test Setup and Procedure

7.2.1 Definition

Flicker:	impression of unsteadiness of visual sensation induced by a lighting stimulus whose luminance or spectral distribution fluctuates with time.
Pst:	Short-term flicker indicator The flicker severity evaluated over a short period (in minutes); Pst=1 is the conventional threshold of irritability
Plt:	long-term flicker indicator; the flicker severity evaluated over a long period (a few hours). Using successive Pst values.
dc:	the relative steady-state voltage change
dmax:	the maximum relative voltage change
d(t):	the value during a voltage change

7.2.2 Test condition

The EUT was set to produce the most unfavourable sequence of voltage changes.

☒ This product is unlikely to produce significant voltage fluctuations and flicker by examination of the circuit diagram and specification of it. Therefore, it is deemed to fulfill the relevant standard without testing.

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8. EMS TEST

Performance Criteria:

- Criterion A: The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permission loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation and from 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 (or permission loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description, and documentation, and from 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, or by any operation specified in the instruction for use.

Note: "N/A" means Not Applicable in below text.

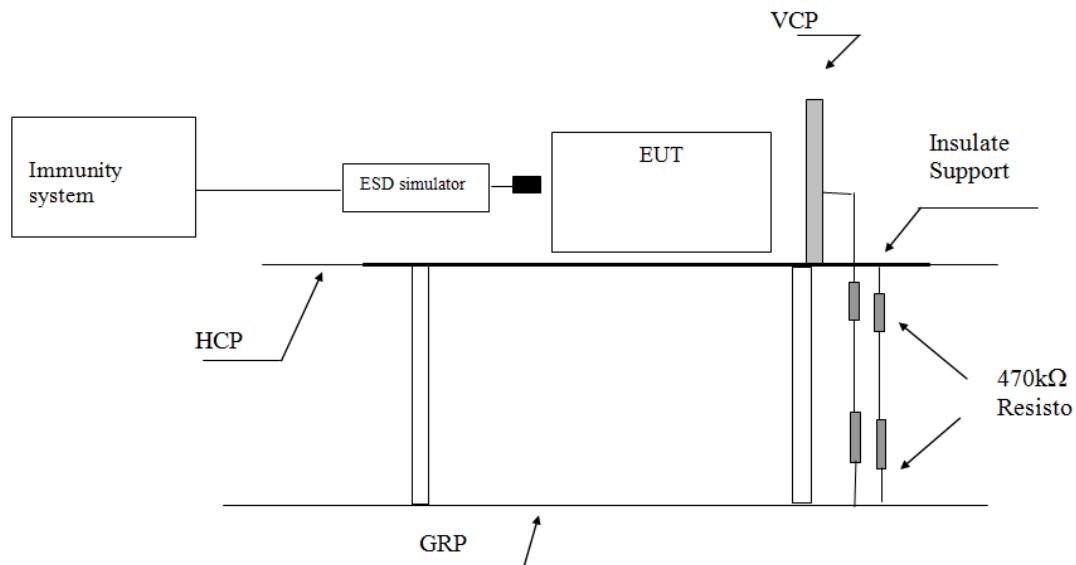
8.1 EN 61000-4-2(Pursuant to EN 55014-2) Electrostatic Discharge Immunity

Performance criterion: B

Test Result: Pass

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8.1.1 Block Diagram of Test Setup



Note: HCP means Horizontal Coupling Plane,

VCP means Vertical Coupling Plane

GRP means Ground Reference Plane

8.1.2 Test Setup and Procedure

The EUT was put on a 0.8m high wooden table 0.1m high for floor standing equipment standing on the ground reference plane (GRP) 3m by 2m in size, made by iron 1.0 mm thick.

A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size & HCP were constructed from the same material type & thickness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end.

The distance between EUT and any of the other metallic surface excepted the GRP, HCP & VCP was greater than 1m.

The EUT was arranged and connected according to its functional requirements.

Direct static electricity discharges were applied only to those points and surface which were accessible to personnel during normal usage.

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On each preselected points 10 times of each polarity single discharge were applied. The time interval between successive single discharges was at least 1s.

The ESD generator was held perpendicular to the surface to which the discharge was applied. The discharge return cable of the generator was kept at a distance of 0.2m whilst the discharge was being applied. During the contact discharges, the tip of the discharge electrode was touched the EUT before the discharge switch was operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.

Indirect discharge was conducted to objects placed near the EUT, simulated by applying the discharges of the ESD generator to a coupling plane, in the contact discharge mode.

After each discharge, the ESD generator was removed from the EUT, the generator was then retriggered for a new single discharge. For ungrounded product, a grounded carbon fibre brush with bleeder resistors (2×470 kΩ) in the grounding cable was used after each discharge to remove remnant electrostatic voltage.

For air discharge, a minimum of 10 single air discharges were applied to the selected test point for each such area.

