FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Guangdong Joy Intelligent Technology Co., Ltd

Robot Vacuum Cleaner

Model Number: D800

Additional Model: LR1, L8050, L8150, L8250, L8650, L8750, L8350,LDS M7 PRO, LDS M8 PRO,LDS M7(MAX),LDS U6, LDS M8, LDS M8 MAX, L8450, BG900, Probot Nelson A9, Pro27, J30, J30 PRO, Probot Nelson A9 Max, Pro27+, L8850, S30, BOBOT NAVI 302, SBT-003WL, L8151, C133868, NETBOT LS27, L8+, L8180, Q6, Self - CLEAN LASER, L8, IVAC17.FCT.0230A, IVAC17.FCT.0230C, IVAC17.FCT.0240A, IVAC17.FCT.0240C, Lxxxx

(xxxx represent number or numeric alphabetic combination)

FCC ID: 2AV2K-D800

Prepared for:	Guangdong Joy Intelligent Technology Co., Ltd
	No.10, Zhangwu Street, Qiaoli, Changping Town, 523586 Dongguan,
	Guangdong, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R1912040-3
Date of Test:	Jul. 29~Oct. 10, 2020
Date of Report:	Oct. 12, 2020

TABLE OF CONTENTS

Description Page

TEST REPORT VERIFICATION 3
1. GENERAL INFORMATION 4
1.1. Description of Device (EUT) 4
1.2. Antenna Information 4
1.3. Difference between Model Numbers 5
2. SUMMARY OF TEST 7
2.1. Summary of test result 7
2.2. Test Facilities 8
2.3. Measurement uncertainty 9
2.4. Assistant equipment used for test 9
2.5. Block Diagram 9
2.6. Test Mode 10
2.7. Power Setting of Test Software 10
2.8. Channel List 11
2.9. Test Equipment List 12
3. RADIATED SPURIOUS EMISSIONS AND BAND EDGE 13
3.1. Limit 13
3.2. Test setup 14
3.3. Spectrum Analyzer Setting 15
3.4. Test Procedure 16
3.5. Test Result 17
4. AC POWER LINE CONDUCTED EMISSIONS 23
4.1. Limit 23
4.2. Test Setup 23
4.3. Spectrum Analyzer Setting 23
4.4. Test Procedure 23
4.5. Test Result 24
5. TEST SETUP PHOTO 30
6. EUT PHOTO 32

EST Technology Co., Ltd.

Applicant: **Address:**	Guangdong Joy Intelligent Technology Co., Ltd No.10, Zhangwu Street, Qiaoli, Changping Town, 523586 Dongguan, Guangdong, China
Manufacturer: **Address:**	Guangdong Joy Intelligent Technology Co., Ltd No.10, Zhangwu Street, Qiaoli, Changping Town, 523586 Dongguan, Guangdong, China
Factory: **Address:**	Guangdong joy Intelligent Technology Co., Ltd. No. 10, Zhangwu Street, Qiaoli, Changping Town, 523586 Dongguan, Guangdong, China
E.U.T:	Robot Vacuum Cleaner
Model Number:	D800
Additional Model:	Please see section 1.3 of the report
Power Supply:	DC 24V From Adapter Input AC 100V-240V 50/60Hz DC 24V From Automatic Dirt Disposal Input AC 100-130V 50/60Hz
Trade Name:	------ Serial No.: ------
Date of Receipt:	Jul. 29, 2020 Date of Test: Jul. 29~Oct. 10, 2020
Test Specification:	FCC Part 15 Subpart C (15.247) ANSI C63.10:2013 FCC KDB 558074 D01 15.247 Meas Guidance v05r02 FCC KDB 662911 D01 Multiple Transmitter Output v02r01
Test Result:	The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd. **Date:** Oct. 12, 2020

Prepared by:	Reviewed by:	Approved by:
Ring Yang/ Assistant	Seven Wang/ Engineer	Iceman Hu / Manager

Other Aspects:

