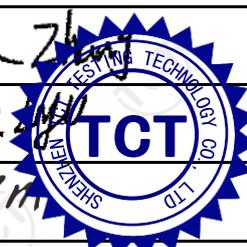


EMC TEST REPORT

Household appliances, electrical tools & similar apparatus

Test Report No.:	TCT220719E003	
Date of issue	Jul. 22, 2022	
Testing laboratory.....:	Shenzhen TCT Testing Technology Co., Ltd.	
Testing location/ address.....:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Applicant's name	Dong Guan Qipump products Co., LTD	
Address.....:	Room 208. Zhen An East Road, ChangAn Town, Dong Guan City, China	
Manufacturer's name	Dong Guan Qipump products Co., LTD	
Address.....:	Room 208. Zhen An East Road, ChangAn Town, Dong Guan City, China	
Standard(s).....:	EN IEC 55014-1:2021 EN IEC 55014-2:2021 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019+A2:2021	
Test item description.....:	Electric balloon pump	
Trade Mark.....:	N/A	
Model/Type reference	73005, Q-520, Q-521, Q-522, 73005-B, 73005-C, 73005-D	
Rating(s)	Input: AC 220-240 V, 50Hz, 600 W.	
Date of receipt of test item.....:	Jul. 19, 2022	
Date (s) of performance of test:	Jul. 19, 2022 ~ Jul. 22, 2022	
Tested by (+signature).....:	Mark ZHANG	
Check by (+signature).....:	Howie LYU	
Approved by (+signature)	Tomsin	



General disclaimer:

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1. General Product Information

1.1.EUT description

Test item description	: Electric balloon pump
Model/Type reference	: 73005
Rating(s)	: Input: AC 220–240 V, 50 Hz, 600 W.
AC Line	: <input type="checkbox"/> Shielded <input checked="" type="checkbox"/> Unshielded, <input type="checkbox"/> Detachable <input checked="" type="checkbox"/> Un-detachable <input type="checkbox"/> No applicable <input checked="" type="checkbox"/> Length: 1.63 m

1.2.Model(s) list

No.	Model No.	Tested with
1	73005	<input checked="" type="checkbox"/>
Other models	Q-520, Q-521, Q-522, 73005-B, 73005-C, 73005-D	<input type="checkbox"/>

Note: 73005 is tested model, other models are derivative models. The models are identical in circuit and PCB layout, only different on the model names. So the test data of 73005 can represent the remaining models.

2. Test Information

2.1.EUT operation mode(s)

Mode #	Operating mode description	Test voltage
1	Working	AC 230 V/ 50 Hz

2.2.Special accessories and auxiliary equipment

Product Type	Manufacturer	Model No.	Serial No.
/	/	/	/

2.3.Configuration of system under test



(EUT: Electric balloon pump)

2.4. General test conditions

Environmental reference conditions

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.

The climatic conditions during the tests were within the following limits:

Temperature	Humidity	Atmospheric pressure
15 °C – 35 °C	30 % - 60 %	86 kPa – 106 kPa

If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.

Measurement uncertainties

Test Item	Uncertainty
Uncertainty for Disturbance voltage at the mains terminals	3.10 dB
Uncertainty for Disturbance power (30 MHz to 300 MHz)	4.16 dB
Uncertainty for Radiated emission (30 MHz to 1 GHz)	4.56 dB
Uncertainty for Radiated emission (1 GHz to 6 GHz)	4.22 dB

The overall measurement uncertainty of a measurement is defined as the range of which can be supposed that it contains the true value with a specified probability.

This probability is 95 % for the generally specified measurement uncertainty (so-called expanded measurement uncertainty).

The limits for emission measurements and the Test levels for immunity tests in the applied standards were defined taking into consideration the accuracy limits for measurement and testing equipment required by the Basic standards.

All measurement and test results of the EMC laboratory of Shenzhen TCT Testing Technology Co., Ltd. fulfil the requirements for measurement uncertainties according to the standards applied.

Decision rule for statement(s) of conformity is based on accuracy method specified in Clause 4.4.3 in IEC Guide 115:2021.

3. Test Result Summary

EN IEC 55014-1:2021	
Requirement – Test case	Verdict
Disturbance voltage (9 kHz(150 kHz) to 30 MHz)	Pass
Disturbance power (30 MHz to 300 MHz)	Pass
Radiated emission (30 MHz to 6 GHz)	N/A
Magnetic field (9 kHz to 30 MHz)	N/A
Discontinuous disturbance (Clicks)	N/A
EN IEC 61000-3-2:2019+A1:2021	
Requirement – Test case	Verdict
Harmonic current emissions	Pass
EN 61000-3-3:2013+A1:2019+A2:2021	
Requirement – Test case	Verdict
Voltage changes, voltage fluctuations and flicker	Pass
EN IEC 55014-2:2021	
Requirement – Test case	Verdict
Electrostatic discharge immunity (ESD)	Pass
Radiated, radio-frequency, electromagnetic field immunity (RS)	N/A
Electrical fast transient/burst immunity (EFT/B)	Pass
Surge immunity	Pass
Immunity to conducted disturbances, induced by radio-frequency fields (CS)	Pass
Voltage dips, short interruptions and voltage variations immunity (DIPS)	Pass
Remark---	

Test case verdicts	
- Test case does not apply to the test object	N/A
- Test object does meet the requirement.....	P (Pass)
- Test object does not meet the requirement	F (Fail)

4. List of Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Due
Disturbance voltage at mains terminals				
EMI Test Receiver	R&S	ESCI3	100898	2023/07/04
Line Impedance Stabilisation Newtork(LISN)	Schwarzbeck	NSLK 8126	8126453	2023/02/24
Attenuator	N/A	10dB	164080	2023/07/04
844 Shielded room	SKET	8m*4m*4m	CR4	2023/03/02
Test software	EZ EMC	EMEC-3A1	/	/
Disturbance voltage at telecommunication terminals				
EMI Test Receiver	R&S	ESCI3	100898	2023/07/04
Line Impedance Stabilisation Newtork(LISN)	Schwarzbeck	NSLK 8126	8126453	2023/02/24
ISN	Schwarzbeck	CAT5 8158	151	2023/02/24
844 Shielded room	SKET	8m*4m*4m	CR4	2023/03/02
Test software	EZ EMC	EMEC-3A1+	/	/
Disturbance power (30 MHz to 300 MHz)				
EMI Test Receiver	R&S	ESCI3	100898	2023/07/04
Absorption Power Clamp	Da Ze	ZN23201	0811	2023/07/04
Attenuator	N/A	XPSJQ-BNC-JK-6 DB	N/A	2023/07/04
844 Shielded room	SKET	8m*4m*4m	CR4	2023/03/02
Test software	EZ EMC	EMEC-3A1	/	/
Radiated emission (30 MHz to 1 GHz)				
Broadband Antenna	Schwarzbeck	VULB 9168	01197	2023/03/06
EMI Test Receiver	R&S	ESCI7	100529	2023/02/24
Test software	EZ EMC	FA-03A2 RE+	/	/
3m Anechoic Chamber	SKET	9m*6m*6m	SA01	2023/01/25
Radiated emission (1 GHz to 6 GHz)				
Horn Antenna	Schwarzbeck	BBHA 9120 D	02372	2023/03/06
Signal Analyzer	R&S	FSQ40	200061	2023/07/04
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	2023/02/24