8.1.3 Test Result

Direct Application of ESD

Direct Contact Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result (Pursuant to EN 55014-2)	Discharged Points
4	20	A	Accessible metal parts of the EUT Conductive substrate with coating which is not declared to be insulating

Direct Air Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result (Pursuant to EN 55014-2)	Discharged Points
2, 4, 8	20	A	All accessible points where contact discharge cannot be applied such as Displays, Indicators light, Keyboard, Button, Switch, Knob, Air gap, Slots, Hole and so on

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Indirect Application of ESD

Horizontal Coupling Plane under the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result (pursuant to EN 55014-2)	Discharged Point
4	20	A	At the front edge of each HCP opposite the centre point of each unit of the EUT

Vertical Coupling Plane beside the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result (pursuant to EN 55014-2 criterion B)	Discharged Point
4	20	A	The centre of the vertical edge of the coupling plane

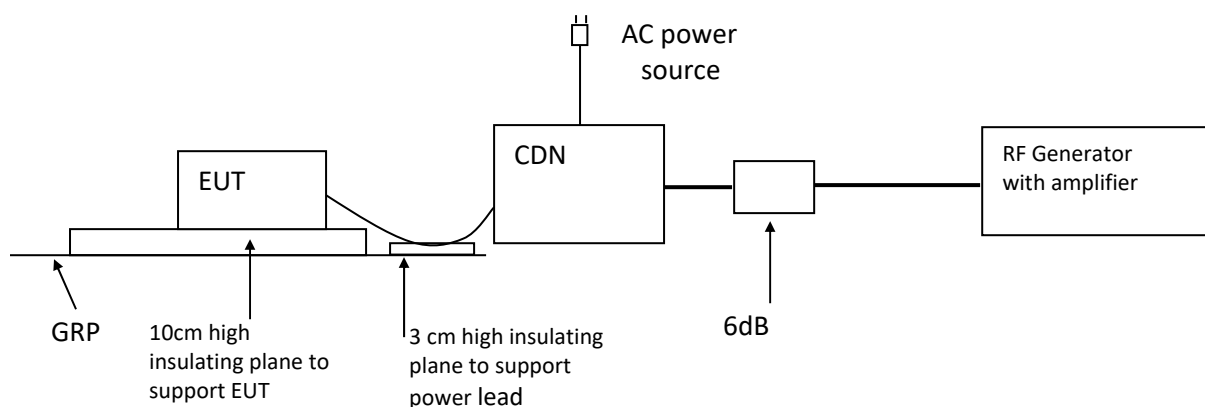
TEST REPORT

8.2 EN 61000-4-6(Pursuant to EN 55014-2) Injected Current (0.15 MHz to 230 MHz)

Performance criterion: A

Test Result: Pass

8.2.1 Block Diagram of Test Setup



8.2.2 Test Setup and Procedure

The EUT was placed on an insulating support of 0.1m height above a ground reference Plane, arranged and connected to satisfy its functional requirement.

All relevant cables were provided with the appropriate coupling and decoupling devices at a distance between 0.1m and 0.3m from the projected geometry of the EUT on an insulating support of 0.03m height above the ground reference plane.

Test voltage was verified before each testing though power meter combined in the RF generator with AMP.

Dwell time was set to 3s and step was set as 1% to keep sufficient response time for EUT. The frequency from 0.15MHz to 230MHz was checked.

8.2.3 Test Result

Port:	Frequency (MHz)	Level (Pursuant to EN55014-2)	Result
A.C. Power Lines	0.15 to 230	3V (r.m.s.)	A
D.C. Power Lines	0.15 to 230	1V (r.m.s.)	N/A
Signal Lines	0.15 to 230	1V (r.m.s.)	N/A
Control Lines	0.15 to 230	1V (r.m.s.)	N/A

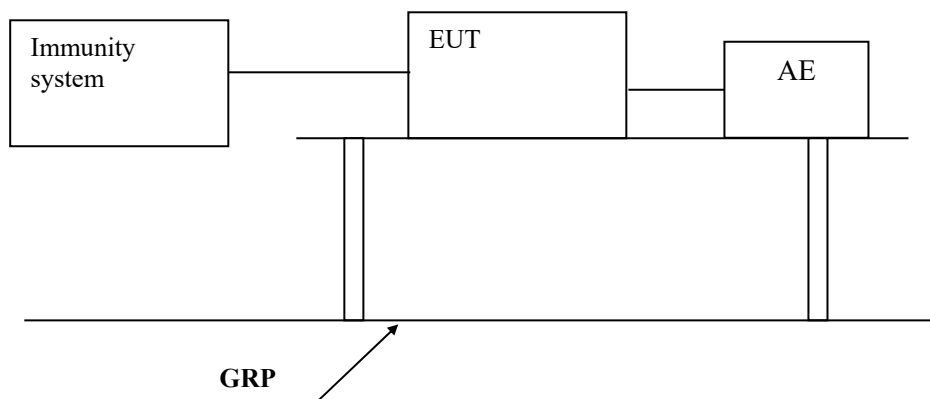
TEST REPORT

8.3 EN 61000-4-4(Pursuant to EN 55014-2) Electrical Fast Transient/Burst

Performance criterion: B

Test Result: Pass

8.3.1 Block Diagram of Test Setup



8.3.2 Test Setup and Procedure

The EUT was placed on a 0.1m high wooden table, standing on the ground reference plane 3m by 2m in size, made by steel 1mm thick.

The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m.

The mains lead excess than 0.5m was folded to avoid a flat coil and situated at a distance of 0.1m above the ground reference plane to insure the distance between the coupling device and the EUT was 0.5m.

