EUROFINS PRODUCT TESTING SERVICE (SHANGHAI) CO., LTD

EMC TEST- REPORT

TEST REPORT NUMBER: EFSH17111413-IE-01-E01-A1

eurofins
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2 General Information

2.1 Notes

The results of this test report relate exclusively to the item tested as specified in chapter "Description of test item" and are not transferable to any other test items.

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Operator:

2018-03-26		Perry Li / Testing Engineer	
Date	Eurofins-Lab.	Name / Title	Signature

Technical responsibility for area of testing:

2018-03-26		Stefan Zhao / Project Engineer	
Date	Eurofins	Name / Title	Signature

2.2 Testing laboratory

Eurofins Product Testing Service (Shanghai) Co., Ltd
No. 395 West Jiangchang Road, Jing'an District, Shanghai, China
Telephone : +86-21-61819181
Fax : +86-21-61819299

Test location, where different:

Name : Shenzhen SEM.Test Technology Co., Ltd.
Address : 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian'er Road, Block 70, Bao'an District, Shenzhen, Guangdong, China
Telephone : +86-755-3366 3308
Fax : +86-755-3366 3309

All items were performed and tested at Shenzhen SEM.Test Technology Co., Ltd.

2.3 Details of approval holder

Name : ./.
Address : ./.

Telephone : 2017-11-07
Fax : 2017-11-08

2.4 Application details

Date of receipt of application : 2017-11-08 to 2017-11-22
Date of receipt of test item : 2018-03-26 (Date of test: N/A)
Date of test :
Amendment 1 :

2.5 Test item

Product type : Vacuum Cleaner
Model name : 8025, 8025D, 831NWA, 831NWB
Brand name :
Serial number : ./.
Ratings : DC 18.5V 2000mAh built-in battery
Additional information :

1. All models are identical except appearance and attachments.
2. Adapter information: model: ZD12D240035EU
   INPUT: 100-240V~, 50/60Hz, 0.5A OUTPUT: DC 24V, 0.35A
3. Charging mode and standalone operation mode are tested.
4. Model 8025 is selected to test full items.

See amendment on page 43.

2.6 Test standards

Technical standard :

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

EN 55014-2:2015

EN 61000-3-2:2014

EN 61000-3-3:2013

3 Technical test

3.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified were ascertained in the course of the tests performed. ☐

3.2 Test environment

Temperature	: 20	...	25°C
Relative humidity content	: 30	...	60%
Air pressure	: 100	...	103kPa

3.3 Test equipment utilized

Equipment Name	Manufactory	Model	Serial No.	Cal Due date
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2018-06-11
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2018-06-11
Amplifier	Agilent	8447F	3113A06717	2018-06-11
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2018-06-07
Loop Antenna	EVERFINE	LLA-2	711001	2018-06-07
Clamp	Luthi	MDS21	3809	2018-06-22
EMI Test Receiver	Rohde & Schwarz	ESCI	101611	2018-06-11
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2018-06-11
AC LISN	Schwarz beck	NSLK8126	8126-224	2018-06-11
Digital Power Analyzer	California Instrument	CTS	72831	2018-06-11
Power Source	California Instrument	5001IX-CTS400	25965	2018-06-11
Horn Antenna	ETS	3117	00086197	2018-06-07
Pre-amplifier	Compliance Direction	PAP-0118	24002	2018-06-11
ESD Generator	LIONCEL	ESD-203B	0170901	2018-08-14
Transient 2000	EMC PARTNER	TRA2000	863	2018-06-11
Couple Clamp	EMC PARTNER	CN-EFT1000	CH-4242	2018-06-11
CDN	Luthi	CDNL-801	2655	2018-06-11
Attenuator	EMCI	MA-5100/6BF2	1009	2018-06-11
CS Immunity Tester	SCHAFFNER	NSG2070	1123	2018-06-11
Signal Generater	R&S	SMB100A	105942	2018-09-10
RF Power Amplifier	BONN Elektronik	BLWA0830-160/100/40D	128740	2018-09-10
RF Power Amplifier	NJNT	NTWPAS-2560025	2560025	2018-09-10
Gestockte Breitband(S tacked) Log.-per.Antenna	SCHWARZBECK	STLP9128D	043	2018-09-10
Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2018-09-10
Power Meter	R&S	NRP2	102031	2018-09-10

3.4 Test results

☒ 1st test ☐ test after modification ☐ production test

Test item	Sub clause	Required	Test passed	Test failed
Conducted Emission	Clause 4.1.1 of EN 55014-1	☒	☒	☐
Disturbance power	Clause 4.1.2 of EN 55014-1	☐	☐	☐
Radiated disturbance	Clause 4.1.2 of EN 55014-1	☒	☒	☐
Discontinuous disturbance	Clause 4.2 of EN 55014-1	☐	☐	☐
Harmonic Current Emissions	EN 61000-3-2	☐	☐	☐
Voltage Changes, Voltage Fluctuations and Flicker	EN 61000-3-3	☒	☒	☐
Electrostatic Discharge	Clause 5.1 of EN 55014-2 & IEC61000-4-2	☒	☒	☐
Electrical Fast Transients	Clause 5.2 of EN 55014-2 & IEC61000-4-4	☒	☒	☐
Injected currents (RF continues conducted)	Clause 5.4 of EN 55014-2 & IEC 61000-4-6	☒	☒	☐
Radio frequency electromagnetic fields	Clause 5.5 of EN 55014-2 & IEC 61000-4-3	☒	☒	☐
Surge immunity	Clause 5.6 of EN 55014-2 & IEC 61000-4-5	☒	☒	☐
Voltage dips and Interruption	Clause 5.7 of EN 55014-2 & IEC 61000-4-11	☒	☒	☐

Note: 1. The Radiated disturbance test was selected instead of Disturbance power test according to "Figure 10 - Flow chart of emission testing" of EN 55014-1.
2. The Harmonics current emission test was not required as the rated power of EUT was less than 75W.

4 Emission Test

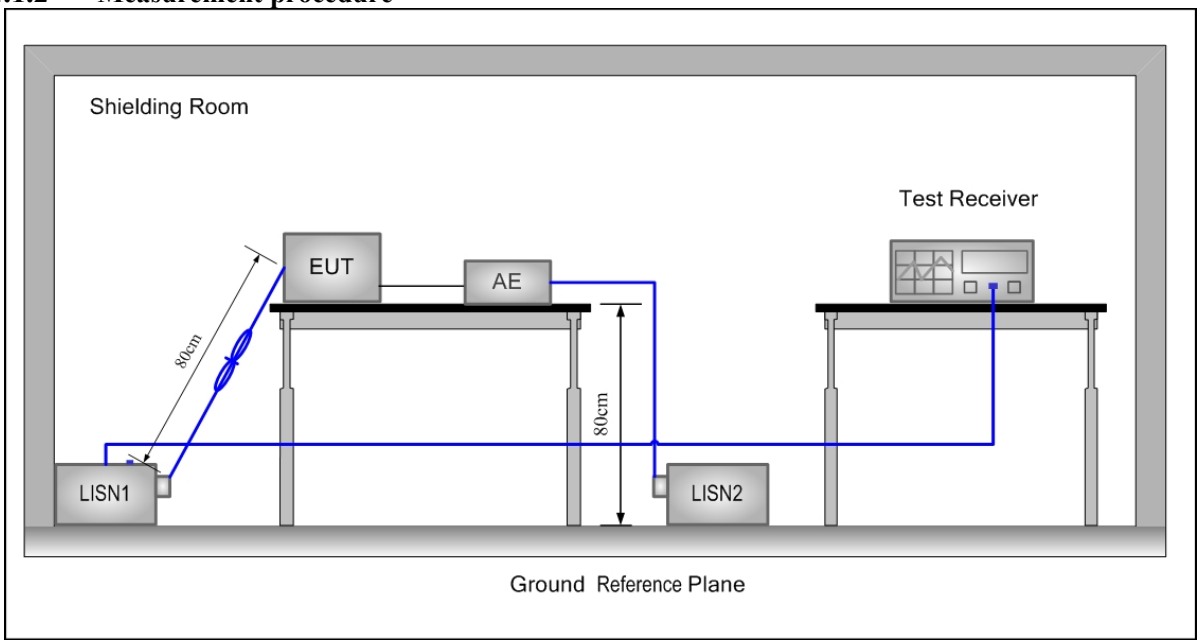
4.1 Conducted Emission

This clause lays down the general requirements for the measurement of disturbance voltage produced at the terminals of apparatus.

4.1.1 Limits

Frequency range MHz	At mains terminals dB (μV)	
	Quasi-peak Limit	Average Limit
0.15 to 0.50	66 to 56	59 to 46
0.50 to 5	56	46
5 to 30	60	50
Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 30 MHz. Note2: The lower limit is applicable at the transition frequency.		

4.1.2 Measurement procedure



1. The mains terminal disturbance voltage was measured with the EUT in a shielded room.
2. The EUT was connected to AC power source through a LISN (Line Impedance Stabilization Network) which provides a (50 μH + 5 Ω) || 50 Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

4. Before get the final emission results with quasi-peak(QP) detector and average(AV) detector, a pre-scan was performed with the peak(PK) and average(AV) detector to find out the maximum emission data plots of the EUT.