#3 3m Anechoic Chamber	SKET	9m*6m*6m	SA03	2023/01/25
Test software	EZ_EMG	FA-03A2 RE+	/	/
Magnetic field strength (9 kHz to 30 MHz)				
Loop antenna	ZHINAN	ZN30900A	12024	2022/09/05
EMI Test Receiver	R&S	ESIB7	100197	2023/07/04
#3 3m Anechoic Chamber	SKET	9m*6m*6m	SA03	2023/01/25
Test software	EZ_EMG	FA-03A2 RE+	/	/
Magnetic field induced current (9 kHz to 30 MHz)				
EMI Test Receiver	R&S	ESCI3	100898	2023/07/04
Triple-Loop Antenna	Da Ze technology CO.,LTD	ZN30401	160026	2022/09/11
543 Shielded room	SKET	5m*4m*3m	SR2	2023/01/25
Test software	EZ_EMG	EMEC-3A1	/	/
Harmonic current emissions & Voltage Fluctuations and Flicker				
AC Power Supply	KIKUSUI	PCR4000M	UC002552	2023/04/12
Harmonic/Flicker Analyzer	KIKUSUI	KHA1000	UD002324	2023/07/04
Line Impedance Network	KIKUSUI	LIN1020JF	UC001738	2023/07/04
Test software	KIKUSUI	HarmoCapture	/	/
Electrostatic discharge immunity (ESD)				
Electrostatic Discharge Generator	HAEFELY	PESD300	H012056	2023/07/04
Radiated, radio-frequency, electromagnetic field immunity (RS)				
Antenna	SKET	STLP 9129_Plus	/	/
Signal Generator	Agilent	N5182A	MY47070282	2023/07/04
Amplifier	SKET	HAP_80M01G-250 W	/	2023/02/24
Amplifier	SKET	HAP_01G03G-75 W	202104180	2023/07/04
Amplifier	SKET	HAP_03G06G-80 W	202004044	2023/07/04
Field Probe	Narda	EP-601	811ZX01057	2023/07/04
USB Power Sensor	Agilent	U2001A	MY53410013	2023/02/24
USB Power Sensor	Agilent	U2001A	MZ54330012	2023/02/24
743 Anechoic Chamber	SKET	7m*4m*3m	SA04	2023/03/06
Test software	SKET	EMC-S	/	/

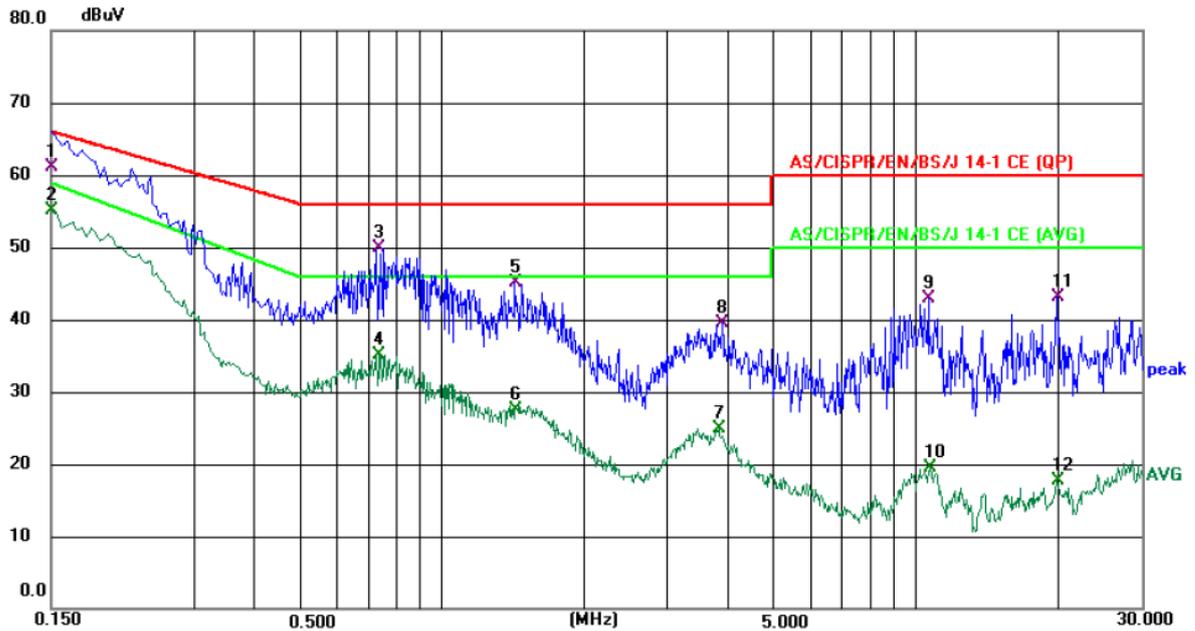
Electrical fast transient/burst immunity (EFT/B)				
Fast Transient Burst Simulator	Prima	EFT61004BG	PR12074375	2023/07/04
Capacitive Coupling folder	Prima	EFT-CLAMP	N/A	2022/09/11
Surge immunity				
Lightning Surge Generator	Prima	SUG61005BG	PR12125534	2023/07/04
Immunity to conducted disturbances, induced by radio-frequency fields (CS)				
Conducted Immunity Test System	Schloder	CDG-6000-75	126B1290/2014	2023/04/12
CDN	Schloder	CDN M2+M3-16	A2210281/2014	2023/07/04
EM-Clamp	Schloder	EMCL-20	132A1194/2014	2023/07/04
RF Attenuator	PE	75W 6dB	N/A	2023/07/04
543 Shielded room	SKET	5m*4m*3m	SR2	2023/01/25
Test software	HUBERT	IEC/EN61000-4-6	/	/
Voltage dips, short interruptions and voltage variations immunity (DIPS)				
Cycle Sag Simulator	Prima	DRP61011AG	PR12106201	2023/07/04

5. Test Conditions and Results (Emission)

5.1. Disturbance voltage

Test requirement	EN IEC 55014-1:2021						
Test frequency range.:	9 kHz(150 kHz) to 30 MHz						
Limits.....	Disturbance voltage limits for induction cooking and IPT						
	Frequency	Appliances which are 100 V rated and without an earth connection			All other appliances		
	MHz	dB μ V Quasi-peak	dB μ V Average	dB μ V Quasi-peak	dB μ V Average		
	0.009 to 0.05	122	-	110	-		
	0.05 to 0.15	102 to 92	-	90 to 80	-		
	0.15 to 0.5	72 to 62	62 to 52	66 to 56	56-46		
	0.5 to 5	56	46	56	46		
	5 to 30	60	50	60	50		
	Disturbance voltage limits for other than induction cooking and IPT						
	Frequency	Mains ports		Associated ports			
		Disturbance voltage		Disturbance voltage		Disturbance current	
	MHz	dB μ V Quasi-peak	dB μ V Average	dB μ V Quasi-peak	dB μ V Average	dB μ A Quasi-peak	dB μ A Average
	0.15 to 0.5	66 to 56	59-46	80	70	40 to 30	30 to 20
	0.5 to 5	56	46	74	64	30	20
	5 to 30	60	50	74	60		
	Mains port of tools						
	Frequency	P \leq 700 W		700 W < P \leq 1 000 W		P > 1 000 W	
	MHz	dB μ V Quasi-peak	dB μ V Average	dB μ V Quasi-peak	dB μ V Average	dB μ V Quasi-peak	dB μ V Average
	0.15 to 0.35	66 to 59	59 to 49	70 to 63	63 to 53	76 to 69	69 to 59
	0.35 to 5	59	49	63	53	69	59
5 to 30	64	54	68	58	74	64	
Wired Network port according CISPR 32 class B							
Frequency range(MHz)		dB μ V Quasi-peak		dB μ V Average			
0.15 to 0.5		84 to 74		74 to 64			
0.5 to 30		74		64			
Test method.....	The AMN placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.						
Ambient temperature.:	25.3 °C						
Relative humidity	56 %						
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China						
Test model(s)	73005						
EUT operation mode..:	Mode 1						
Test results	Pass						
Remark.....	/						