The EUT was arranged and connected to satisfy its functional requirement and supplied by the coupling-decoupling network.

8.3.3 Test Result

Level (Pursuant to EN55014-2)	Polarity	A.C. Power supply line and protective earth terminal	D.C. Power Lines, Signal Line & Control Line
0.5kV	+	N/A	N/A
0.5kV	-	N/A	N/A
1kV	+	A	N/A
1kV	-	A	N/A

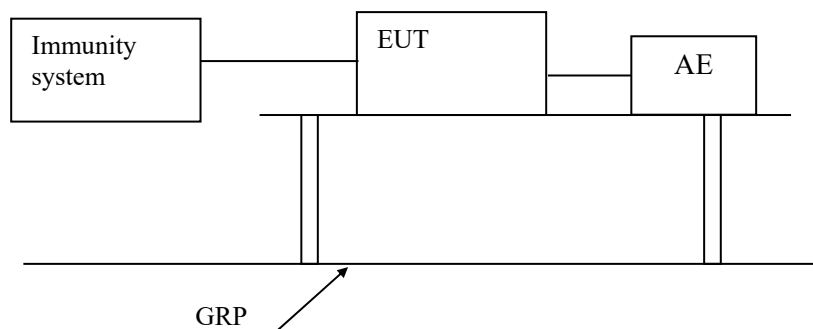
TEST REPORT

8.4 EN 61000-4-5(Pursuant to EN 55014-2) Surge Immunity

Performance criterion: B

Test Result: Pass

8.4.1 Block Diagram of Test Setup



8.4.2 Test Setup and Procedure

The surge was applied to the EUT power supply terminals via the capacitive coupling network.

Decoupling networks were required in order to avoid possible adverse effects on equipment not under test that might be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave might be developed on the lines under test.

The EUT was arranged and connected according to its functional requirements.

The EUT was placed on a 0.1m high wooden support above the GRP), supplied by the coupling-decoupling network, and arranged and connected to satisfy its functional requirement. The power cord between the EUT and the coupling/decoupling network was less than 2 meters.

8.4.3 Test Result

Level (Pursuant to EN 55014-2)		Result
Between Phase And Phase:	1kV	N/A
Between Phase And Neutral:	1kV	A
Between Phase And Earth:	2kV	N/A
Between Neutral And Earth:	2kV	N/A

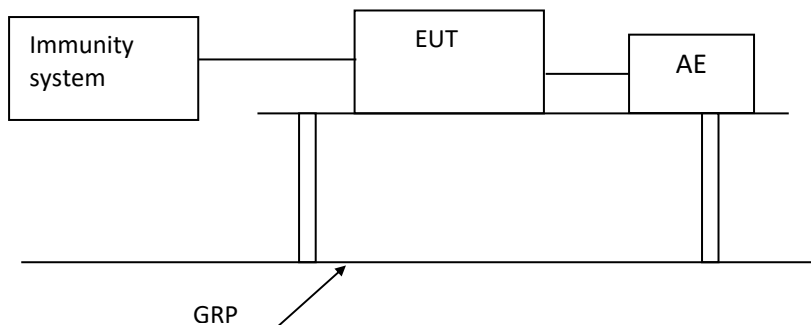
8.5 EN 61000-4-11(Pursuant to EN 55014-2) Voltage Dips and Interruptions

Performance criterion: C

TEST REPORT

Test Result: Pass

8.5.1 Block Diagram of Test Setup



8.5.2 Test Setup and Procedure

The EUT was placed on an insulating support of 0.8m height, standing on a ground reference plane, and arranged and connected to satisfy its functional requirement

The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.

The EUT was tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.

Abrupt changes in supply voltage was occur at zero crossings of the voltage.

8.5.3 Test Result

Test condition (Pursuant to EN 55014-2)				
Test Level in %U _T	50 Hz		60 Hz	
	Duration	Result	Duration	Result
0	0.5	A	0.5	N/A
40	10	A	12	N/A
70	25	A	30	N/A

Remark: U_T is the rated voltage for the equipment.