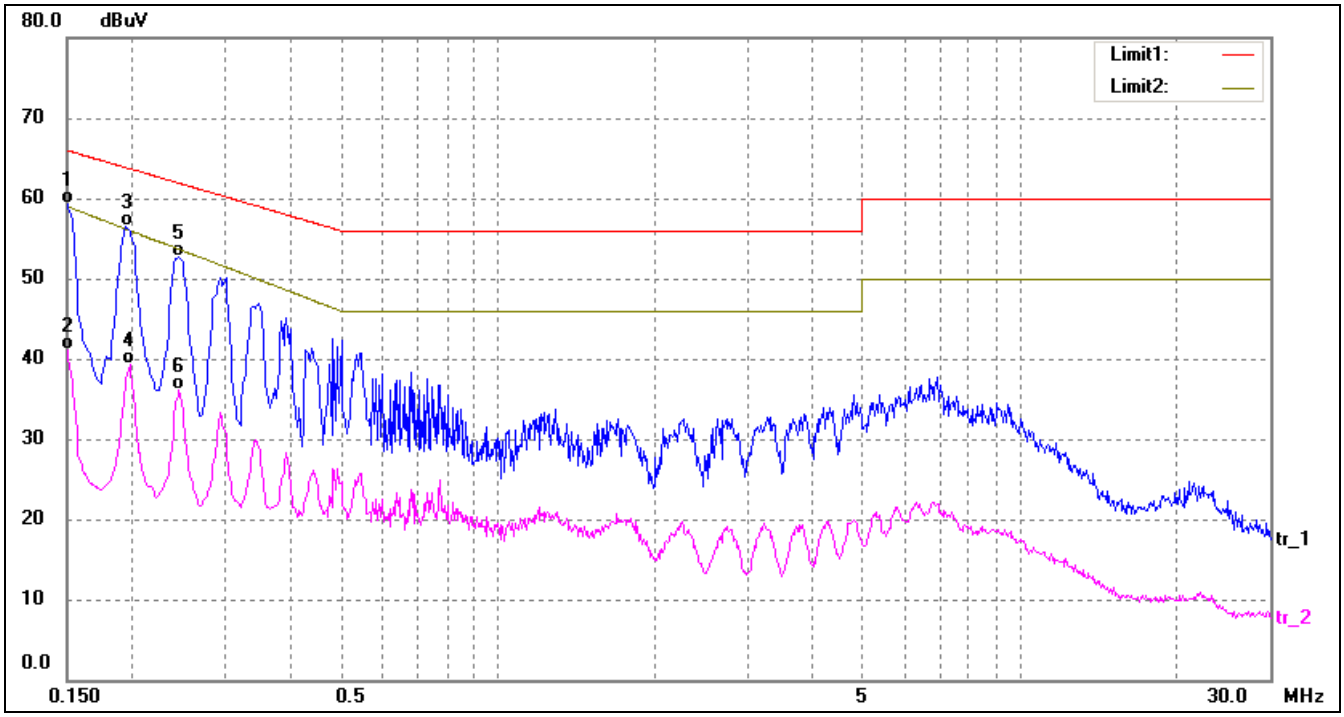
4.1.3 Measurement uncertainty

Ulab(cond) = 1.8dB at 95% level of confidence, k=2

4.1.4 Results -Measurement Data

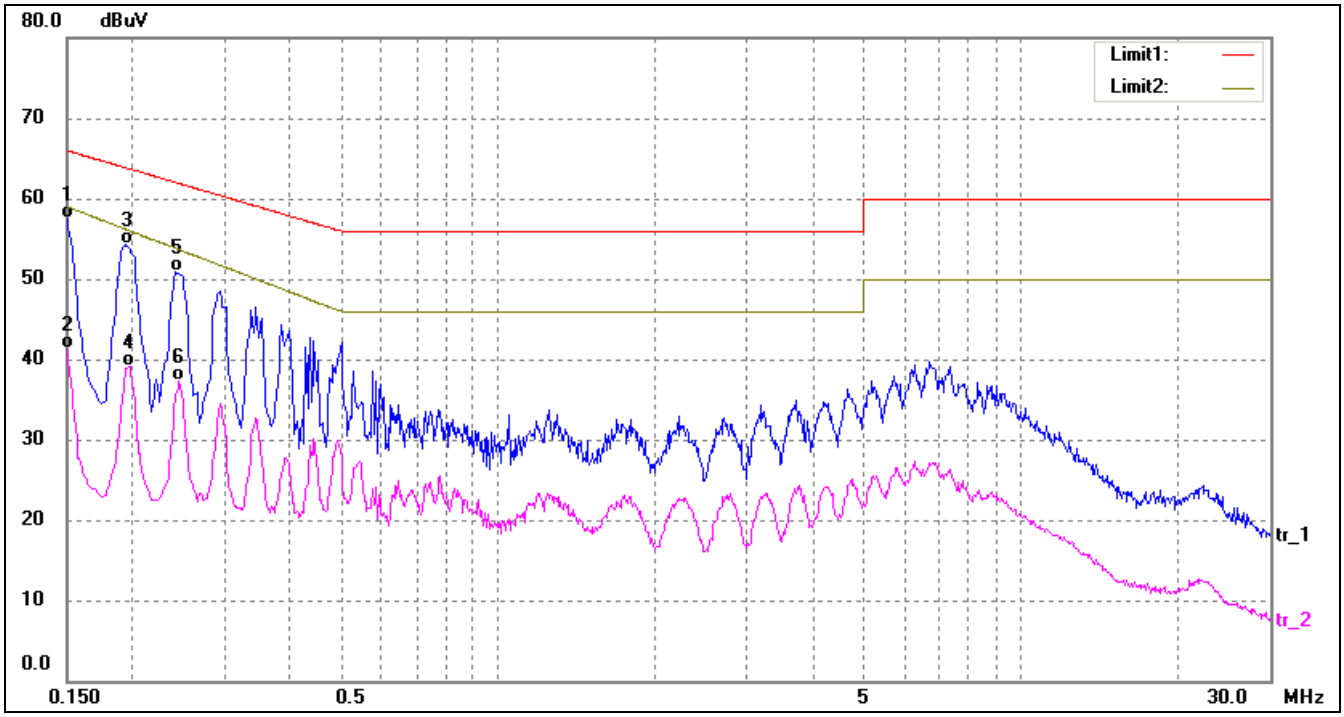
Charging mode

Job No.:	**CE**	**Phase:**	**L1**
Standard:	**EN55014 Conduction(QP)**	**Power Source:**	**AC 230V/50Hz**
Test item:	**Conduction Test**	**Date:**	**17/11/21/**
Temp.(℃)/Hum.(%RH):	**26℃/60%RH**	**Time:**	**14/01/47**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Over (dB)	Detector
1*	0.1500	49.44	9.85	59.29	66.00	-6.71	QP
2	0.1500	31.20	9.85	41.05	59.00	-17.95	AVG
3	0.1940	46.74	9.81	56.55	63.86	-7.31	QP
4	0.1980	29.42	9.80	39.22	56.00	-16.78	AVG
5	0.2460	42.85	9.80	52.65	61.89	-9.24	QP
6	0.2460	26.27	9.80	36.07	53.66	-17.59	AVG

Job No.:	**CE**	**Phase:**	**N**
Standard:	**EN55014 Conduction(QP)**	**Power Source:**	**AC 230V/50Hz**
Test item:	**Conduction Test**	**Date:**	**17/11/21/**
Temp.(℃)/Hum.(%RH):	**26℃/60%RH**	**Time:**	**14/04/03**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Over (dB)	Detector
1*	0.1500	47.57	9.85	57.42	66.00	-8.58	QP
2	0.1500	31.41	9.85	41.26	59.00	-17.74	AVG
3	0.1940	44.51	9.81	54.32	63.86	-9.54	QP
4	0.1980	29.29	9.80	39.09	56.00	-16.91	AVG
5	0.2420	41.02	9.80	50.82	62.03	-11.21	QP
6	0.2460	27.48	9.80	37.28	53.66	-16.38	AVG

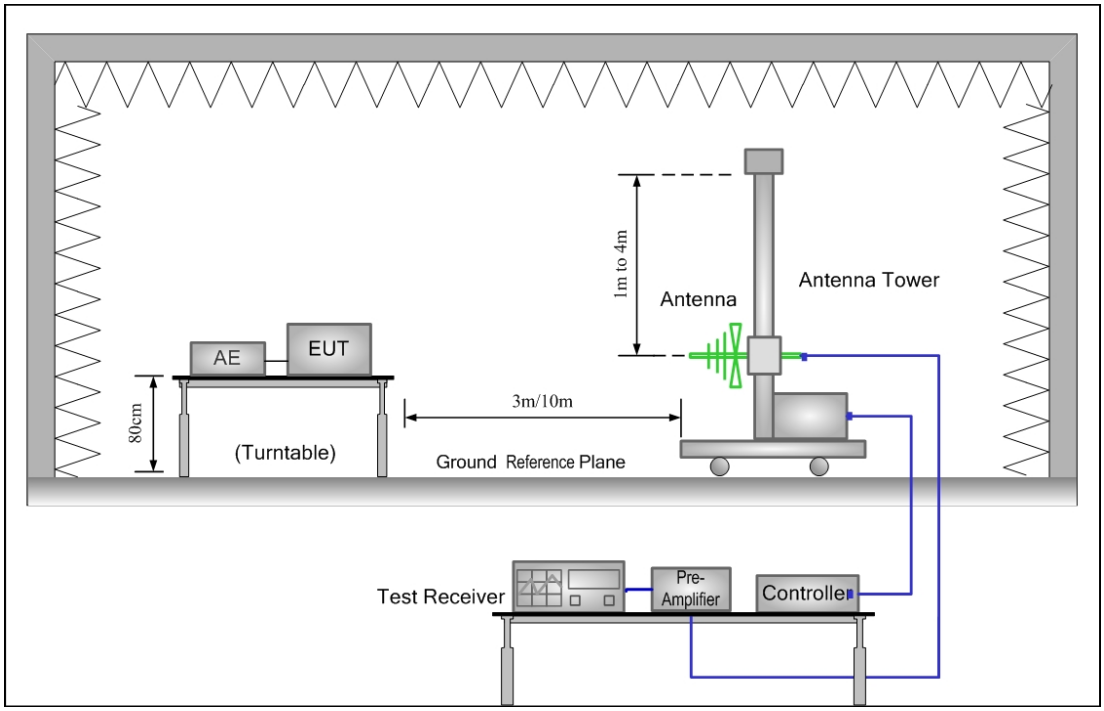
4.2 Radiated disturbance

This clause lays down the general requirements for the measurement of Radiated disturbance produced at the space of apparatus.

4.2.1 Limits

Frequency range	Quasi-peak limits at 3m
MHz	dB (μV/m)
30 to 230	40
230 to 1000	47
At transitional frequencies the lower limit applies.	

4.2.2 Measurement procedure



1. The radiated emissions test was conducted in a semi-anechoic chamber. The EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

2. Before get the final emission results with quasi-peak(QP) detector, a pre-scan was performed with the peak(PK) detector to find out the maximum emission data plots of the EUT.

3. The frequencies of maximum emission were determined in the final radiated emissions measurement, the physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance.

Measurements were performed for both horizontal and vertical antenna polarization. Test was performed on subcontractor.