Measurement data and Graphical presentation of the result



Site 844 Shielding Room

Phase: L1

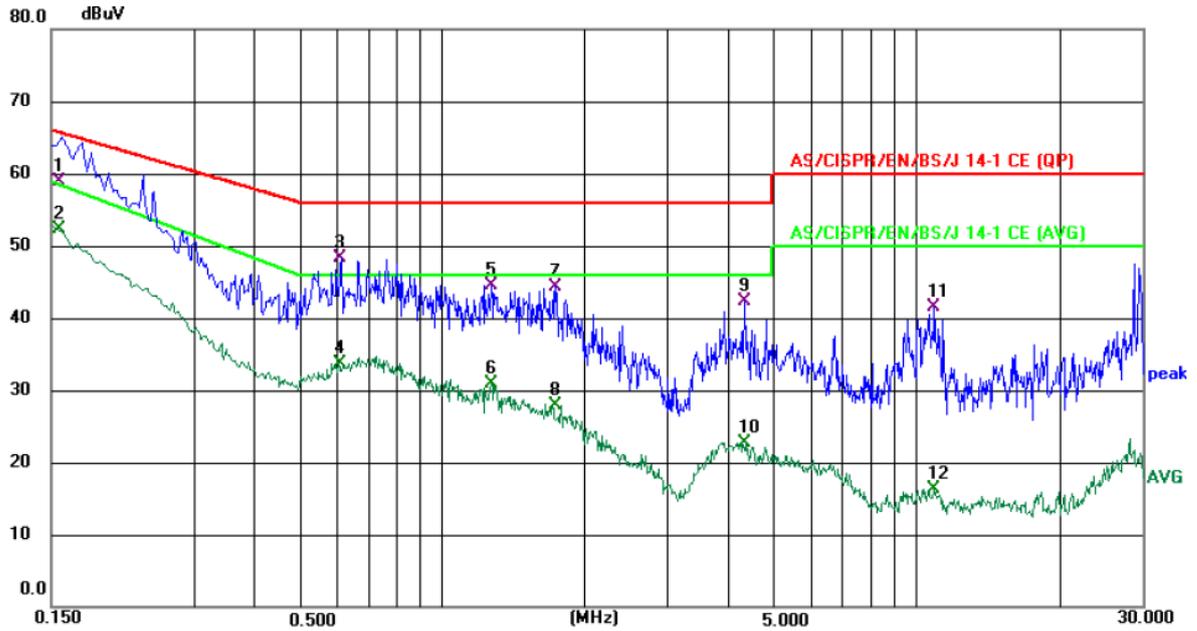
Temperature: 25.3 (°C)

Humidity: 56 %

Limit: AS/CISPR/EN/BS/J 14-1 CE (QP)

Power: AC 230 V/50 Hz

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	50.52	10.58	61.10	66.00	-4.90	QP	
2	*	0.1500	44.51	10.58	55.09	59.00	-3.91	AVG	
3		0.7378	39.72	10.14	49.86	56.00	-6.14	QP	
4		0.7378	24.92	10.14	35.06	46.00	-10.94	AVG	
5		1.4259	35.05	10.11	45.16	56.00	-10.84	QP	
6		1.4259	17.34	10.11	27.45	46.00	-18.55	AVG	
7		3.8580	14.79	10.09	24.88	46.00	-21.12	AVG	
8		3.9020	29.42	10.09	39.51	56.00	-16.49	QP	
9		10.6419	32.66	10.24	42.90	60.00	-17.10	QP	
10		10.7339	9.22	10.24	19.46	50.00	-30.54	AVG	
11		19.8739	32.60	10.49	43.09	60.00	-16.91	QP	
12		19.8739	7.27	10.49	17.76	50.00	-32.24	AVG	



Site 844 Shielding Room Phase: *N* Temperature: 25.3 (°C) Humidity: 56 %

Limit: AS/CISPR/EN/BS/J 14-1 CE (QP) Power: AC 230 V/50 Hz

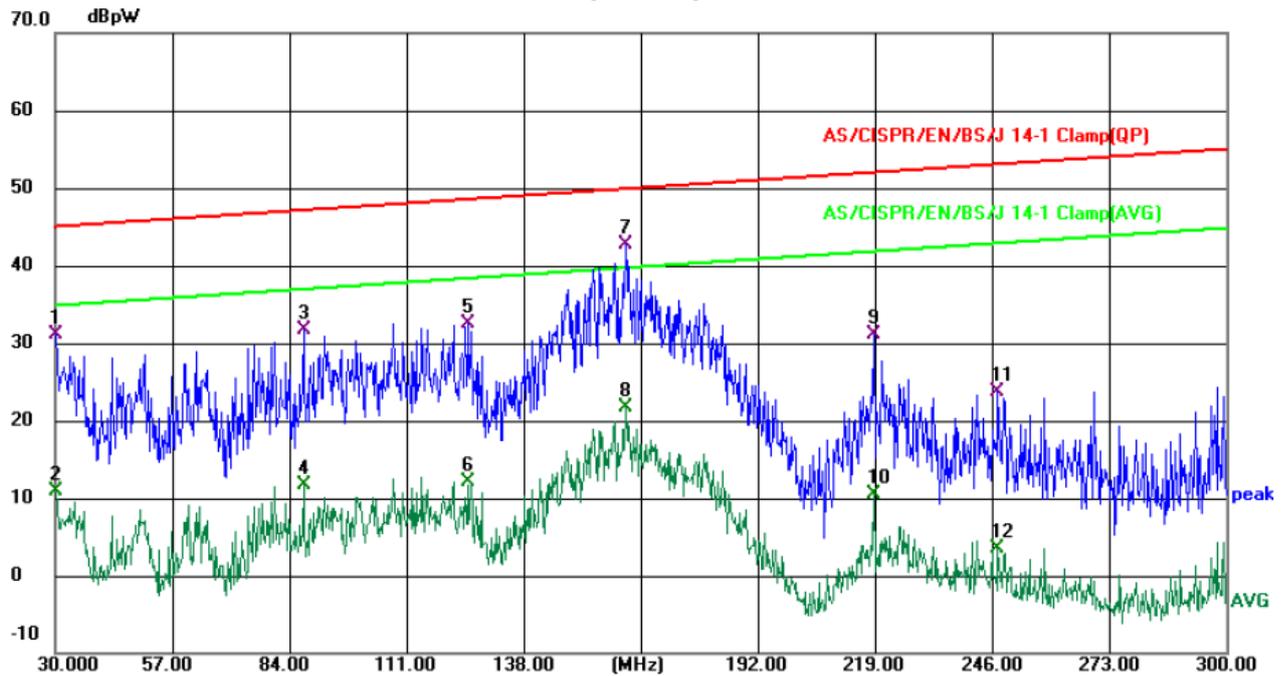
No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1548	48.42	10.48	58.90	65.74	-6.84	QP	
2 *	0.1548	41.73	10.48	52.21	58.66	-6.45	AVG	
3	0.6059	38.24	10.14	48.38	56.00	-7.62	QP	
4	0.6059	23.49	10.14	33.63	46.00	-12.37	AVG	
5	1.2740	34.36	10.15	44.51	56.00	-11.49	QP	
6	1.2740	20.73	10.15	30.88	46.00	-15.12	AVG	
7	1.7419	34.24	10.16	44.40	56.00	-11.60	QP	
8	1.7419	17.74	10.16	27.90	46.00	-18.10	AVG	
9	4.3578	32.14	10.19	42.33	56.00	-13.67	QP	
10	4.3578	12.43	10.19	22.62	46.00	-23.38	AVG	
11	10.9500	31.21	10.36	41.57	60.00	-18.43	QP	
12	10.9500	5.98	10.36	16.34	50.00	-33.66	AVG	



5.2. Disturbance power

Test requirement	EN IEC 55014-1:2021		
Test frequency range..	30 MHz to 300 MHz		
Limits.....	Household appliances and similar apparatus		
	Frequency (MHz)	Quasi-peak	Average
		dBpW	
	30 to 300	45 to 55	35 to 45
	Tools(Rated motor power not exceeding 700 W)		
	Frequency (MHz)	Quasi-peak	Average
		dBpW	
	30 to 300	45 to 55	35 to 45
	Tools(Rated motor power above 700 W and not exceeding 1000 W)		
	Frequency (MHz)	Quasi-peak	Average
		dBpW	
	30 to 300	49 to 59	39 to 49
	Tools(Rated motor power above 1000 W)		
	Frequency (MHz)	Quasi-peak	Average
dBpW			
30 to 300	55 to 65	45 to 55	
Test method.....	<p>The distance between the clamp test set-up (the appliance, the lead to be measured and the absorbing clamp) and any other conductive objects (including persons, walls and ceiling, but excluding the floor) shall be at least 0.8 m. The appliance to be tested shall be placed on a non-metallic support table parallel to the floor. The height of the table shall be 0.1 m ± 0.025 m for appliances primarily intended to be positioned on the floor in normal use, and 0.8 m ± 0.05 m for other appliances.</p> <p>The lead to be measured is placed in a straight line for a distance sufficient to accommodate the absorbing clamp, and to permit the necessary measuring adjustment of position for tuning. The clamp is placed around the lead.</p>		
Ambient temperature..	25 °C		
Relative humidity	55 %		
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China		
Test model(s)	73005		
EUT operation mode..	Mode 1		
Test results	Pass		
Remark.....	/		