TEST REPORT

8.6 EN 61000-4-3(Pursuant to EN 55014-2) Radiated Electromagnetic Field Immunity

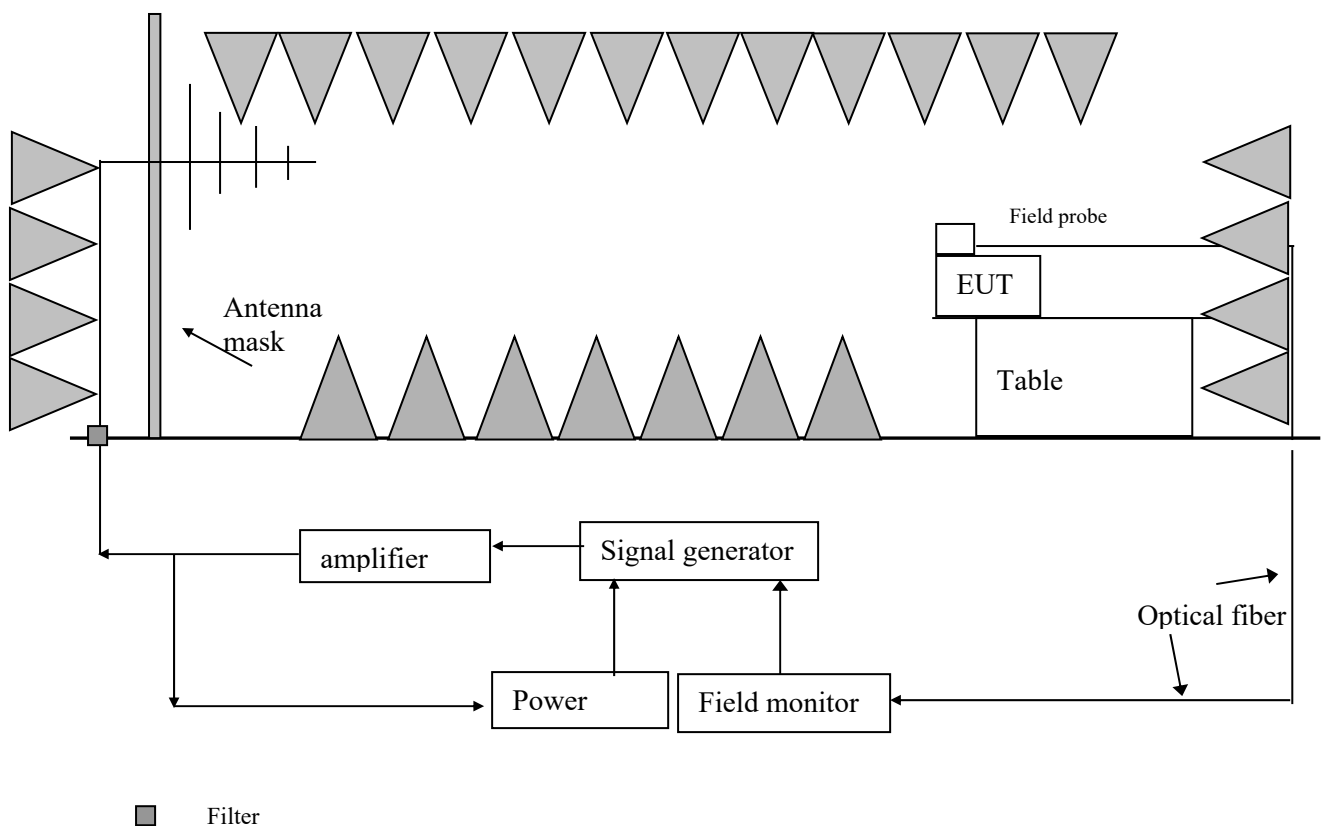
Performance criterion: A

Test Result: **Not Applicable**

Remark:

Containing electronic control circuitry with no internal clock frequency or oscillator frequency higher than 15 MHz.

8.6.1 Block Diagram of Test Setup



TEST REPORT

8.6.2 Test Setup and Procedure

The test was conducted in a fully anechoic chamber to maintain a uniform field of sufficient dimensions with respect to the EUT, and also in order to comply with various national and international laws prohibiting interference to radio communications.

The equipment was placed in the test facility on a non-conducting table 0.8m high (for floor standing EUT, is placed on a non-conducting support 0.1m height).

For all ports connected to EUT, manufacturer specified cable type and length was used, for those cables no specification, unshielded cable applied. Wire is left exposed to the electromagnetic field for a distance of 1m from the EUT. The EUT was arranged and connected according to its functional requirements

Before testing, the intensity of the established field strength had been checked by placing the field sensor at a calibration grid point, and with the field generating antenna and cables in the same positions as used for the calibration, the forward power needed to give the calibrated field strength was measured. Spot checks was made at a number of calibration grid points over the frequency range 80MHz to 1000MHz, both polarizations was checked.

After calibration, the EUT was initially placed with one face coincident with the calibration plane.

The frequency range is swept from 80 MHz to 1000 MHz at 3V/m EM field, with the signal 80% amplitude modulated with a 1 kHz sine-wave, pausing to adjust the r.f. signal level.

The dwell time at each frequency was 3s so as that the EUT to be exercised and be able to respond.

The step size was 1% of the fundamental with linear interpolation between calibrated points. Test was performed with the generating antenna facing each of the four sides of the EUT.