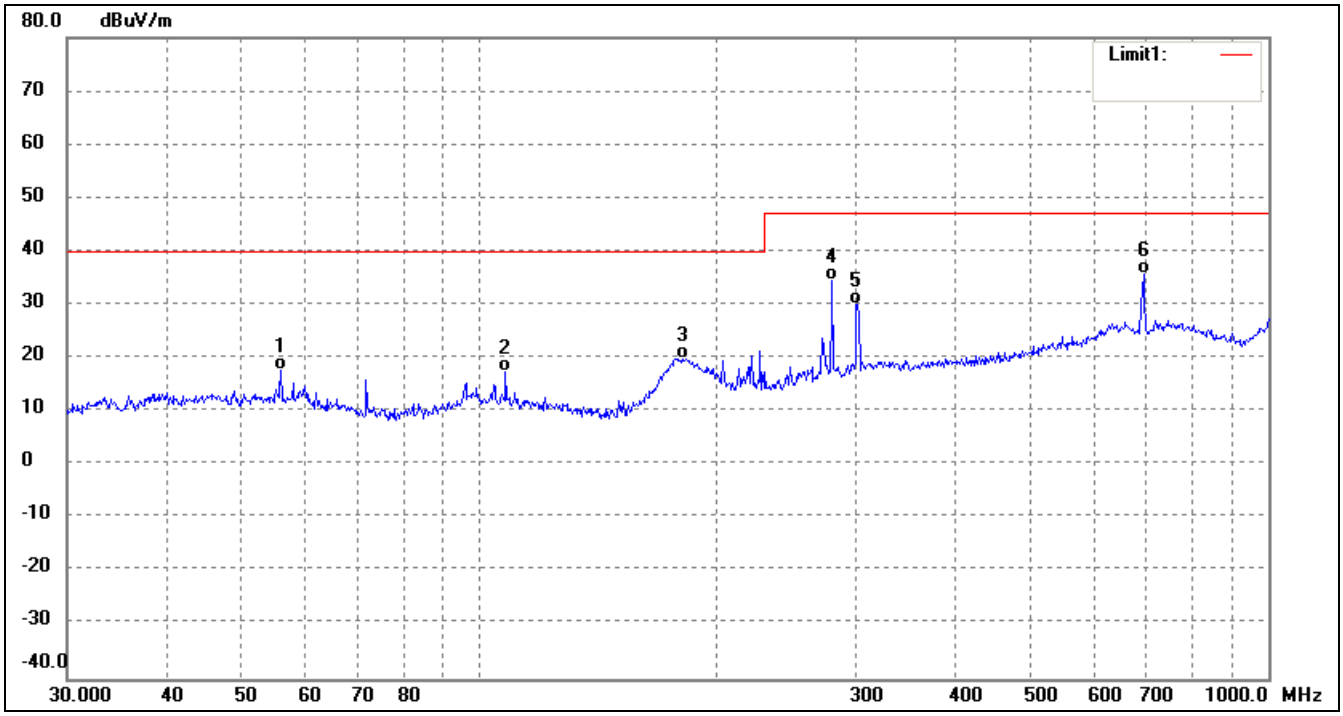
4.2.3 Measurement uncertainty

Ulab(cond) = 3.9dB at 95% level of confidence , k=2

4.2.4 Results

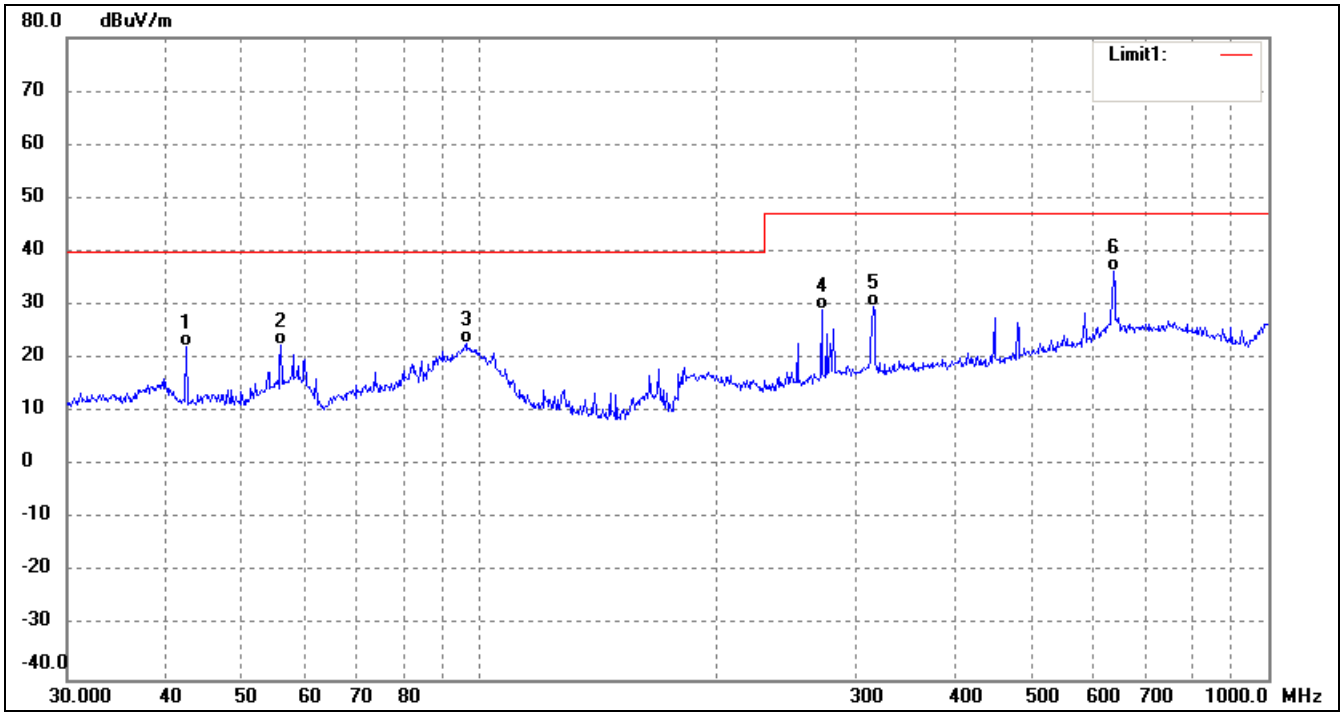
Charging mode

Job No.:	**RE**	**Polarization:**	**Horizontal**
Standard:	**EN55014-1**	**Power Source:**	**AC 230V/50Hz**
Test item:	**Radiation Test**	**Date:**	**17/11/21/**
Temp.(C)/Hum.(%RH):	**22(C)/54%RH**	**Time:**	**11/42/40**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Remark
1	56.0007	34.41	-16.52	17.89	40.00	-22.11	QP
2	107.8877	33.96	-16.61	17.35	40.00	-22.65	QP
3	180.6488	39.05	-19.05	20.00	40.00	-20.00	QP
4	280.0238	44.81	-10.36	34.45	47.00	-12.55	QP
5	300.3673	39.78	-9.59	30.19	47.00	-16.81	QP
6	694.4174	37.10	-1.41	35.69	47.00	-11.31	QP

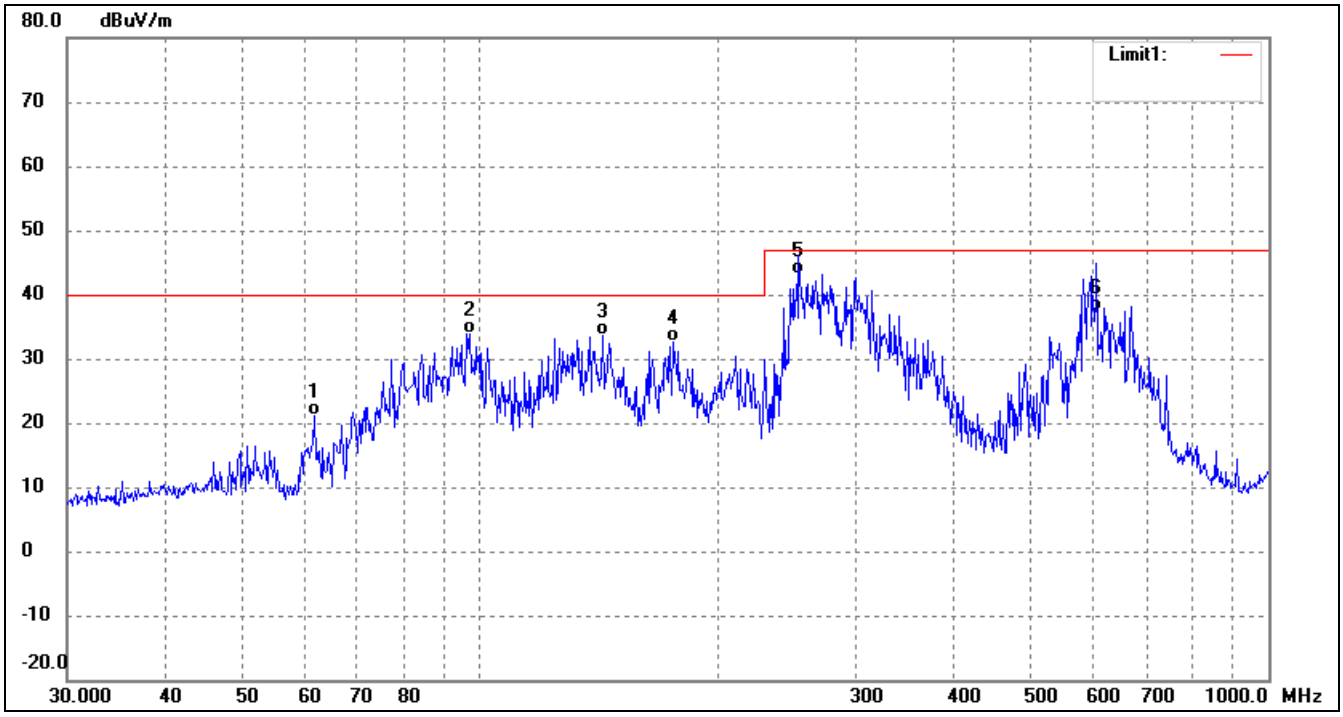
Job No.:	**RE**	**Polarization:**	**Vertical**
Standard:	**EN55014-1**	**Power Source:**	**AC 230V/50Hz**
Test item:	**Radiation Test**	**Date:**	**17/11/21/**
Temp.(C)/Hum.(%RH):	**22(C)/54%RH**	**Time:**	**11/39/32**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Remark
1	42.4508	38.90	-16.50	22.40	40.00	-17.60	QP
2	56.0007	39.00	-16.52	22.48	40.00	-17.52	QP
3	96.0986	40.09	-17.14	22.95	40.00	-17.05	QP
4	271.3246	40.14	-10.98	29.16	47.00	-17.84	QP
5	315.4808	39.10	-9.40	29.70	47.00	-17.30	QP
6	636.1340	37.51	-1.15	36.36	47.00	-10.64	QP

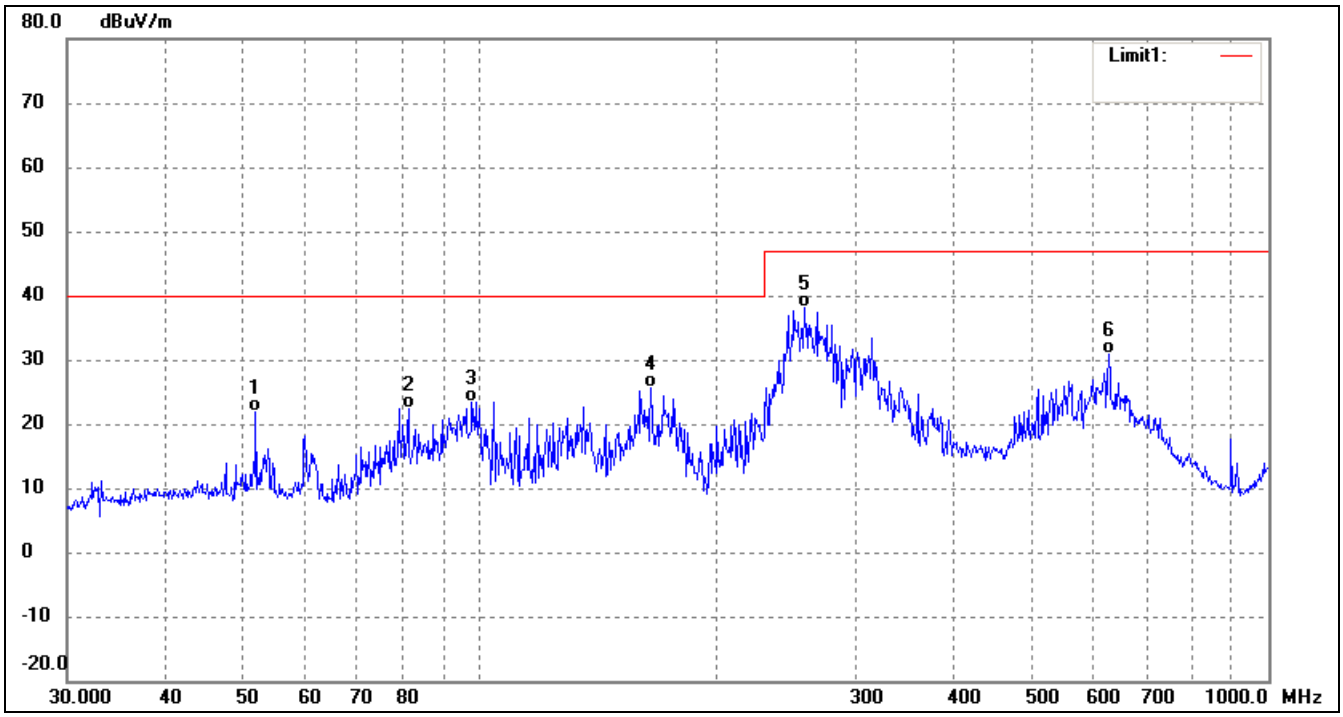
Standalone operation mode

Job No.:	**RE**	**Polarization:**	**Horizontal**
Standard:	**EN55014-1**	**Power Source:**	**DC 18.5V**
Test item:	**Radiation Test**	**Date:**	**17/11/22/**
Temp.(C)/Hum.(%RH):	**22(C)/54%RH**	**Time:**	**11/30/38**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	61.7781	37.99	-16.88	21.11	40.00	-18.89	QP
2	97.1148	50.87	-16.98	33.89	40.00	-6.11	QP
3	143.3261	52.02	-18.46	33.56	40.00	-6.44	QP
4	175.6516	51.62	-19.07	32.55	40.00	-7.45	QP
5	253.8367	55.21	-12.01	43.20	47.00	-3.80	QP
6	605.6592	38.07	-0.67	37.40	47.00	-9.60	QP