Measurement data and Graphical presentation of the result



Site 844 Shielding Room

Probe:

Temperature: 25 (°C)

Limit: AS/CISPR/EN/BS/J 14-1 Clamp(QP)

Power: AC 230 V/50 Hz

Humidity: 55 %

No.	Frequency (MHz)	Reading (dBpW)	Factor (dB)	Level (dBpW)	Limit (dBpW)	Margin (dB)	Detector	P/F	Remark
1	30.3600	23.51	7.54	31.05	45.01	-13.96	QP	P	
2	30.3600	3.42	7.54	10.96	35.01	-24.05	AVG	P	
3	87.4400	20.68	10.96	31.64	47.13	-15.49	QP	P	
4	87.4400	0.80	10.96	11.76	37.13	-25.37	AVG	P	
5	125.1200	23.76	8.80	32.56	48.52	-15.96	QP	P	
6	125.1200	3.24	8.80	12.04	38.52	-26.48	AVG	P	
7 *	161.6400	31.38	11.35	42.73	49.88	-7.15	QP	P	
8	161.6400	10.42	11.35	21.77	39.88	-18.11	AVG	P	
9	218.9600	21.17	10.01	31.18	52.00	-20.82	QP	P	
10	218.9600	0.46	10.01	10.47	42.00	-31.53	AVG	P	
11	247.4800	14.79	8.88	23.67	53.05	-29.38	QP	P	
12	247.4800	-5.31	8.88	3.57	43.05	-39.48	AVG	P	

5.3. Radiated emission

Test requirement	EN IEC 55014-1:2021		
Test frequency range.:	30 MHz to 6 GHz		
Limits.....	OATS or SAC		
	Frequency (MHz)	10 m measurement distance	3 m measurement distance
		Quasi-peak (dB μ V/m)	
	30 to 230	30	40
	230 to 1000	37	47
	OATS or SAC or FAR		
	Frequency (MHz)	3 m measurement distance	
		Peak (dB μ V/m)	Average (dB μ V/m)
1 000 to 3 000	70	50	
3 000 to 6 000	74	54	
Upper frequency limit for testing	Clock frequency F_x (As informed by applicant)		Upper frequency limit for measurement
	<input checked="" type="checkbox"/>	≤ 108 MHz	1 GHz
	<input type="checkbox"/>	$108 \text{ MHz} < F_x \leq 500$ MHz	2 GHz
	<input type="checkbox"/>	$500 \text{ MHz} < F_x \leq 1$ GHz	5 GHz
	<input type="checkbox"/>	$F_x > 1$ GHz	$5 \times F_x$ up to max. 6 GHz
	<input type="checkbox"/>	Information not provided for testing	6 GHz
Test method.....	Measurements were made in a 3/10-meter semi-anechoic chamber that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3/10 meters with the receive antenna located at 1 to 4-meter height in both horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		
Ambient temperature.:	/		
Relative humidity	/		
Test location	/		
Test model(s)	/		
EUT operation mode.:	/		
Test results	N/A		
Remark.....	Radiated test NOT applied because conditions of 4.3.4.2 are met, only disturbance power measurement applied.		

5.4.Magnetic field

Test requirement	EN IEC 55014-1:2021		
Test frequency range :	9 kHz to 30 MHz		
Limits.....	Magnetic field strength		
	Frequency	3 m measurement distance	
	MHz	Quasi-peak (dBμA/m)	
	0.009 to 0.07	69	
	0.07 to 0.15	69 to 39	
	0.15 to 4	39 to 3	
	4 to 30	3	
	Magnetic field induced current		
	Frequency	Horizontal component	Vertical component
	MHz	Quasi-peak (dBμA)	
	0.009 to 0.07	88	106
	0.07 to 0.15	88 to 58	106 to 76
	0.15 to 30	58 to 22	76 to 40
Test set-up description.....	<input type="checkbox"/>	Equipment on a table of 80 cm height	
	<input type="checkbox"/>	Equipment on the floor (insulated from ground plane)	
	<input type="checkbox"/>	Equipment placed in the centre of the loop antenna system (LAS) according CISPR 16-2-3	
Test method applied . :	<input type="checkbox"/>	3 m distance, 0.6 m loop antenna according CISPR 16-1-4:2010	
	<input type="checkbox"/>	2 m loop antenna system (LAS) according CISPR 16-2-3:2010	
Ambient temperature :	/		
Relative humidity	/		
Test location	/		
Test model(s)	/		
EUT operation mode. :	/		
Test results	N/A		
Remark.....	Not applied, Because the EUT are not induction cooking appliance.		

5.5. Discontinuous disturbance (Clicks)

Test requirement	: EN IEC 55014-1:2021
Test frequency range.....	: 150 kHz to 30 MHz
Click-analyser.....	<input type="checkbox"/> 4-channel click analyser
	<input type="checkbox"/> 1-channel click analyser
	<input type="checkbox"/> Other: ---
Test set-up description	<input type="checkbox"/> Set-up Type A (40 cm distance to vertical ground plane, 80 cm over ground plane)
	<input type="checkbox"/> Set-up Type B (40 cm distance to horizontal ground plane)
	<input type="checkbox"/> Floor standing equipment set-up (10 cm over ground plane)
	<input type="checkbox"/> Other: ---
Applied method for discontinuous disturbances ..	<input type="checkbox"/> Click rate determined on base of switching operations
	<input type="checkbox"/> Click rate determined on base of clicks measurements
	<input type="checkbox"/> Other: ---
Ambient temperature.....	: /
Relative humidity	: /
Test location	: /
Test model(s)	: /
EUT operation mode.....	: /
Test results	: N/A
Remark.....	: This test isn't applicable because the EUT doesn't have relative function.