TEST REPORT

9 APPENDIX I - PHOTOS OF TEST SETUP

Conducted Emission



Radiated Power



TEST REPORT

Clicks



EFT Immunity

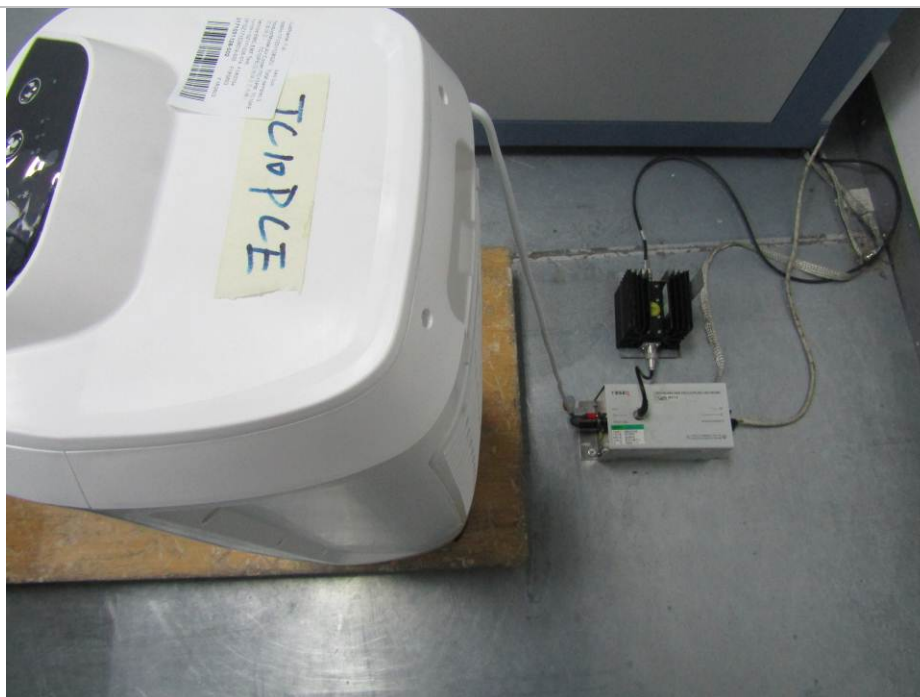


TEST REPORT

ESD Immunity