Job No.:	**RE**	**Polarization:**	**Vertical**
Standard:	**EN55014-1**	**Power Source:**	**DC 18.5V**
Test item:	**Radiation Test**	**Date:**	**17/11/22/**
Temp.(C)/Hum.(%RH):	**22(C)/54%RH**	**Time:**	**11/35/30**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Remark
1	52.0251	38.26	-16.50	21.76	40.00	-18.24	QP
2	81.2117	42.01	-19.60	22.41	40.00	-17.59	QP
3	97.7983	40.37	-16.88	23.49	40.00	-16.51	QP
4	164.9075	44.82	-19.07	25.75	40.00	-14.25	QP
5	258.3264	50.09	-11.85	38.24	47.00	-8.76	QP
6	627.2738	32.22	-1.45	30.77	47.00	-16.23	QP

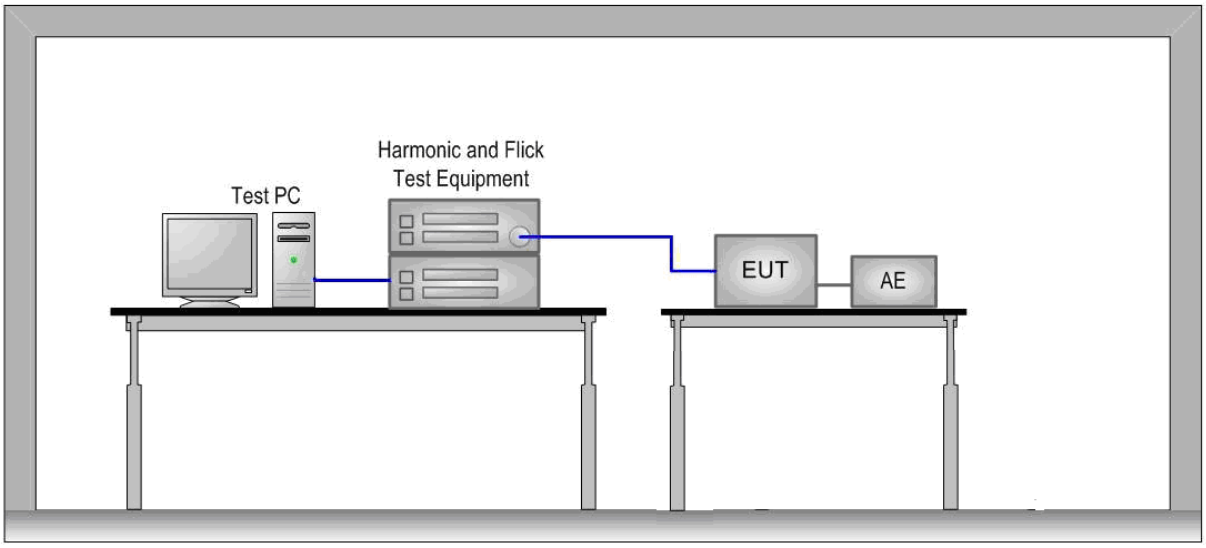
4.3 Voltage Changes, Voltage Fluctuations and Flicker

This part is concerned with the limitation of voltage fluctuations and flicker impressed on the public low-voltage system.

4.3.1 Limits

Value	Limit
Pst	1,0
Plt	0,65
dt	3,3%
dc	3,3%
dmax	4,0%

4.3.2 Measurementest procedure



The equipment under test is placed on a wooden table with a height of 0,8 m in the EMC lab. The voltage fluctuations and flicker were measured at the supply terminals of the EUT.

4.3.3 Results

Parameter values recorded during the test:

Vrms at the end of test (Volt):	**229.76**			
Highest dt (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Time(mS) > dt:	**0.0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.00**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.064**	**Test limit:**	**1.000**	**Pass**

5 Immunity Test

5.1 Performance Criteria Description in Clause 6 of EN 55014-2

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 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.
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 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. 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 instructions for use.

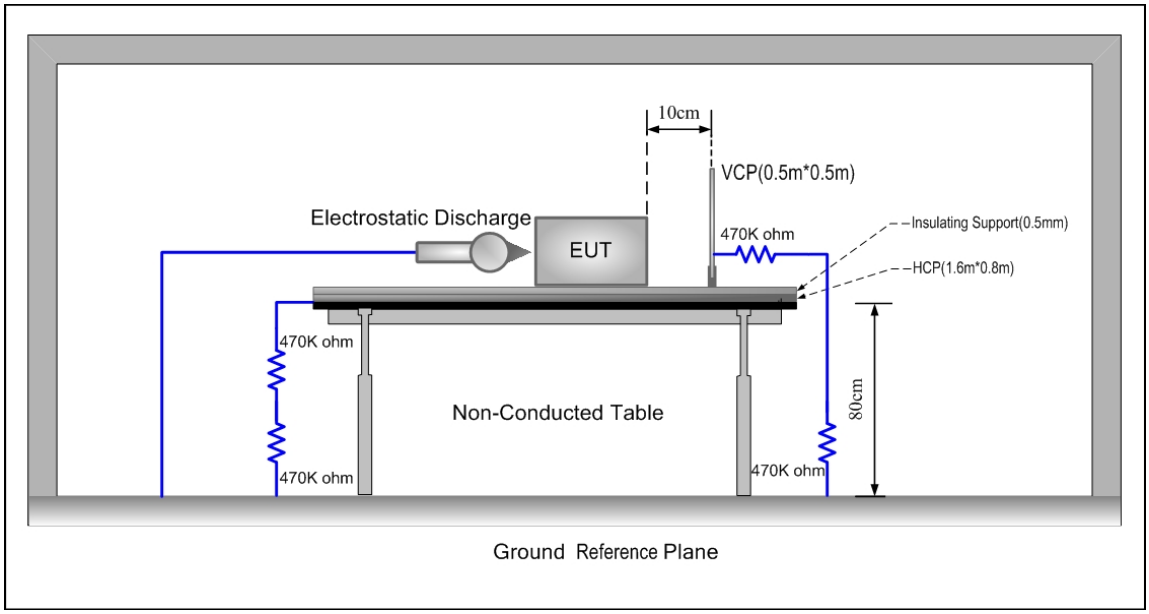
5.2 Classification of apparatus

Category I:	Apparatus containing no electronic control circuitry.
Category II:	Transformer toys, dual supply toys, mains powered motor operated appliances, tools, heating appliances and similar electric apparatus (for example . UV radiators, IR radiators and microwave ovens) containing electronic control circuitry with no internal clock frequency or oscillator frequency higher than 15 MHz.
Category III:	Equipment which in normal use, is not connected to a power network and has no cables attached.
Category IV:	All other apparatus covered by the scope of this standard.

The EUT belongs to Category **III,** and the EUT belongs to Category **II** for charging mode.

5.3 ESD

5.3.1 Test Procedures



1. Contact discharge was applied only to conductive surfaces of the EUT. Air discharge was applied only to non-conducted surfaces of the EUT.
2. The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane (GRP).
3. 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 while HCP were constructed from the same material type and 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 surfaces excepted the GRP, HCP and VCP was greater than 1m.
4. During the contact discharges, the tip of the discharge electrode was touching the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the ESD generator was removed from the EUT, the generator is then retriggered for a new single discharge. For ungrounded product, a discharge cable with two resistances was used after each discharge to remove remnant electrostatic voltage. 10 times of each polarity single discharge were applied to HCP and VCP.

5.3.2 Results

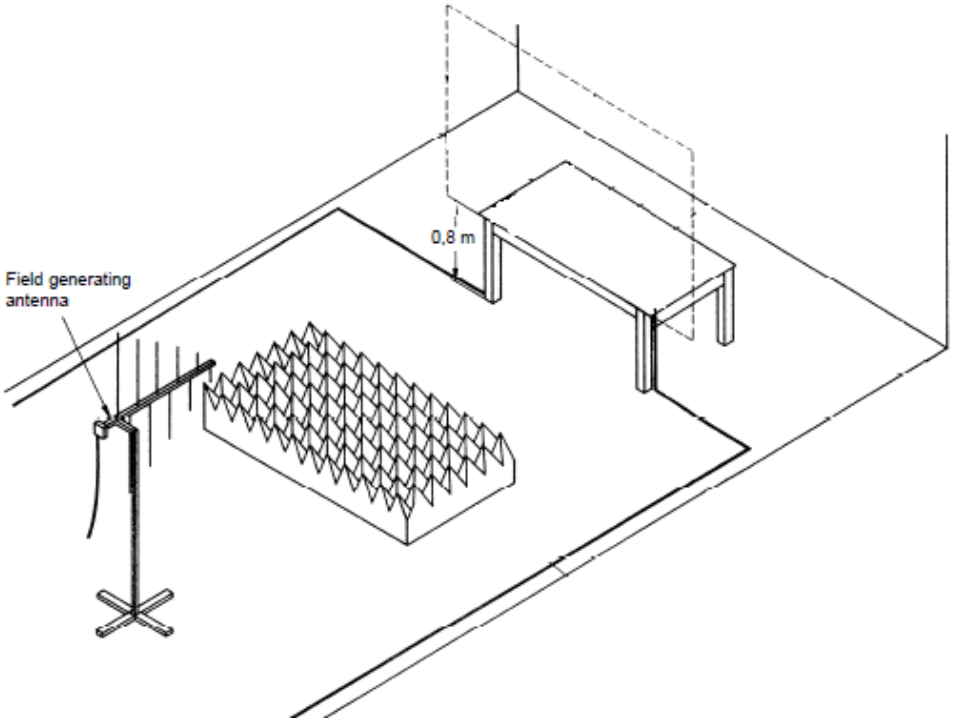
Charging mode, Standalone operation mode

Test point	Table (T) Floor (F)	Contact (C) Air (A)	Voltage (kV)	Number of discharge	Polarity (+ / -)	Opinion
Air discharge	T	A	±2, ±4, ±8	Mini 20/point	+ / -	A
Direct discharge	T	C	±2, ±4	Mini 20/point	+ / -	A
HCP	T	C	±2, ±4	Mini 20/point	+ / -	A
VCP	T	C	±2, ±4	Mini 20/point	+ / -	A

A: no loss of function.

5.4 Radio frequency electromagnetic fields

5.4.1 Measurement procedure



1. The EUT was placed on 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP. The tests normally shall be performed with the generating antenna facing each of four sides of the EUT. When equipment can be used in different orientations (e.g. vertical or horizontal) the test shall be performed on all possible sides of the EUT.
2. The tests are carried out with a field strength by 3 V/m (measured in the unmodulated field) with amplitude modulated signal by a depth of 80 % by a sinusoidal audio signal of 1 kHz. The logarithmic step was 1% and the dwell time was 3s dependent of the EUT cycle time. Test was performed on subcontractor.