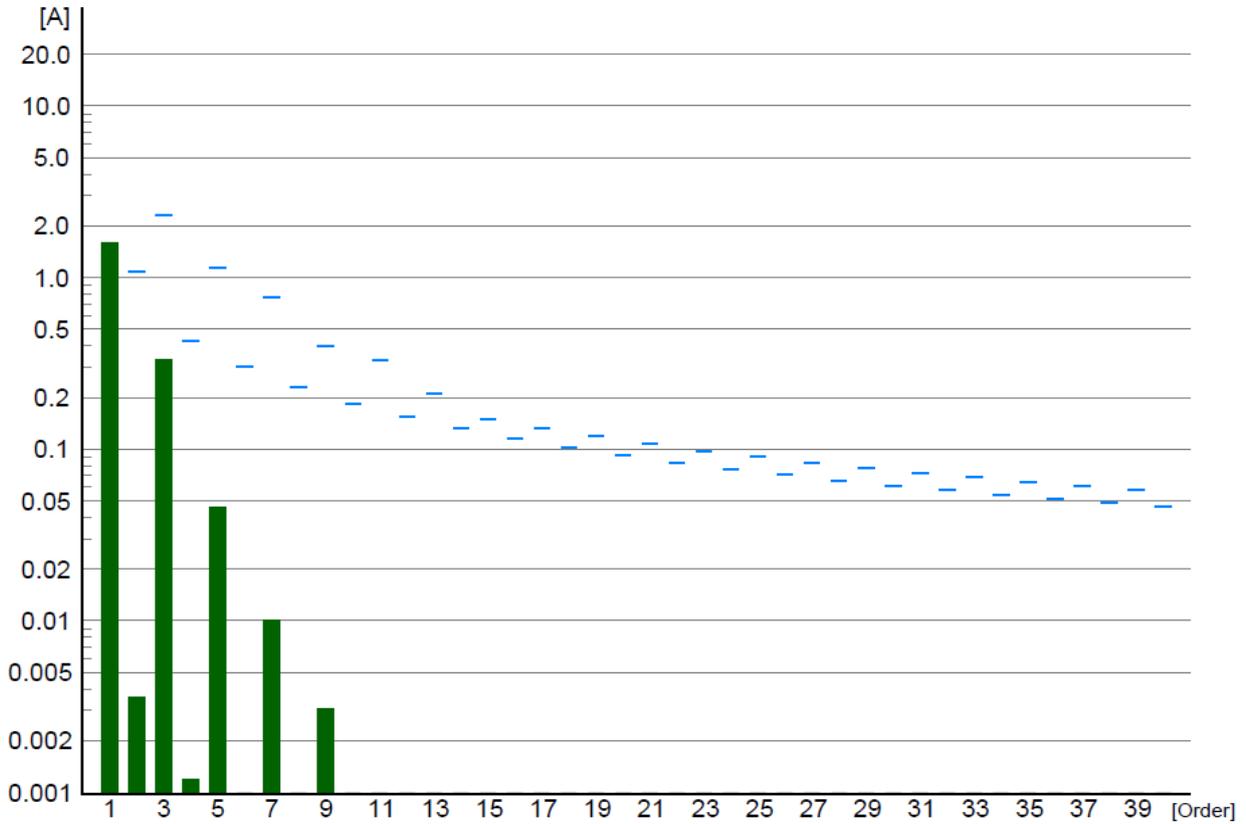
5.6. Harmonic current emissions

Test requirement	EN IEC 61000-3-2:2019+A1:2021	
Limit classification in accordance with the standard	Limits - Class A equipment	
	Odd harmonics	
	Harmonic order (n)	Maximum permissible harmonic current (A)
	3	2.30
	5	1.14
	7	0.77
	9	0.40
	11	0.33
	13	0.21
	$15 \leq n \leq 39$	$0.15 \times 15/n$
	Even harmonics	
	2	1.08
	4	0.43
	6	0.30
	$8 \leq n \leq 40$	$0.23 \times 8/n$
Limits – Class B equipment		
The harmonics of the input current shall not exceed the values given in limits for Class A equipment multiplied by a factor of 1.5.		
Test method	This test consists on the measurement of harmonics components of the input current which may be produced by equipment having an input current up to and including 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.	
Ambient temperature	24.6 °C	
Relative humidity	52 %	
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Test model(s)	73005	
EUT operation mode	Mode 1	
Test results	Pass	
Remark	/	

Measurement data and Graphical presentation of the result

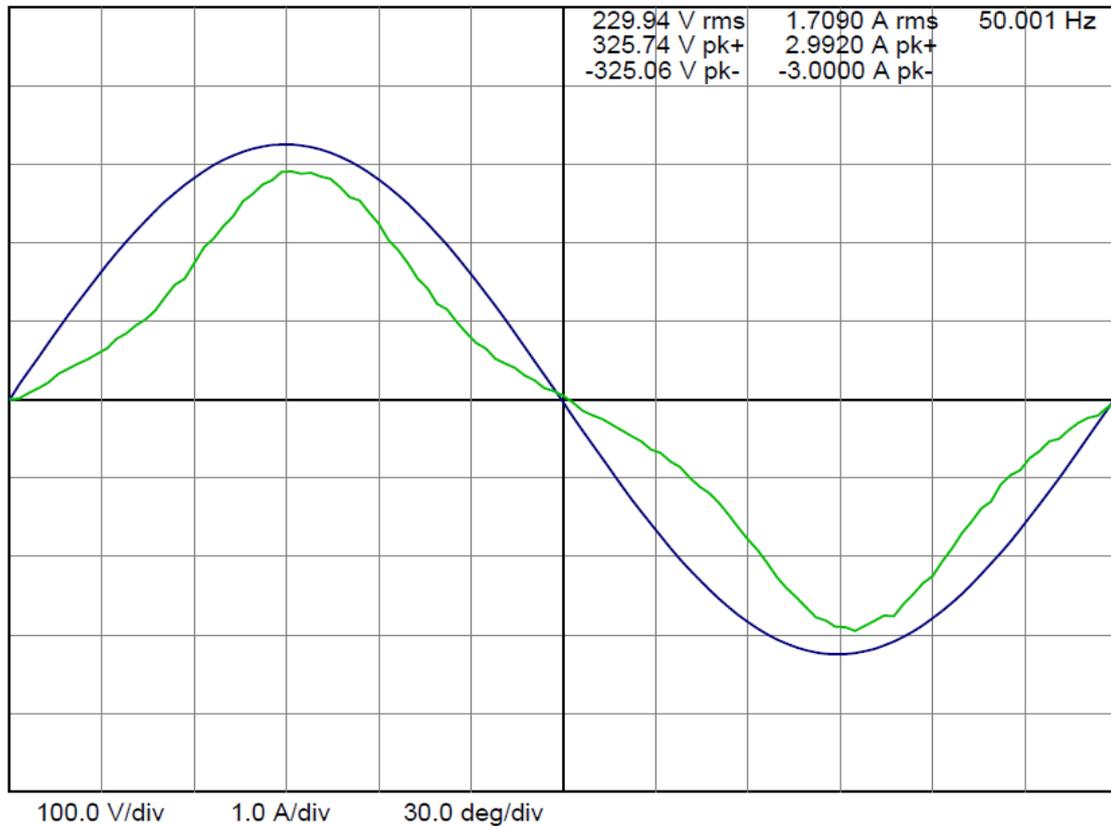
2D Harmonics (Average)

Pass Warning Fail



V/I Waveform (Frame number : 0)

Voltage Current



Test Data of Harmonics Current

Final Test Result	Pass	Tobs	Quasi-Stationary
Voltage	230.06 V	THC	0.3580 A
Current	1.7090 A	POHC/Limit	0.0010 A / ---- *4
Power	383.22 W	Nominal	230 V / 50 Hz
Power Factor	0.9772	Fundamental Current	1.6710 A
Apparent Power	392.9 VA	Measuring Period	150 s
THD (max)	21.43 %	Margin	100 %

Order	Limit1(A rms)	Limit2(A rms)	Ave(A rms)	Max(A rms)	Limit Over(s)	Judge
1	----	----	1.6026	1.6710	0.0	N/A
2	1.0800	2.1600	0.0036	0.0040	0.0	N/A
3	2.3000	4.6000	0.3315	0.3550	0.0	Pass
4	0.4300	0.8600	0.0012	0.0020	0.0	N/A
5	1.1400	2.2800	0.0459	0.0500	0.0	Pass
6	0.3000	0.6000	0.0000	0.0010	0.0	N/A
7	0.7700	1.5400	0.0100	0.0120	0.0	Pass
8	0.2300	0.4600	0.0000	0.0010	0.0	N/A
9	0.4000	0.8000	0.0031	0.0040	0.0	N/A
10	0.1840	0.3680	0.0000	0.0000	0.0	N/A
11	0.3300	0.6600	0.0000	0.0010	0.0	N/A
12	0.1533	0.3066	0.0000	0.0000	0.0	N/A
13	0.2100	0.4200	0.0010	0.0010	0.0	N/A
14	0.1314	0.2628	0.0000	0.0000	0.0	N/A
15	0.1500	0.3000	0.0001	0.0010	0.0	N/A
16	0.1150	0.2300	0.0000	0.0000	0.0	N/A
17	0.1324	0.2648	0.0002	0.0010	0.0	N/A
18	0.1022	0.2044	0.0000	0.0000	0.0	N/A
19	0.1184	0.2368	0.0000	0.0000	0.0	N/A
20	0.0920	0.1840	0.0000	0.0000	0.0	N/A
21	0.1071	0.2142	0.0000	0.0000	0.0	N/A
22	0.0836	0.1672	0.0000	0.0000	0.0	N/A
23	0.0978	0.1956	0.0000	0.0000	0.0	N/A
24	0.0767	0.1534	0.0000	0.0000	0.0	N/A
25	0.0900	0.1800	0.0000	0.0010	0.0	N/A
26	0.0708	0.1416	0.0002	0.0020	0.0	N/A
27	0.0833	0.1666	0.0000	0.0010	0.0	N/A
28	0.0657	0.1314	0.0003	0.0020	0.0	N/A
29	0.0776	0.1552	0.0000	0.0000	0.0	N/A
30	0.0613	0.1226	0.0000	0.0010	0.0	N/A
31	0.0726	0.1452	0.0000	0.0000	0.0	N/A
32	0.0575	0.1150	0.0000	0.0000	0.0	N/A
33	0.0682	0.1364	0.0000	0.0000	0.0	N/A
34	0.0541	0.1082	0.0000	0.0000	0.0	N/A
35	0.0643	0.1286	0.0000	0.0000	0.0	N/A
36	0.0511	0.1022	0.0000	0.0000	0.0	N/A
37	0.0608	0.1216	0.0000	0.0000	0.0	N/A
38	0.0484	0.0968	0.0000	0.0010	0.0	N/A
39	0.0577	0.1154	0.0000	0.0000	0.0	N/A
40	0.0460	0.0920	0.0000	0.0010	0.0	N/A

N/A : Not Apply

*4 When the Edition 3.0 is applied, 200% of the Limit1 value is applied to each Limit2 value.