This report base on the previous report with report number: ESTE-R1912040-2, power supply, motor and battery are add in this report. so just re-tested spurious emissions (30-1000MHz) and Conducted Emissions, other test item needn't re-tested.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	:	Robot Vacuum Cleaner
Model Number	:	D800
Operation frequency	:	2412MHz~2462MHz 2422MHz~2452MHz
Number of channel	:	IEEE 802.11b: 11 Channels IEEE 802.11g: 11 Channels IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Max Output Power (PEAK)	:	IEEE 802.11b: 19.25dBm IEEE 802.11g: 18.65dBm IEEE 802.11n HT20: 17.97dBm IEEE 802.11n HT40: 17.51dBm
Modulation Type	:	IEEE 802.11b mode: DSSS(CCK,QPSK, BPSK) IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n mode: OFDM (BPSK/QPSK/16QAM/64QAM)
Sample Type	:	Prototype production

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

1.2. Antenna Information

Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	2

1.3. Difference between Model Numbers

Model	D800, LR1	L8050 Probot Nelson A9, Pro27, J30, J30 PRO, BOBOT NAVI 302	L8150 Probot Nelson A9 Max, Pro27+, L8850, S30, SBT-003 WL, L8151, C133868 ,NETBOT LS27, Self - CLEAN LASER, L8,L8+	L8250, IVAC17. FCT.023 0A, IVAC17. FCT.023 0C, IVAC17. FCT.024 0A, IVAC17. FCT.024 0C	L8650	L8750 BG900	L8350, LDS M7 PRO, LDS M8 PRO, LDS M7(MAX), LDS U6, LDS M8, LDS M8 MAX	L8450
Appearance								
Appearance (back)								
Switch button (key)								
The main board model	DC701	DC701	DC701	DC701	DC701	DC701	DC701	DC701
Algorithm board model WIFI	AC701	AC701	AC701	AC701	AC701	AC701	AC701	AC701
Whether to match collection dust treasure	optional	without	optional	optional	without	without	optional	without
water tank	The external tank	Electric control tank	The external tank	The external tank	Electric control tank	Electric control tank	The external tank	Electric control tank
Appearance of Remote Control	without	without	without	without	without	without	band	band

Model	L8180,Q6
Appearance	
Appearance (back)	
Switch button (key)	
The main board model	DC701
Algorithm board model WIFI	AC701
Whether to match collection dust treasure	Optional
water tank	The external tank
Appearance of Remote Control	without

2. SUMMARY OF TEST

2.1. Summary of test result

Report Section	Description of Test Item	FCC Standard Section	Results
3	6dB Bandwidth	15.247(a)(2)	N/A
4	Maximum Peak Output Power	15.247(b)(3)	N/A
5	Power Spectral Density	15.247(e)	N/A
6	Conducted Band Edge	15.247(d)	N/A
7	Conducted Spurious Emissions	15.247(d)	N/A
8	Radiated Spurious Emissions and Band Edge	15.205 15.209 15.247(d)	PASS
9	AC Power Line Conducted Emissions	15.207	PASS
10	Antenna Requirement	15.203	N/A

Note:

(1) “N/A” denotes test is not applicable in this test report

2.2. Test Facilities

EMC Lab	:	Certificated by CNAS, CHINA Registration No.: L5288 This Certificate is valid until: November 12, 2023 Certificated by FCC, USA Designation Number: CN1215 This Certificate is valid until: January 31, 2022 Certificated by A2LA, USA Registration No.: 4366.01 This Certificate is valid until: January 31, 2022 Certificated by Industry Canada CAB identifier No.: CN0035 This Certificate is valid until: January 31, 2022 Certificated by VCCI, Japan Registration No.:C-14103; T-20073; R-13663; R-20103; G-20097 Date of registration: Apr. 20, 2020 This Certificate is valid until: Apr. 19, 2023 Certificated by TUV Rheinland, Germany Registration No.: UA 50413872 0001 Date of registration: July 31, 2018 Certificated by Intertek Registration No.: 2011-RTL-L2-64 Date of registration: November 08, 2018
Name of Firm	:	EST Technology Co., Ltd.
Site Location	:	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	±3.48dB
Uncertainty for spurious emissions test (30MHz-1GHz)	±4.60 dB(Polarize: H)
	±4.68 dB(Polarize: V)
Uncertainty for spurious emissions test (1GHz to 18GHz)	±4.96dB
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	0.20dB
Uncertainty for Power density test	0.26dB