5.4.2 Results

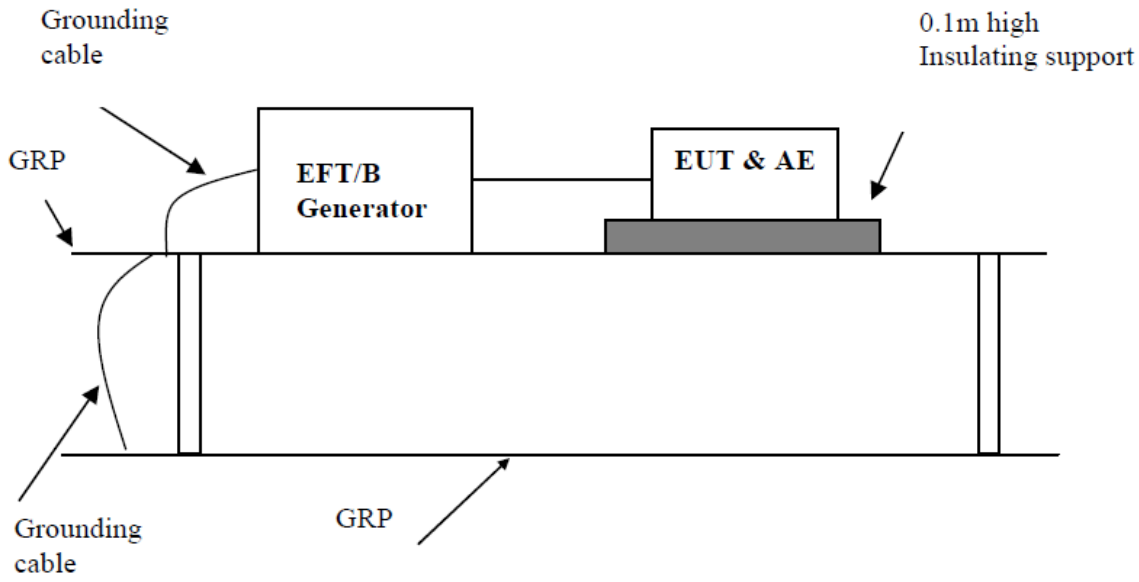
Standalone operation mode

Frequency Range	Field Strength	Modulation	Antenna Polarity	Opinion
80MHz-1GHz	3V/m	80% AM 1kHz	Horizontal	A
80MHz-1GHz	3V/m	80% AM 1kHz	Vertical	A

A: no loss of function.

5.5 Electrical Fast Transients

5.5.1 Measurement procedure



1. The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0,1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The GRP shall project beyond the EUT and the clamp by at least 0.1m on all sides. The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m. All cables to the EUT was placed on the insulation support 0.1m above GRP. Cables not subject to EUT was routed as far as possible from cable under test to minimize the coupling between the cables.
3. The length of signal and power cable between the EUT and EFT generator was 0.5m. If the cable is a non-detachable supply cable more than 0.5m, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1m above the GRP.

5.5.2 Results

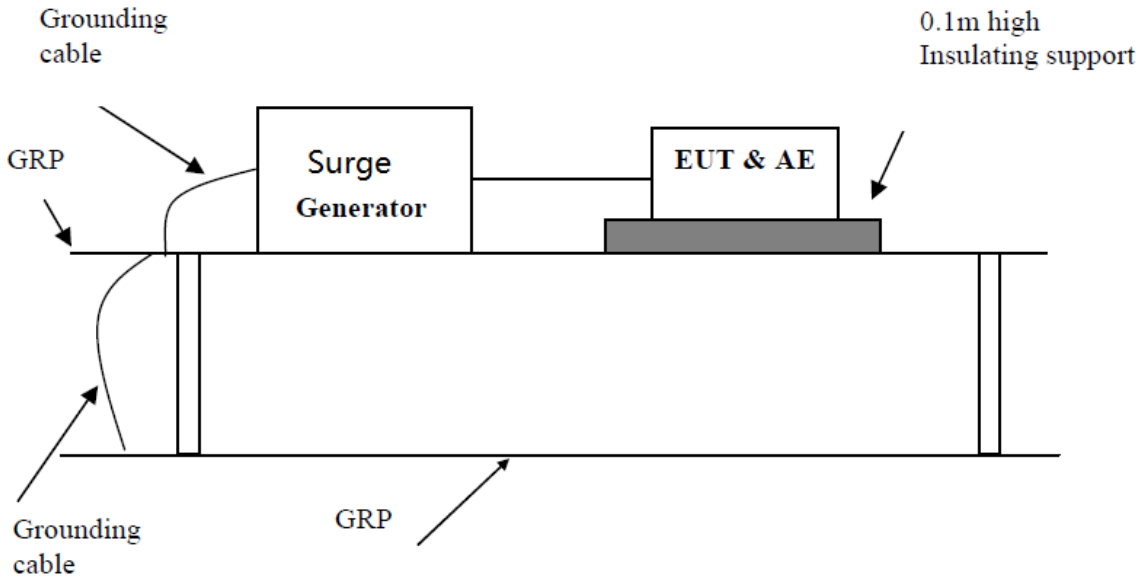
Charging mode

Test port	Voltage (kV)	Polarity (+ / -)	Duration (s or min)	Waveform Tr / Th	Repetition Frequency (kHz)	Opinion
a.c. port, L	1	+/-	2 min	5/50 ns	5	A
a.c. port, N	1	+/-	2 min	5/50 ns	5	A
a.c. port, L+N	1	+/-	2 min	5/50 ns	5	A

A: no loss of function.

5.6 Surge Immunity

5.6.1 Measurement procedure



1. The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0,1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The 1,2/50 μs surge was to be 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 may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave may be applied on the lines under test.
3. The positive pulses are applied 90° relative to the phase angle of the a.c. line voltage to the equipment under test, and the negative pulses are applied 270° relative to the phase angle of the a.c. line voltage to the equipment under test.

5.6.2 Results

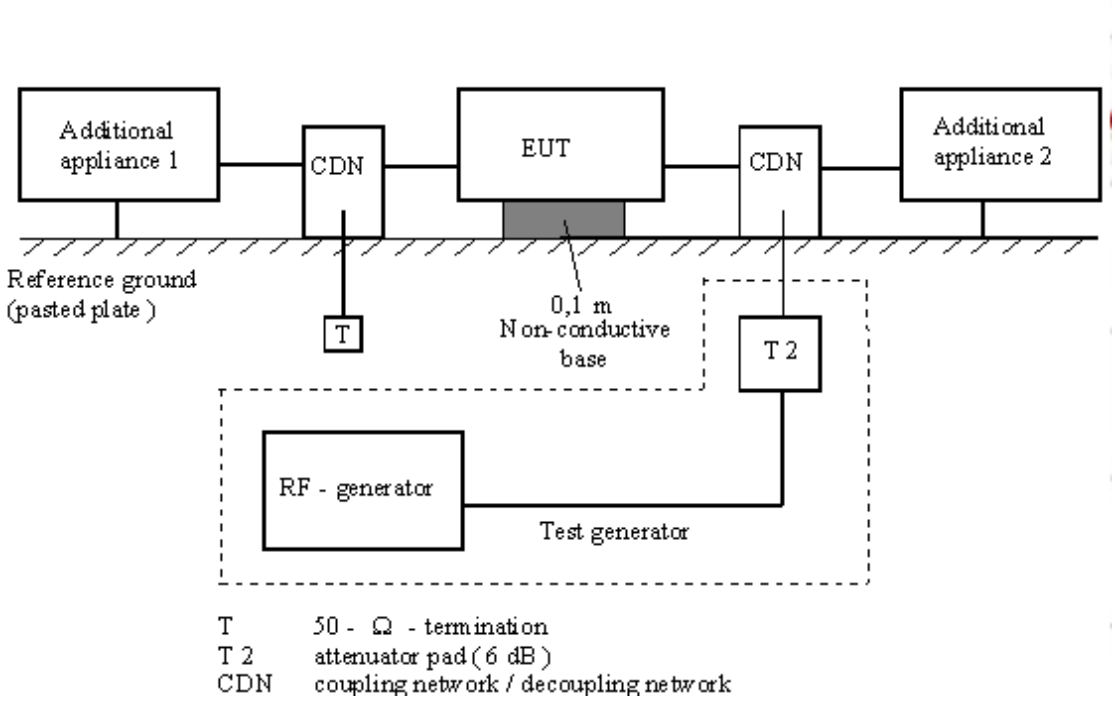
Charging mode

Test port	Polarity (+ / -)	Voltage (kV)	Voltage Waveform	Current Waveform	Repetition Rate	Number of pulses	Opinion
a.c. port, L-N	+/-	1.0	1.2/50 μs	8/20 μs	1 per min	5 /point	A

A: no loss of function.

5.7 Injected currents(RF continues conducted)

5.7.1 Measurement procedure



1. 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 cables exiting the EUT was supported at a height of at least 30 mm above the ground reference plane.
2. The coupling and decoupling devices were required, they were located between 0,1 m and 0,3 m from the EUT. This distance was to be measured horizontally from the projection of the EUT on to the ground reference plane to the coupling and decoupling device.
3. The frequency range was swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80 % amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or to change coupling devices as necessary. Where the frequency was swept incrementally, the step size do not exceed 1 % of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency was not less than the time necessary for the EUT to be exercised and to respond, and was not less than 3s.

5.7.2 Results

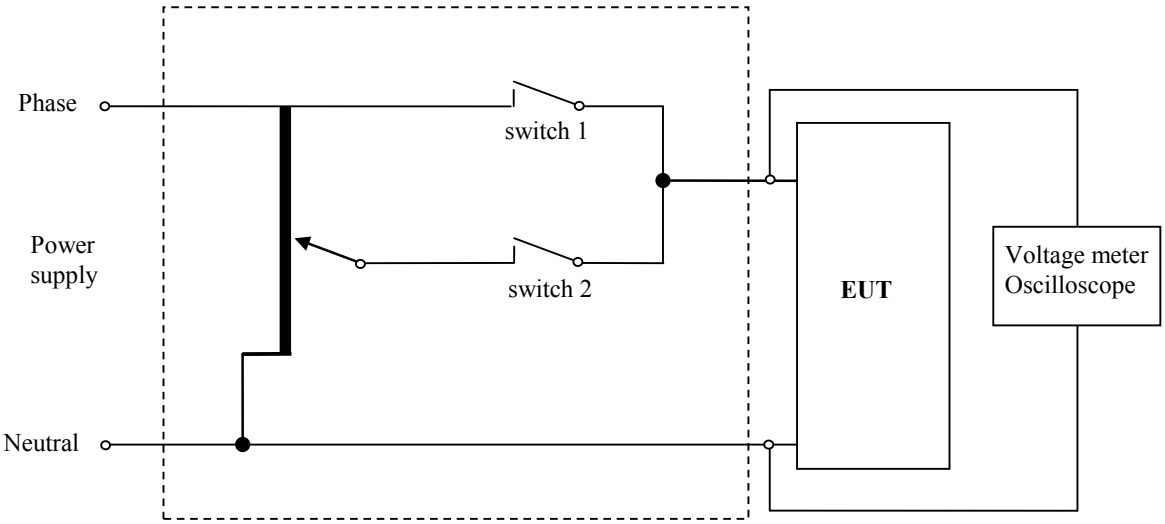
Charging mode

Test port	Voltage (e.m.f.)	Modulation	Frequency Range	Opinion
AC power line	3V	80% AM1 kHz	150 kHz - 230 MHz	A

A: no loss of function.

5.8 Voltage dips and Interruption

5.8.1 Measurement procedure



1. The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0,1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer. Voltage change shall occur at zero crossing.
3. 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.