5.7.Voltage changes, voltage fluctuations and flicker

Test requirement	EN 61000-3-3:2013+A1:2019+A2:2021
Applied limit	<p>The value of P_{st} shall be not greater than 1.0</p> <p>The value of P_{lt} shall be not greater than 0.65</p> <p>The value of $d(t)$ during a voltage change shall not exceed 3.3 % for more than 500 ms</p> <p>The relative steady-state voltage change, d_c shall not exceed 3.3 %</p> <p>The maximum relative voltage change d_{max} shall not exceed:</p> <p>a) 4 % without additional conditions</p> <p>b) 6 % for equipment which is:</p> <ul style="list-style-type: none"> - 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 <p>c) 7 % for equipment which is</p> <ul style="list-style-type: none"> - attended whilst in use (for example : hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as 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.
Test method	This test consists on the measurement of voltage changes, voltage fluctuations and flicker which may be produced by equipment having an input current ≤ 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.
Observation time	10 Minutes
	120 Minutes
	24 times switching according to Annex B
Ambient temperature	24.6 °C
Relative humidity	52 %
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Test model(s)	73005
EUT operation mode	Mode 1
Test results	Pass
Remark	/

Measurement data and Graphical presentation of the result

Test Data of Voltage Fluctuation and Flicker

Final Test Result **Pass**
 Nominal Voltage 230 V
 Nominal Frequency 50 Hz
 Plt Test Duration 600 s
 Flicker Margin 100 %
 d Measurement Margin 100 %

Segment	Pst	dmax(%)	dc(%)	Tmax(ms)	Judge
Limit	1.000	4.000	3.300	500	
Seg. 1	0.022	0.087	0.074	0	Pass

Plt	Value	Judge
Limit	0.650	
Measurement	0.009	Pass



6. Test Conditions and Results (Immunity)

6.1. General information

Performance criteria as defined by the standard	
Criterion	Description from standard
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 permissible 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.
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 permissible 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 to persist after the test. 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.
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 instructions for use.

6.2. Specific information EN IEC 55014-2

Category of test item acc. EN IEC 55014-2 (7.2)	<input type="checkbox"/>	CAT I (Category I) Equipment containing no electronic control circuitry.
	<input checked="" type="checkbox"/>	CAT II (Category II) Mains operated equipment containing electronic control circuitry with no clock frequency higher than 15 MHz.
	<input type="checkbox"/>	CAT III (Category III) Battery operated equipment not included in Category I.
	<input type="checkbox"/>	CAT IV (Category IV) mains operated equipment containing electronic control circuitry with a highest clock frequency greater than 15 MHz but lower than or equal to 200 MHz.
	<input type="checkbox"/>	CAT V (Category V) Mains operated equipment containing electronic control circuitry with a highest clock frequency greater than 200 MHz.

6.3. Electrostatic discharge immunity

Test requirement	EN IEC 55014-2:2021	
Basic standard	EN 61000-4-2:2009	
Test level	Discharge type	Discharge voltage
	Contact discharge voltage	± 4 kV
	Air discharge voltage	± 8 kV
Storage capacitor	150 pF	
Discharge resistor	330 Ω	
Horizontal coupling plate	1.6 x 0.8 m	
Vertical coupling plate	0.5 x 0.5 m	
Number of discharges	Min. 10 per discharge location	
Discharge interval	1 second	
Performance criteria	B	
Test method	The table-top equipment under test is placed on a wooden table, 0.8 m high, standing on the ground reference plane. A horizontal coupling plane (HCP), 1.6 x 0.8 m, is placed on the table. The EUT and the cables are isolated from the coupling plane by an insulating support 0.5 mm thick. The floor standing equipment is isolated from the ground reference plane by an insulating support about 0.1 m thick. The vertical coupling plane (VCP) of dimensions 0.5 m x 0.5 m is placed parallel to, and positioned at a distance of 0.1 m from, the EUT.	
Ambient temperature	24.6 °C	
Relative humidity	52 %	
Air pressure	100.5 kPa	
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Test model(s)	73005	
EUT operation mode	Mode 1	
Test results	Pass	
Remark	/	

6.3.1. Test results for electrostatic discharges

Photos of selected test points:

( Air Discharge)

( Contact Discharge)



Contact discharges			
Test point	Positive polarity	Negative polarity	Observations
	4 kV	4 kV	
VCP- Four Sides	Pass	Pass	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
HCP- Four Sides	Pass	Pass	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3

Air discharges			
Test point	Positive polarity	Negative polarity	Observations
	8 kV	8 kV	
Points on non-conductive surface as indicated in the picture above	Pass	Pass	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3

6.3.2. Test results of observations description

/ - Not performed or not required.
1 –There was no change compared with initial operation during the test.
2 –During the test, degradation of performance, after the test, but no change of actual operating state or stored data.
3 –The function of EUT is loss during the test, after the test, it can be recovered by itself operation or manually operation.

6.4. Radiated, radio-frequency, electromagnetic field immunity

Test requirement	EN IEC 55014-2:2021		
Basic standard	EN IEC 61000-4-3:2020		
Test level	Frequency	Field strength	Modulation
	80 MHz – 1 GHz	3 V/m (r.m.s.) (unmodulated)	80% AM (1 kHz)
	1 GHz – 6 GHz	3 V/m (r.m.s.) (unmodulated)	80% AM (1 kHz)
Dwell time	1 second		
Step size	1 %		
Distance antenna to EUT	3 m		
Performance criteria	A		
Test method	Measurements were made in a fully anechoic chamber and the indicated field strength was pre-calibrated prior to placement of the system under test. Tests were performed in both the horizontal and vertical polarities, where applicable. The antenna was placed 3 meters from the product under test. All sides of the EUT were investigated for anomalies.		
Ambient temperature	/		
Relative humidity	/		
Air pressure	/		
Test location	/		
Test model(s)	/		
EUT operation mode	/		
Test results	N/A		
Remark	The EUT contains electronic control circuit with no internal clock frequency or oscillator frequency higher than 15MHz, according to EN IEC 55014-2:2021 clause 4.3, EUT belongs to category II appliance. This item is not required, according to EN IEC 55014-2:2021 clause 7.2.3.		

6.5. Electrical fast transient/burst immunity

Test requirement	EN IEC 55014-2:2021	
Basic standard	EN 61000-4-4:2012	
Test level	Measurement port	Voltage
	Input and output a.c. power ports	±1 kV
	Input and output d.c. power ports	±0.5 kV
	Signal/control /wired network ports	±0.5 kV
Burst duration	15 ms	
Burst period.....	300 ms	
Repetition frequency	5 kHz	
Test time	2 minutes per level & polarity	
Performance criteria.....	B	
Test method.....	Measurements were made on a ground plane that extends 0.5-meter minimum beyond all sides of the system under test. Mains power tests were conducted with the product connected to a Coupling/Decoupling Network (CDN). One of each unique interface was tested for a period of 2 minute per polarity. The bursts are applied on the mains supply port by using a coupling decoupling network and on signal and control lines ports by using a capacitive clamp.	
Ambient temperature.....	24.6 °C	
Relative humidity	52 %	
Air pressure.....	100.5 kPa	
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Test model(s)	73005	
EUT operation mode.....	Mode 1	
Test results	Pass	
Remark.....	/	

6.5.1. Test results for electrical fast transient/burst

Measurement port	Level	Polarity	Observation	Results
AC power port	1 kV	Positive & Negative	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.5.2. Test results of observations description

/ - Not performed or not required.
1 –There was no change compared with initial operation during the test.
2 –During the test, degradation of performance, after the test, but no change of actual operating state or stored data.
3 –The function of EUT is loss during the test, after the test, it can be recovered by itself operation or manually operation.