Inject current immunity



TEST REPORT

Surge and DIP Immunity



TEST REPORT

10 APPENDIX II – PHOTOS OF EUT



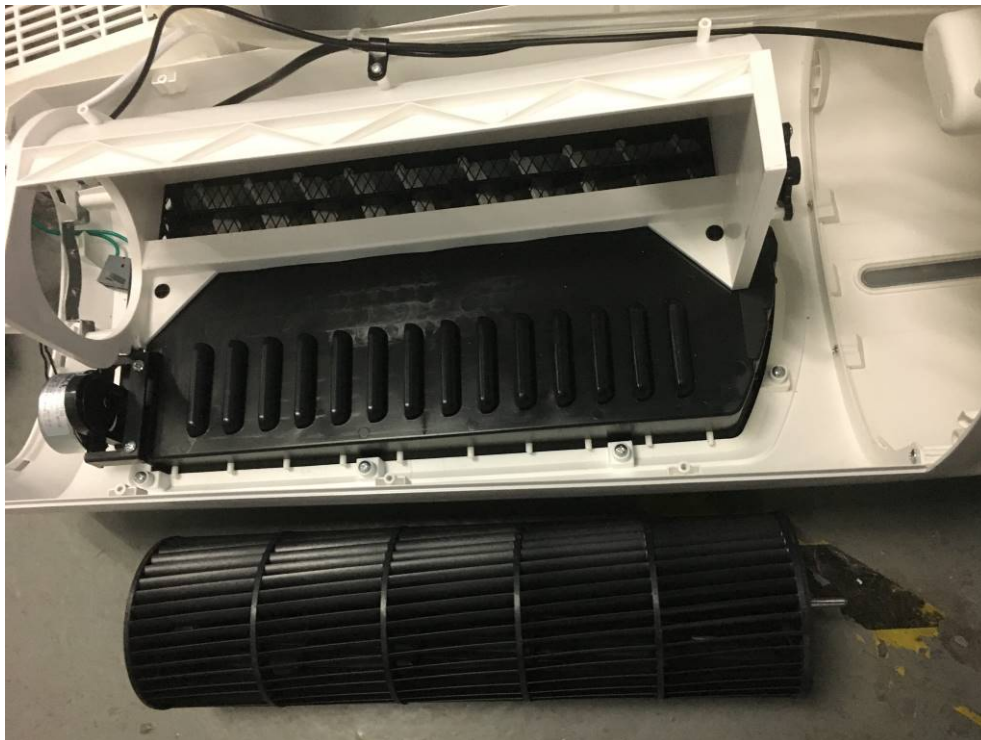
TEST REPORT



TEST REPORT



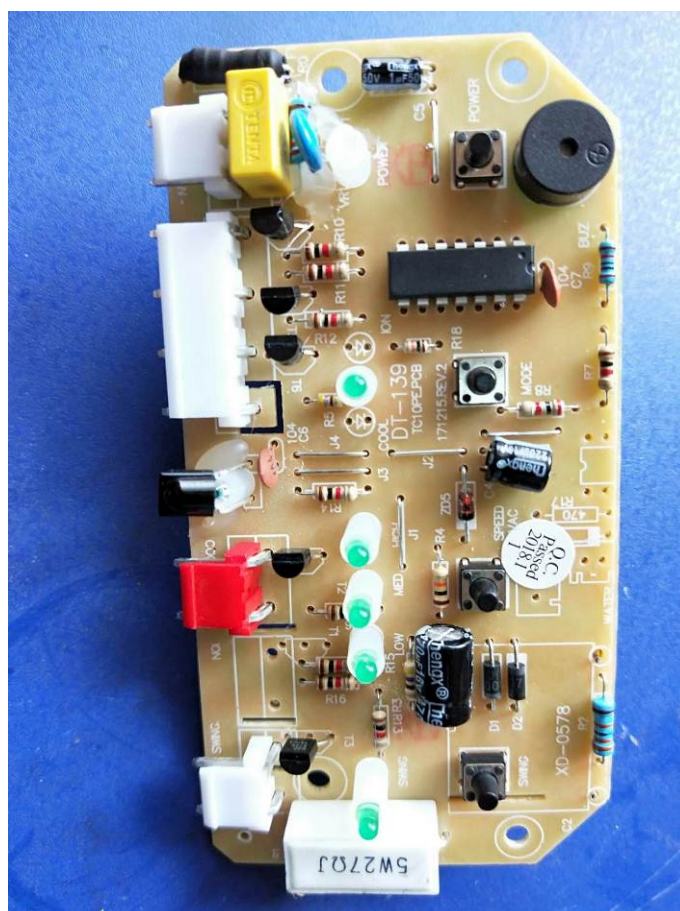