5.8.2 Results

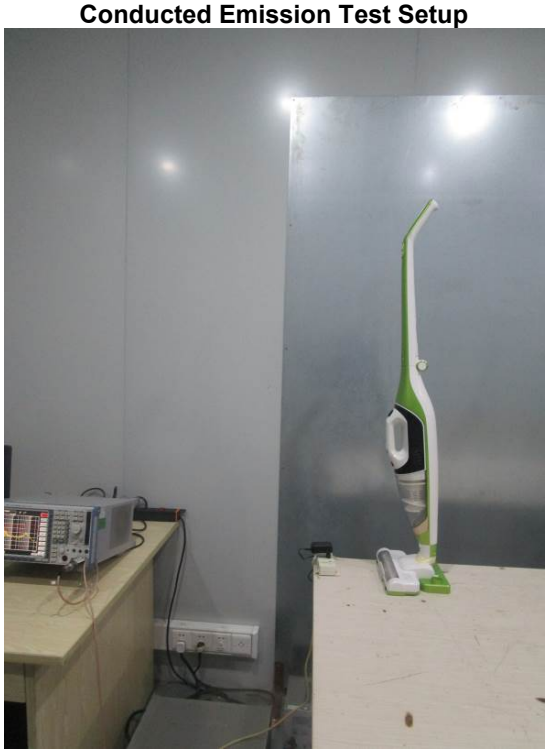
Charging mode

Reduction of supply voltage	Test level in % U_T	Duration in parts of period (in ms)	Opinion
100%	0	0,5 (10 ms)	B
60 %	40	10 (200 ms)	B
30 %	70	25 (500 ms)	B

A: no loss of function.
B: the appliance could not charge normally during voltage dips, but after test it would recover.

6 Test setup Photos

Conducted Emission Test Setup

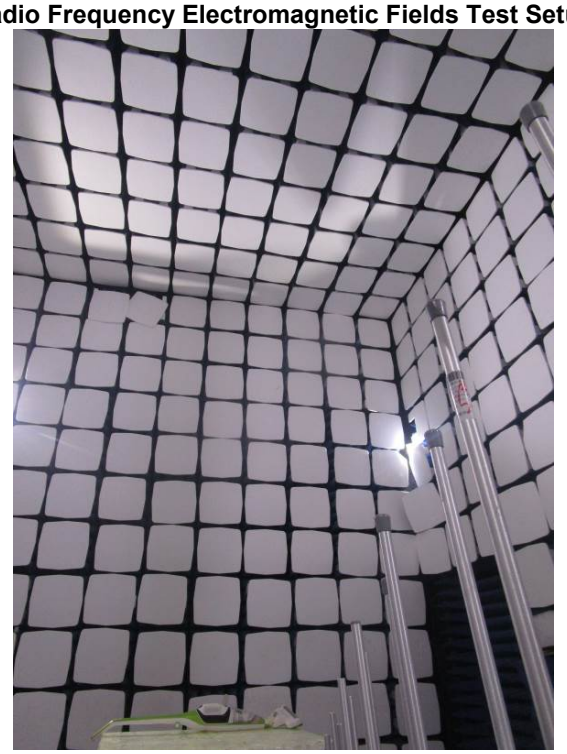


Radiated Disturbance Test Setup

Current Harmonics /Voltage Flicker Test Setup

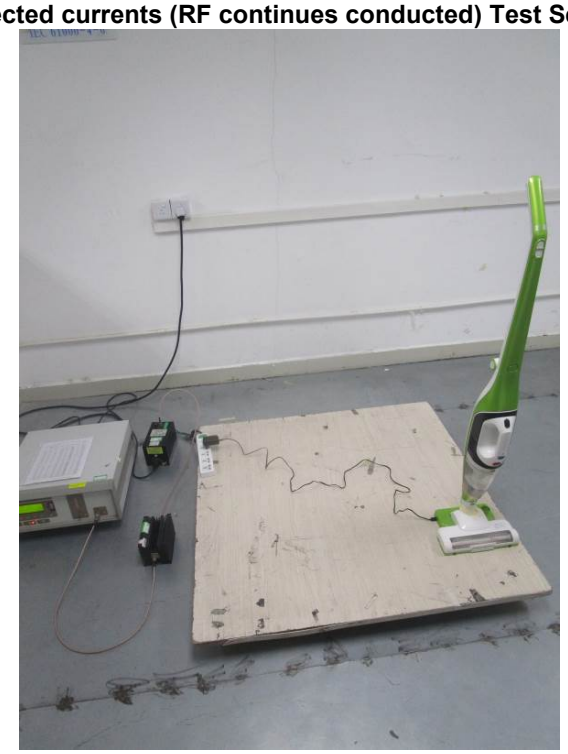
Electrostatic Discharge Test Setup

Radio Frequency Electromagnetic Fields Test Setup



Electrical Fast Transients Immunity/ Surge Immunity/ Voltage dips and Interruption Test Setup