6.6. Surge immunity

Test requirement	EN IEC 55014-2:2021		
Basic standard	EN 61000-4-5:2014+A1:2017		
Test level	Measurement port	Coupling point	Open-circuit peak voltage
	Input a.c. power ports	Line to line	± 1 kV
		Line to earth	± 2 kV
	Wired network ports	Line to earth (unshielded)	± 1 kV
Shield to earth (shielded)		± 0.5 kV	
Repetition rate	1/min		
Phase angles	Positive pulses are applied 90° and negative pulses are applied 270°		
Number of pulses for each coupling	5		
Performance criteria	B		
Test method	Mains power tests were conducted with the product connected to a Coupling/Decoupling Network (CDN). The test voltage was increased from the lowest indicated level up to the maximum level. Five positive polarity pulses at the 90° phase angle, five negative polarity pulses at the 270° phase angle. Each surge was applied 60 seconds after the previous surge. Signal and Telecommunications ports were subject to five (5) positive and five (negative) surges applied through the appropriate Coupling/Decoupling Network (CDN).		
Ambient temperature	24.6 °C		
Relative humidity	52 %		
Air pressure	100.5 kPa		
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China		
Test model(s)	73005		
EUT operation mode	Mode 1		
Test results	Pass		
Remark	/		

6.6.1. Test results for surge

Measurement port		Level	Polarity	Observation	Results
AC power port	L-N	1 kV	Positive	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
			Negative	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.6.2. Test results of observations description

/ - Not performed or not required.
1 –There was no change compared with initial operation during the test.
2 –During the test, degradation of performance, after the test, but no change of actual operating state or stored data.
3 –The function of EUT is loss during the test, after the test, it can be recovered by itself operation or manually operation.

6.7. Immunity to conducted disturbances, induced by radio-frequency fields

Test requirement	EN IEC 55014-2:2021	
Basic standard	EN 61000-4-6:2014	
Frequency range	150 kHz to (80MHz) 230 MHz	
Test level	Measurement port	Voltage
	Input and output a.c. power ports	3 V (r.m.s.) (unmodulated)
	Input and output d.c. power ports	1 V (r.m.s.) (unmodulated)
	Signal/control /wired network ports	1 V (r.m.s.) (unmodulated)
Dwell time	1 second	
Step size	1 %	
Modulation	80% AM (1kHz)	
Performance criteria	A	
Test method	The test allows estimating of the conducted immunity of electrical and electronic equipment to electromagnetic disturbances coming from intended radio-frequency (RF) transmitters in the frequency range 150 kHz to (80MHz) 230 MHz. The interference is applied on mains supply, signal line and earth connection ports by using coupling decoupling networks or a clamp.	
Ambient temperature	24.6 °C	
Relative humidity	52 %	
Air pressure	100.5 kPa	
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Test model(s)	73005	
EUT operation mode	Mode 1	
Test results	Pass	
Remark	/	

6.7.1. Test results for Immunity to injected currents

Measurement port	Frequency	Coupling type	Level	Observation	Results
AC power port	<input type="checkbox"/> 0.15 – 80 MHz <input checked="" type="checkbox"/> 0.15 – 230 MHz	CDN	3 V (r.m.s.)	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.7.2. Test results of observations description

/ - Not performed or not required.

1 –There was no change compared with initial operation during the test.

2 –During the test, degradation of performance, after the test, but no change of actual operating state or stored data.

3 –The function of EUT is loss during the test, after the test, it can be recovered by itself operation or manually operation.

6.8. Voltage dips, short interruptions and voltage variations immunity

Test requirement	EN IEC 55014-2:2021		
Basic standard	EN IEC 61000-4-11:2020		
Test level	Frequency	Test level in % U_T	Duration
	50 Hz	0	0.5 cycle
	50 Hz	40	10 cycles
	50 Hz	70	25 cycles
	60 Hz	0	0.5 cycle
	60 Hz	40	12 cycles
	60 Hz	70	30 cycles
	U _T is the rated voltage of the equipment under test.		
Repetition rate	10 seconds		
Number of dips or interruptions	3		
Performance criteria	C (Voltage dips)		
Test method	The test allows estimating of the conducted immunity of electrical and electronic equipment connected to low-voltage power supply networks for voltage dips and short interruptions. The interference is applied on mains supply port by using a testing generator.		
Ambient temperature	24.6 °C		
Relative humidity	52 %		
Air pressure	100.5 kPa		
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China		
Test model(s)	73005		
EUT operation mode	Mode 1		
Test results	Pass		
Remark	/		

6.8.1. Test results for Voltage dips

% of U _T	Frequency	Duration in cycles	Sync Angle	Observation	Results
0	50 Hz	0.5	0°; 180°	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
40	50 Hz	10	0°; 180°	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
70	50 Hz	25	0°; 180°	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.8.2. Test results of observations description

/ - Not performed or not required.

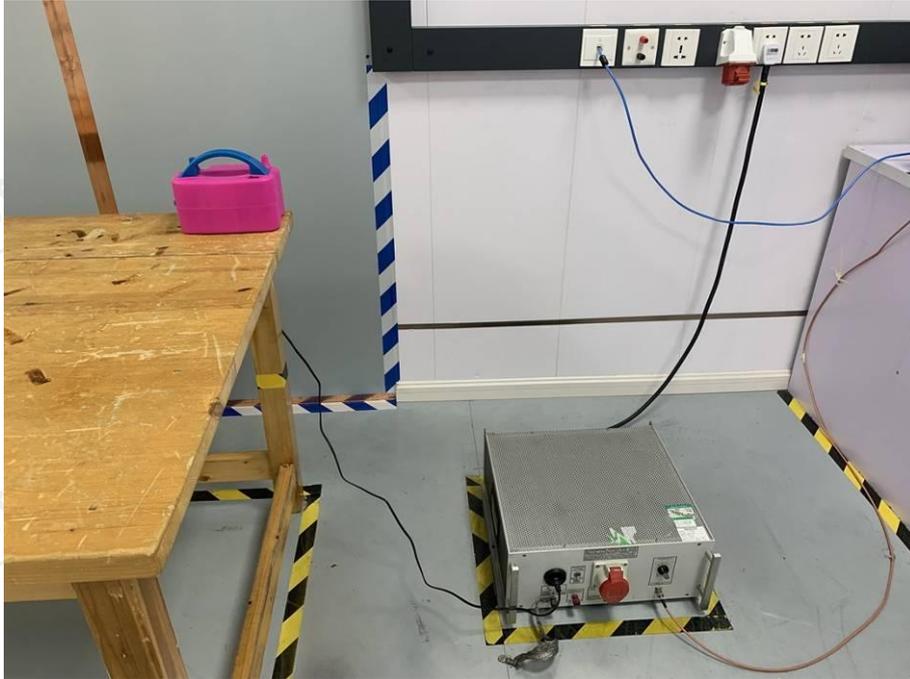
1 –There was no change compared with initial operation during the test.

2 –During the test, degradation of performance, after the test, but no change of actual operating state or stored data.