TEST REPORT



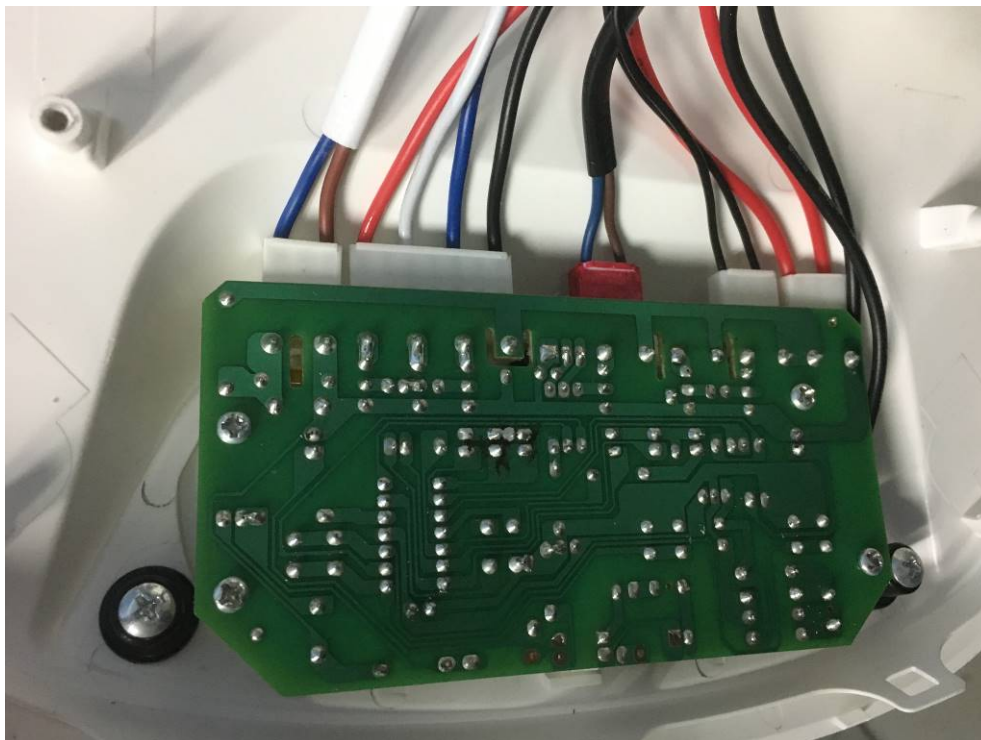
TEST REPORT



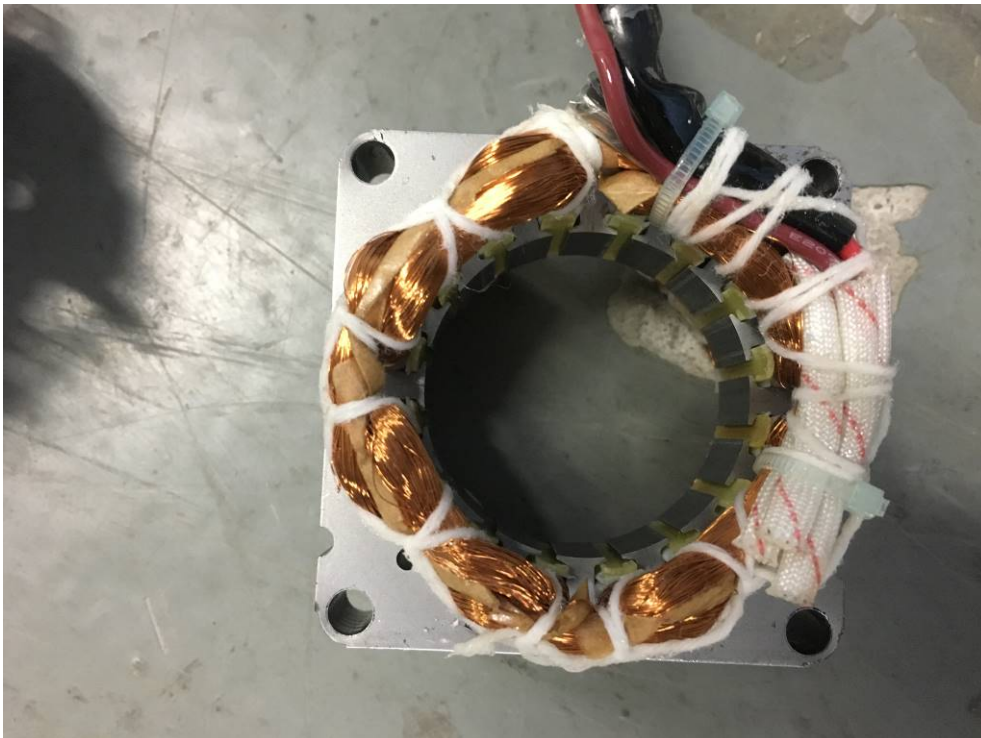
Capacitor
for fan



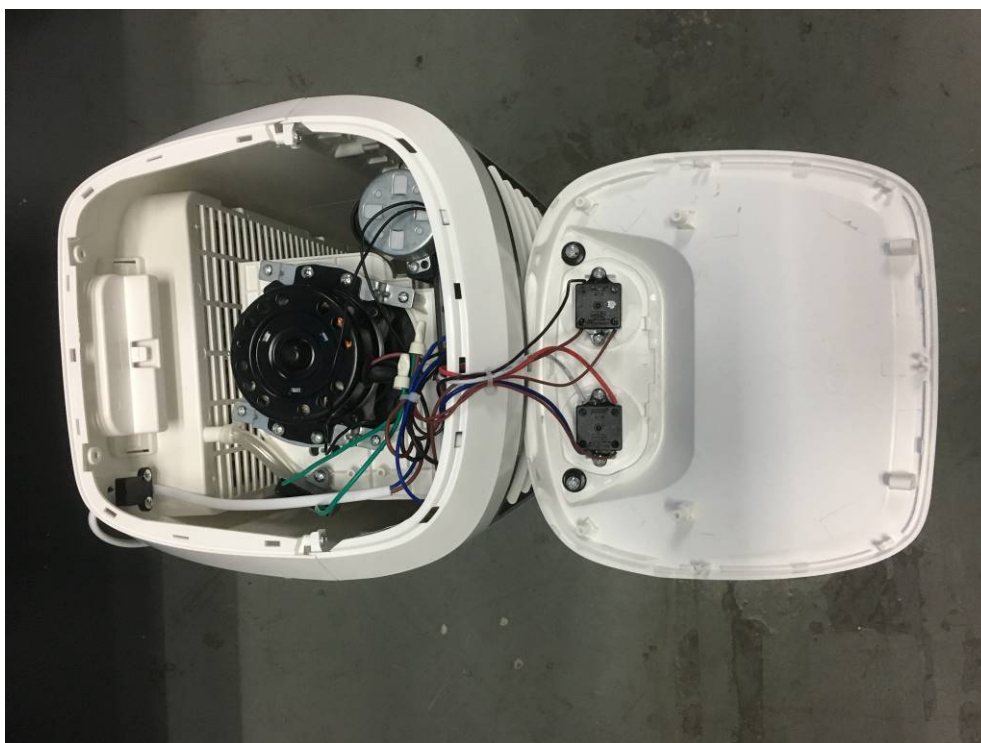
TEST REPORT



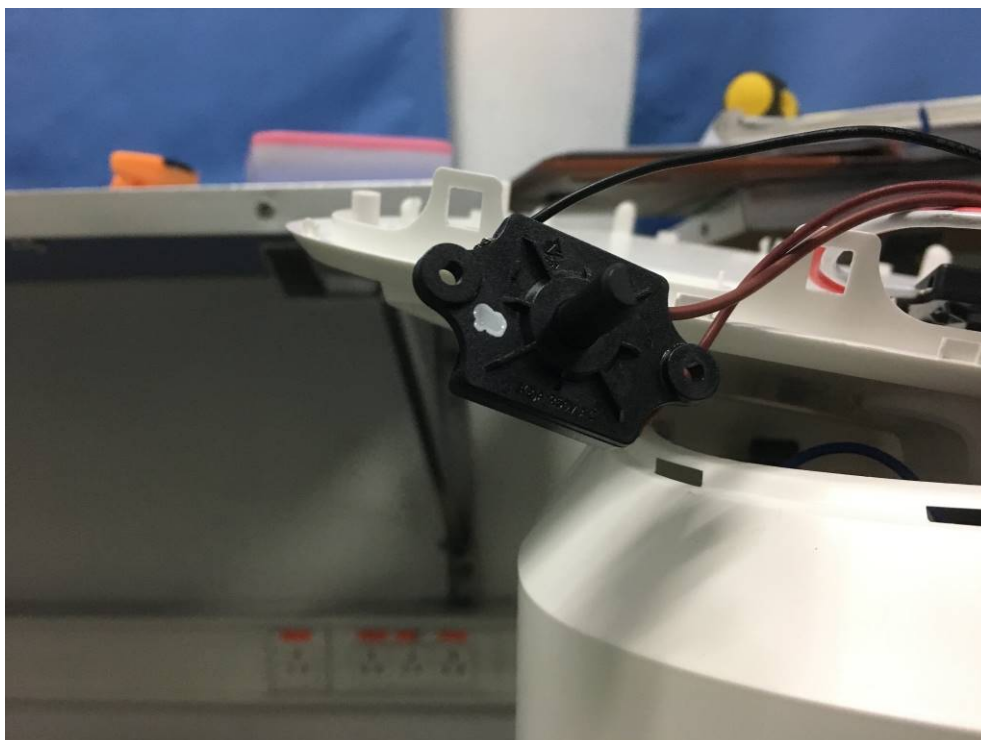