Injected currents (RF continues conducted) Test Setup



7 EUT Photos

For model 8025
Photo 1: Overall view

For model 831NWA
Photo 2: Overall view

For model 831NWB
Photo 3: Overall view

For model 8025D
Photo 4: Overall view

Photo 5: Charging base and power supply view for model 8025

Photo 6: Chasing base view for model 8025

Photo 7: Power supply view for model 8025

Photo 8: Chasing base internal view for model 8025

Photo 9: Disassembly view for model 8025

Photo 10: Floor nozzle view for model 8025

Photo 11: Floor nozzle internal view for model 8025

Photo12: Motor of rotary brush in floor nozzle view for model 8025

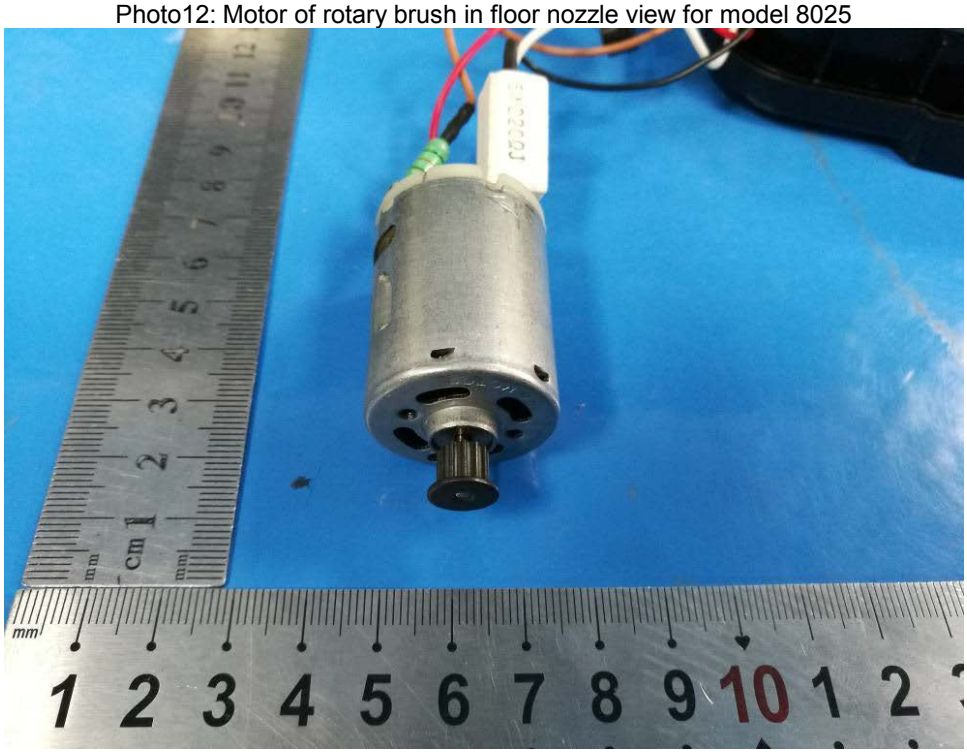


Photo 13: LED view for model 8025

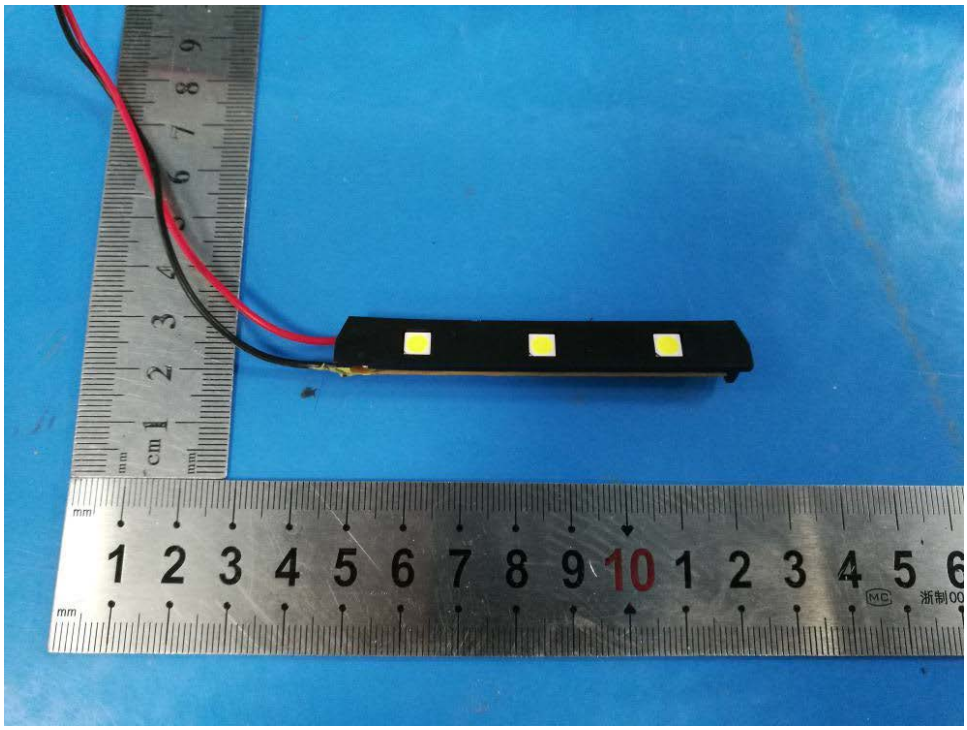


Photo 14: Internal view of extension handle for model 8025

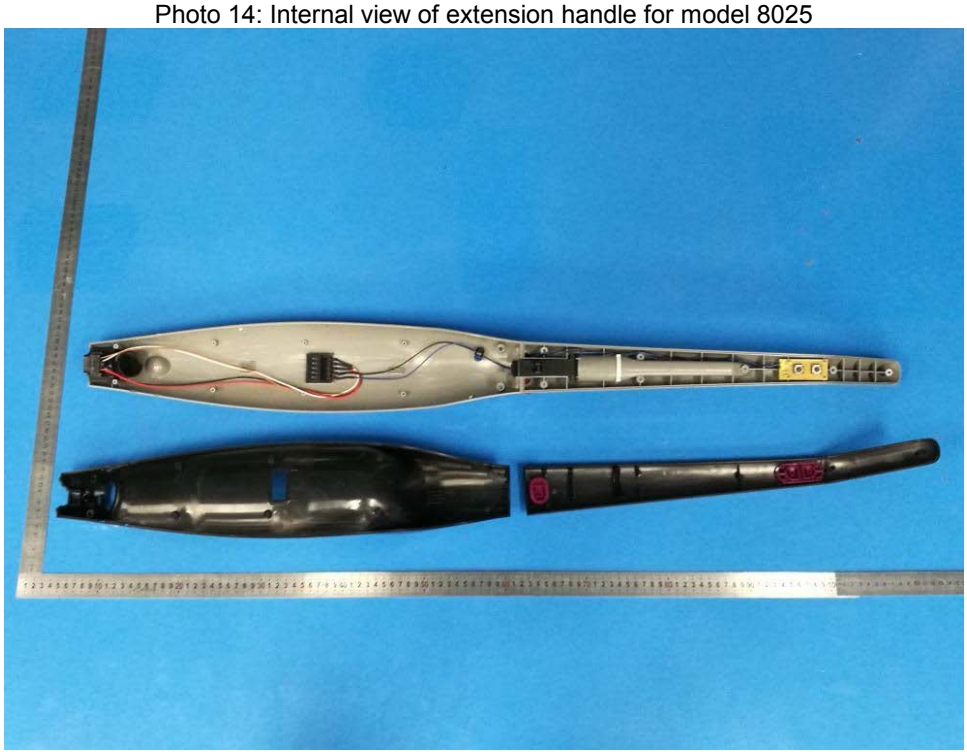


Photo 15: Internal view of extension handle for model 8025

Photo 16: Control PCBA of extension handle view for model 8025

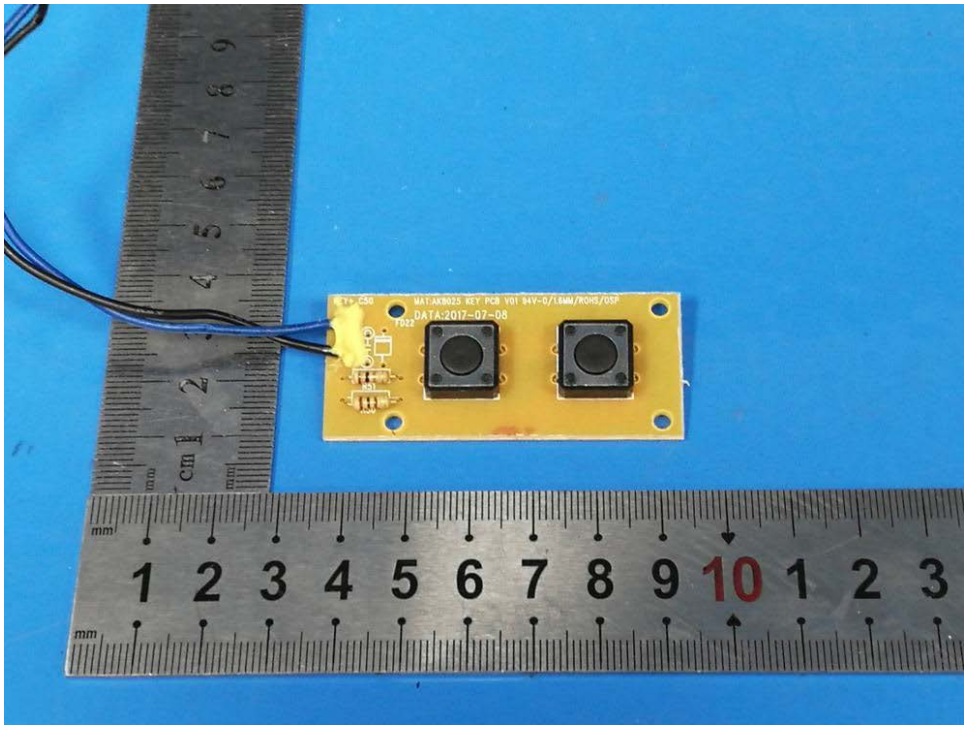


Photo 17: Control PCBA of extension handle view for model 8025

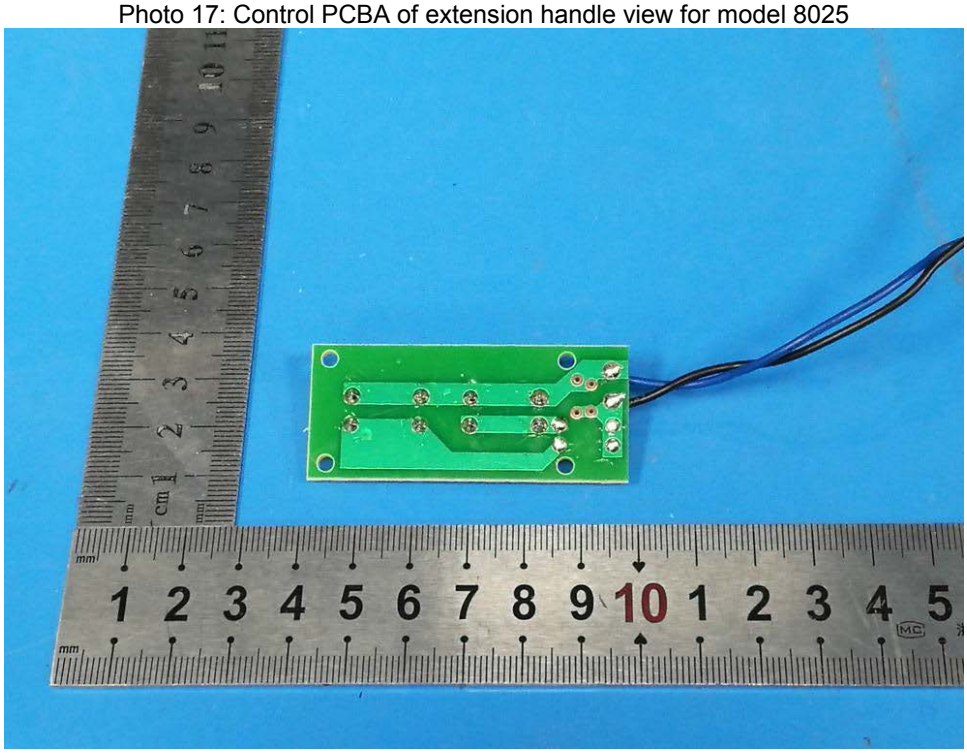


Photo 18: Top view of hand element view for model 8025