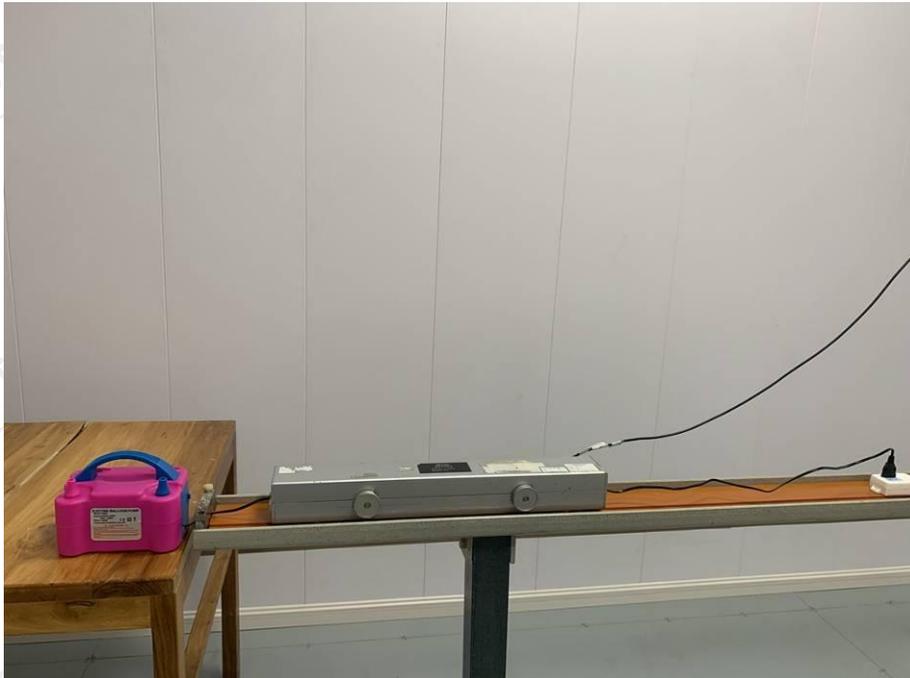
3 –The function of EUT is loss during the test, after the test, it can be recovered by itself operation or manually operation.

7. Test set-up photo

Disturbance voltage at mains terminals test view



Disturbance power (30 MHz to 300 MHz)



Electrostatic discharge immunity (ESD) test view



Harmonic current emissions & Voltage changes, voltage fluctuations and flicker test view



Electrical fast transient/burst immunity (EFT/B) test view



Surge immunity test view



Immunity to conducted disturbances, induced by radio-frequency fields (CS) test view



Voltage dips, short interruptions and voltage variations immunity (DIPS) test view

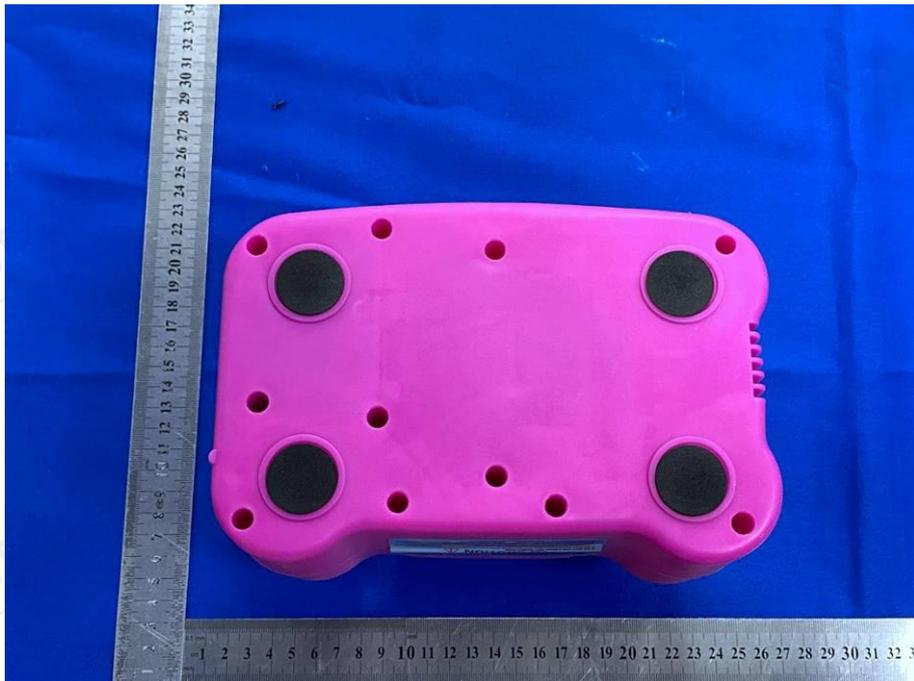


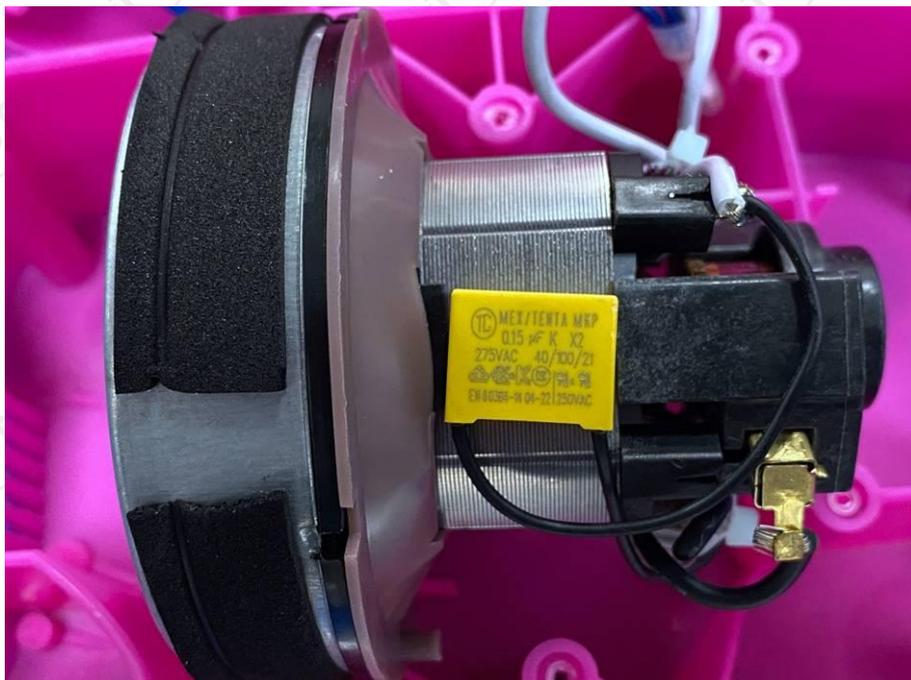
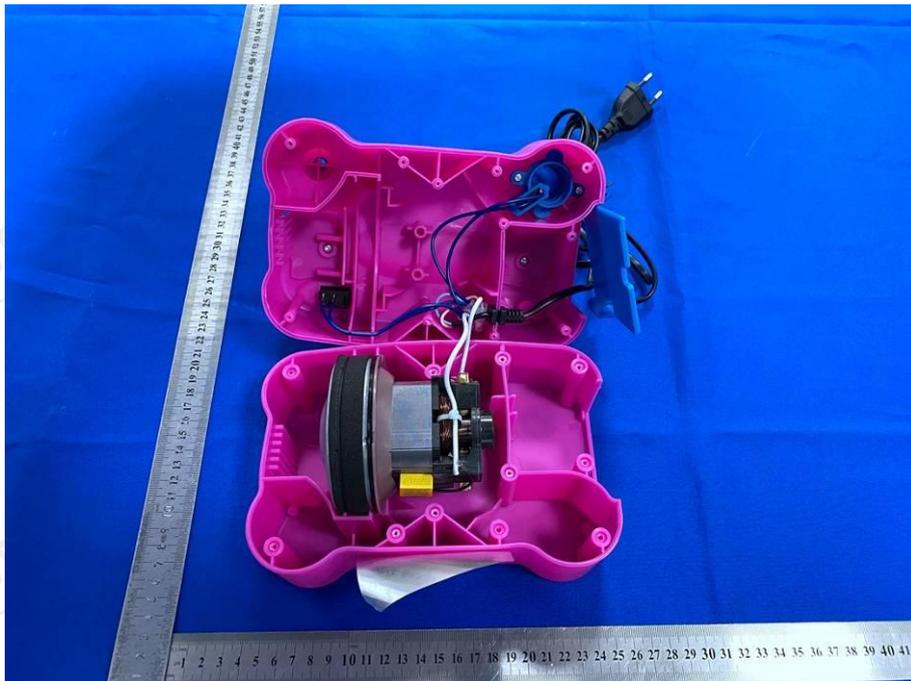
8. Photo of the EUT











*******End of report*******