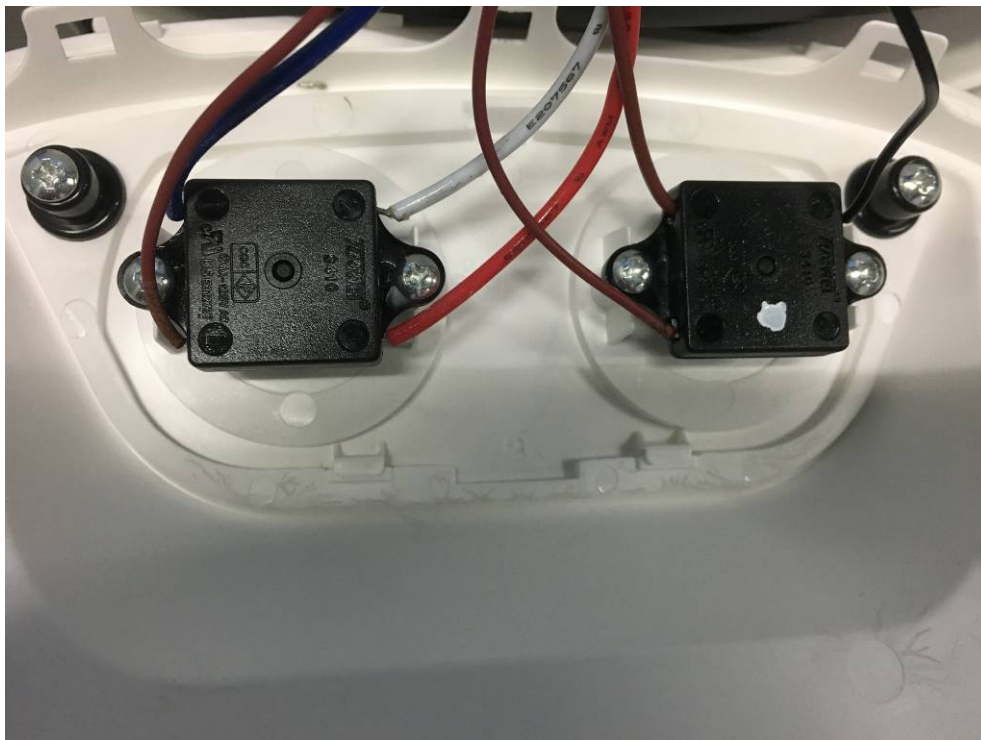
TEST REPORT



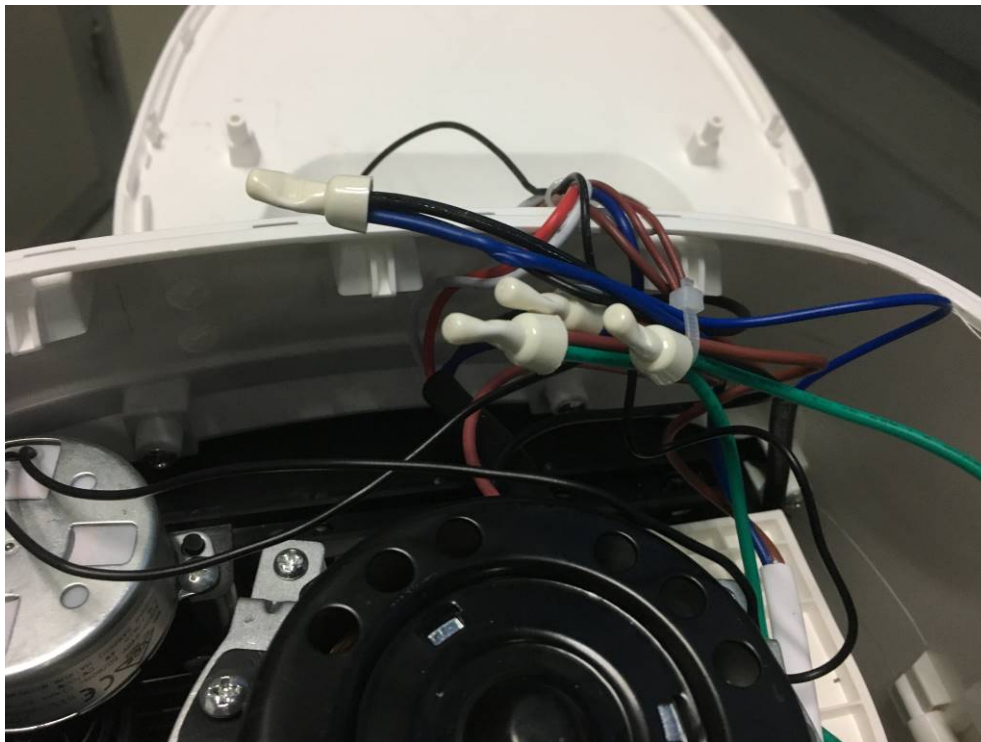
TEST REPORT



TEST REPORT



TEST REPORT



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