Photo 19: Disassembly view of hand element view for model 8025

Photo 20: Internal view of hand element for model 8025

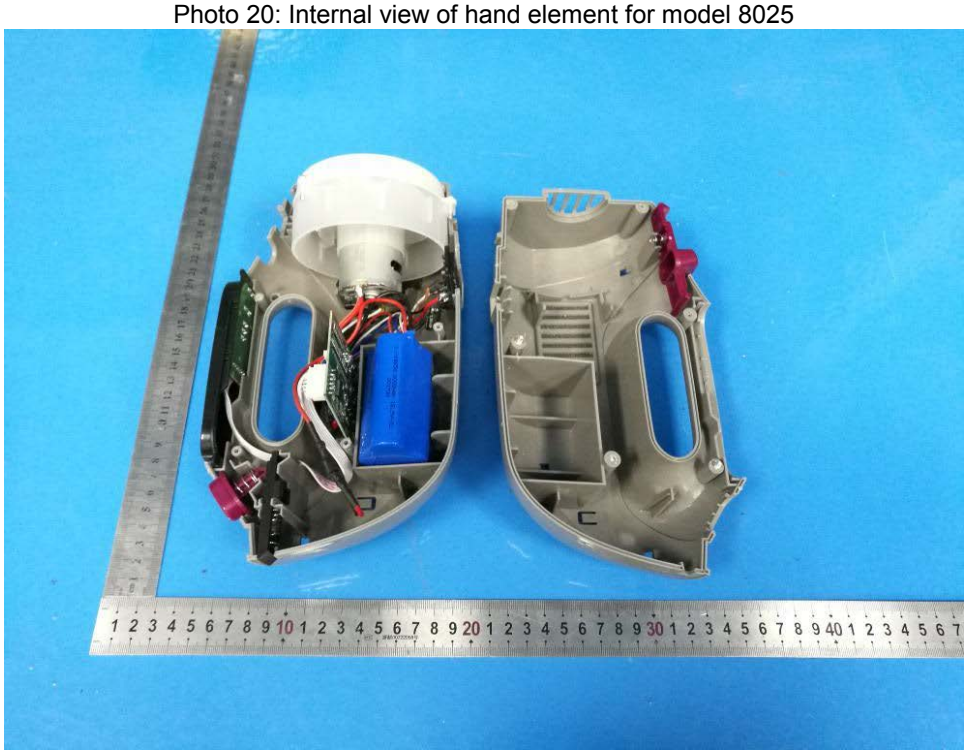


Photo 21: Battery view for model 8025

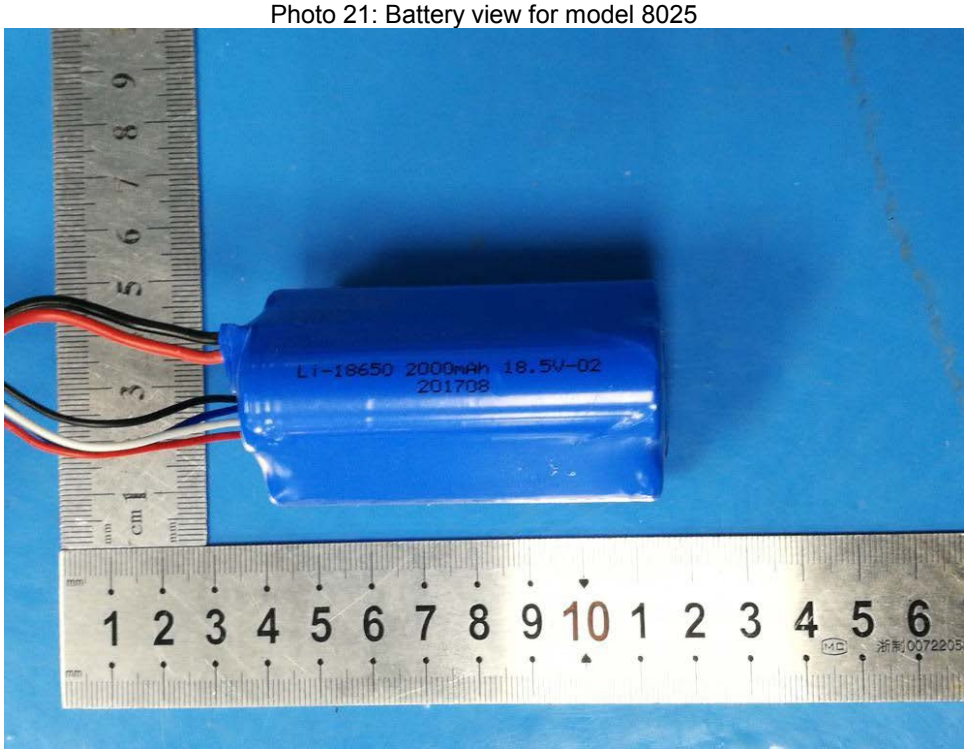


Photo 22: Control PCBA in hand element view for model 8025

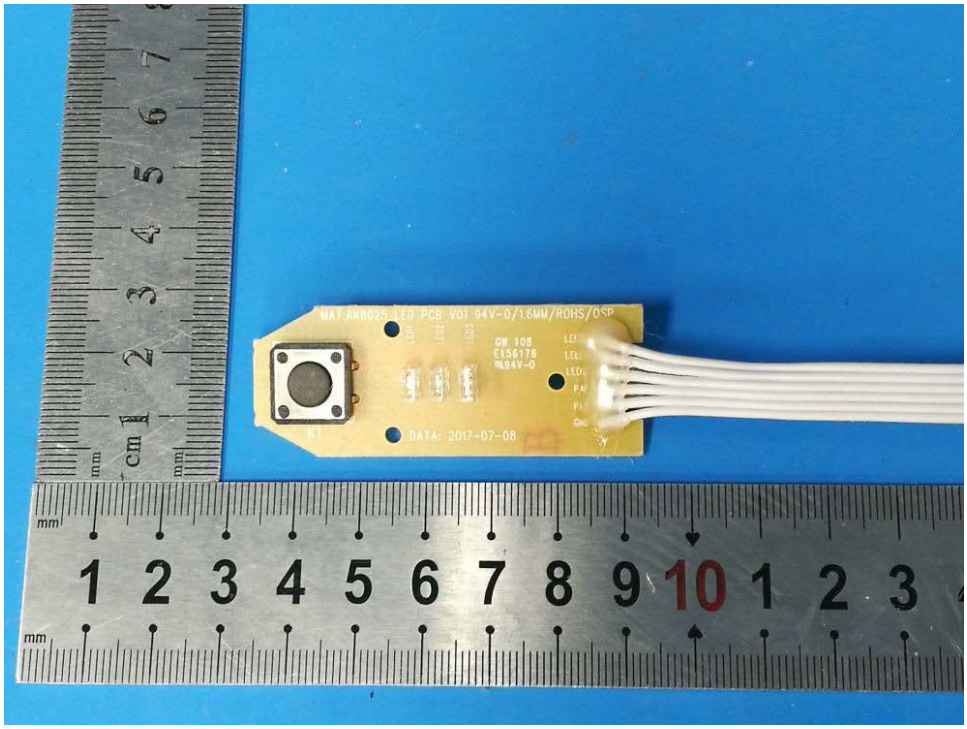


Photo 23: Control PCBA in hand element view for model 8025

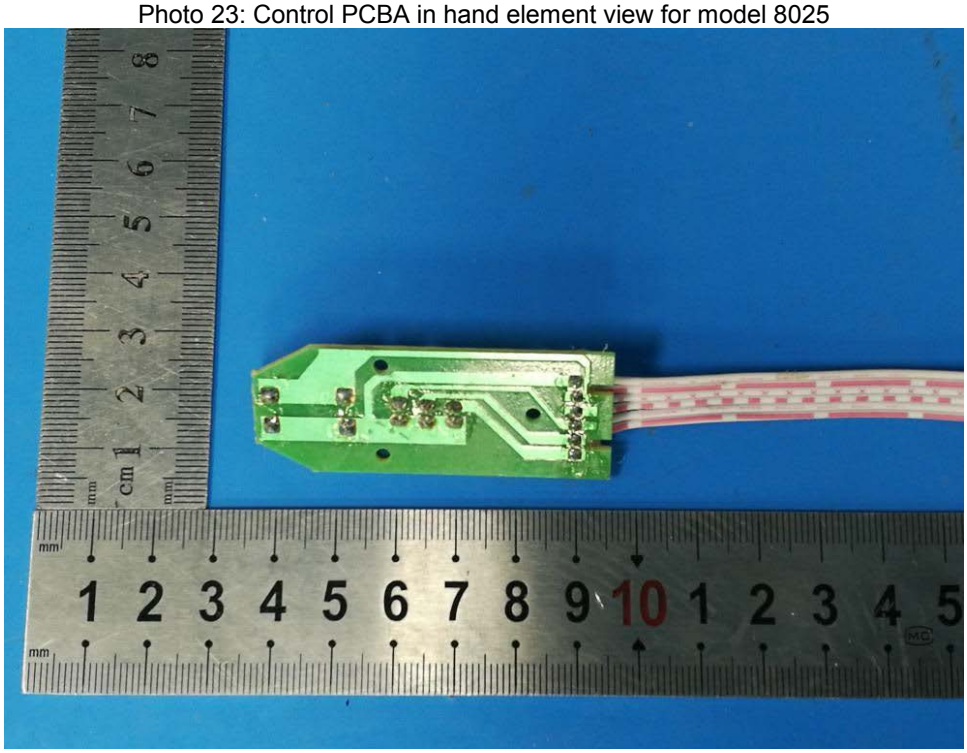


Photo 24: Main PCBA in hand element view for model 8025

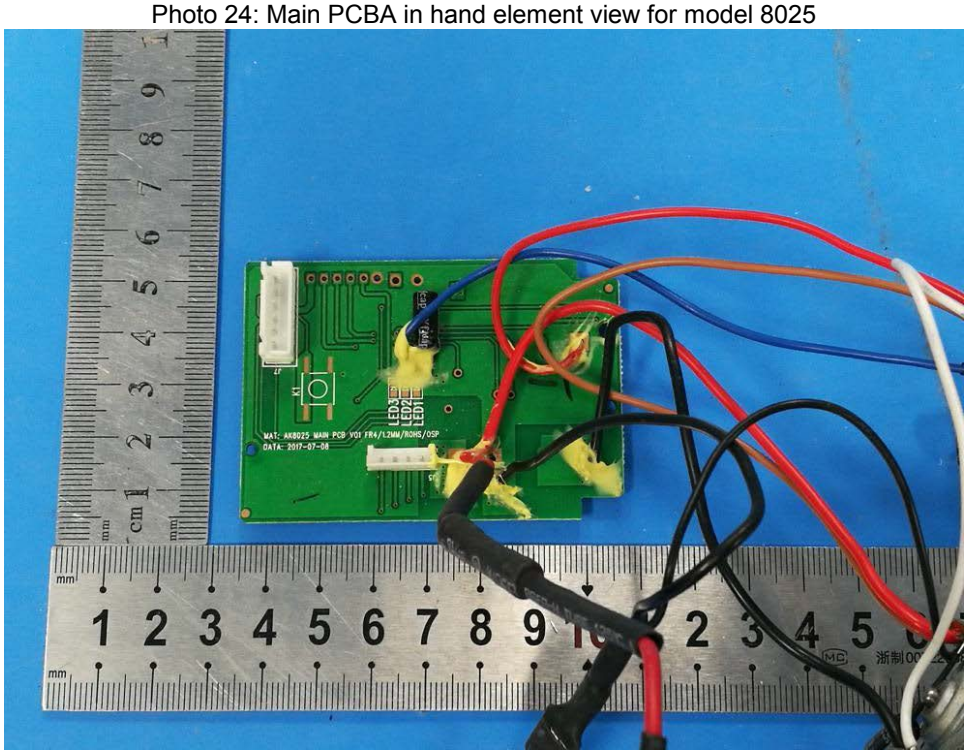


Photo 25: Main PCBA in hand element view for model 8025

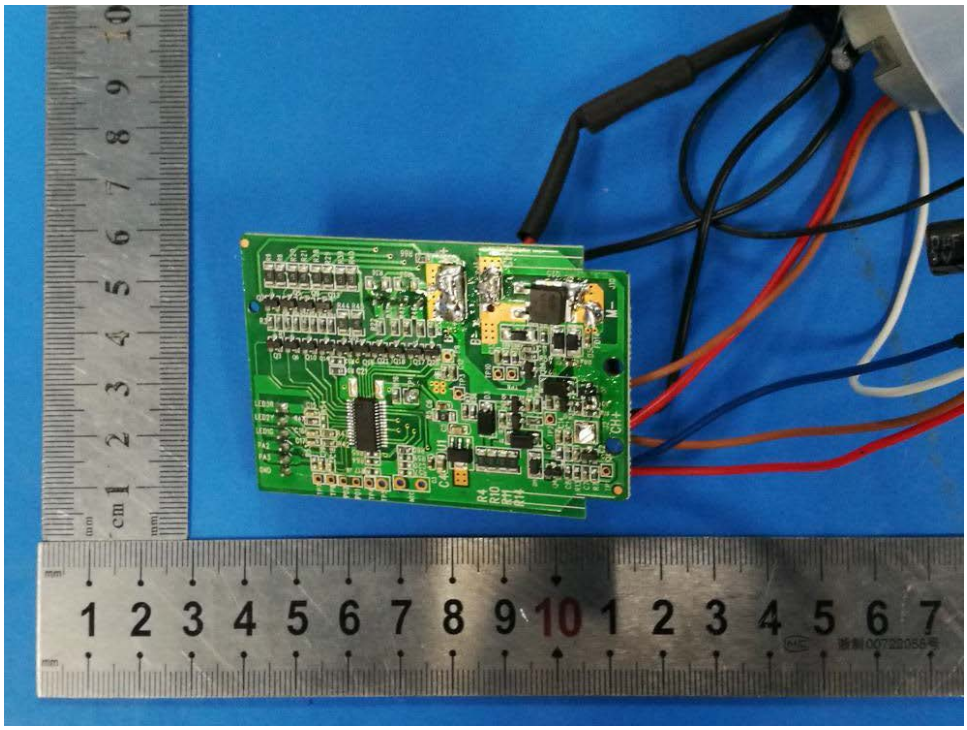


Photo 26: Vacuum motor in hand element view for model 8025

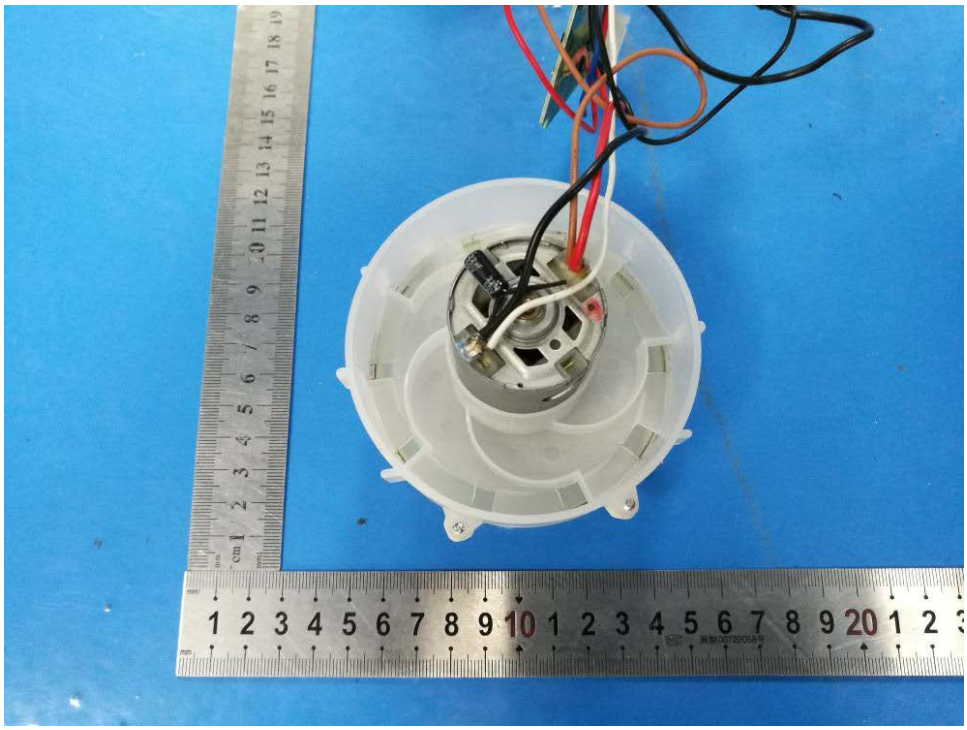


Photo 27: Vacuum motor in hand element view for model 8025

8 Amendment 1

The original test report ref. No EFSH17111413-IE-01-E01 dated 2018-03-12 was modified on 2018-03-26 to include the following changes and/or additions:

1. Model 831NW was updated to 831NWA & 831NWB.
   All models have same main part, except for different attachments.

After review, no tests need to be done.

Test report EFSH17111413-IE-01-E01-A1 replaced the original test report EFSH17111413-IE-01-E01.