Note：This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

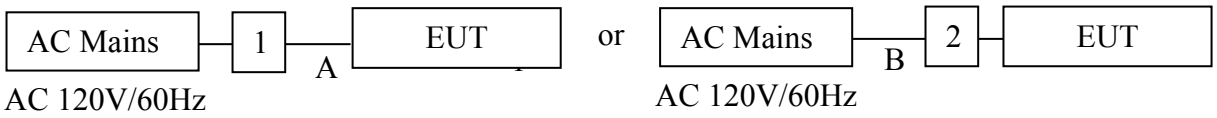
2.4. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
1	Adapter	-	KA3601A-2401200US	-	-
2	Automatic Dirt Disposal		MS1	-	-

Item	Shielded Type	Ferrite Core	Length	Note
A	NO	NO	1.2m	DC Cable
B	NO	NO	1.2m	AC Cable

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into 2.4G WIFI test mode by software before test.



(EUT: Robot Vacuum Cleaner)

2.6. Test Mode

The test mode was selected for the final test as listed below.

Test Item	Mode	Date Rate	Test Channel
Radiated Spurious Emissions(Below 1GHz)	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS0	Low/Middle/High
	IEEE 802.11n HT40	MCS0	Low/Middle/High
AC Power Line Conducted Emissions	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS0	Low/Middle/High
	IEEE 802.11n HT40	MCS0	Low/Middle/High

Note:

1. In radiated measurement,the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane.**

2.7. Power Setting of Test Software

Software Name	RFTestTool		
Frequency(MHz)	2412	2437	2462
IEEE 802.11b Setting	40	40	40
IEEE 802.11g Setting	40	40	40
IEEE 802.11n HT20 Setting	40	40	40
Frequency(MHz)	2422	2437	2452
IEEE 802.11n HT40 Setting	40	40	40

2.8. Channel List

IEEE 802.11b/802.11g/802.11n HT20					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462
2	2417	7	2442		
3	2422	8	2447		
4	2427	9	2452		
5	2432	10	2457		
IEEE 802.11n HT40					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	6	2437	9	2452
4	2427	7	2442		
5	2432	8	2447		

2.9. Test Equipment List

For conducted emission test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	EST-E001	LISAI	June 13,20	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E002	LISAI	June 13,20	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 13,20	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

For radiated emission test(9kHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 13,20	1 Year
Active Loop Antenna	SCHWAREB ECK	FMZB 1519B	EST-E054	LISAI	June 13,20	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	N/A	EST-001	N/A	N/A	N/A	N/A

For radiated emissions test (30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 13,20	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 13,20	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
30-1000MHz Cable	N/A	EST-002	N/A	N/A	N/A	N/A

3. RADIATED SPURIOUS EMISSIONS AND BAND EDGE

3.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

15.209 Limit

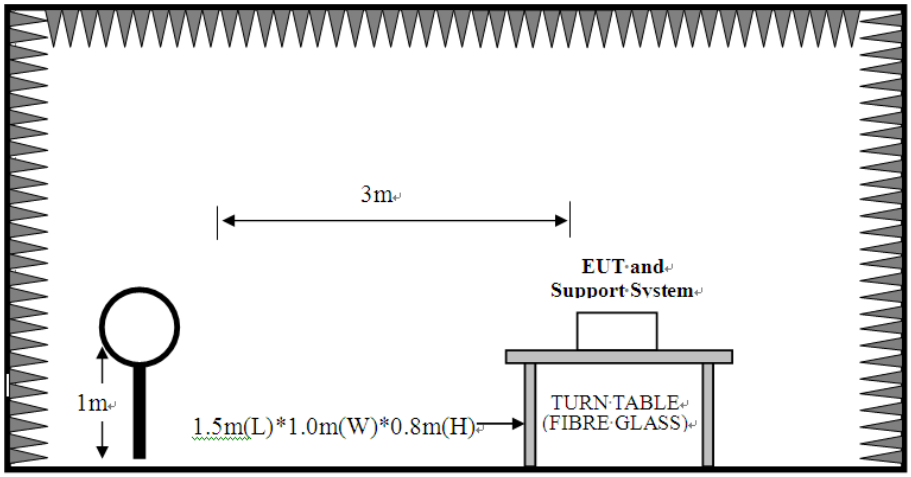
Frequency (MHz)	Field Strength(μV/m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

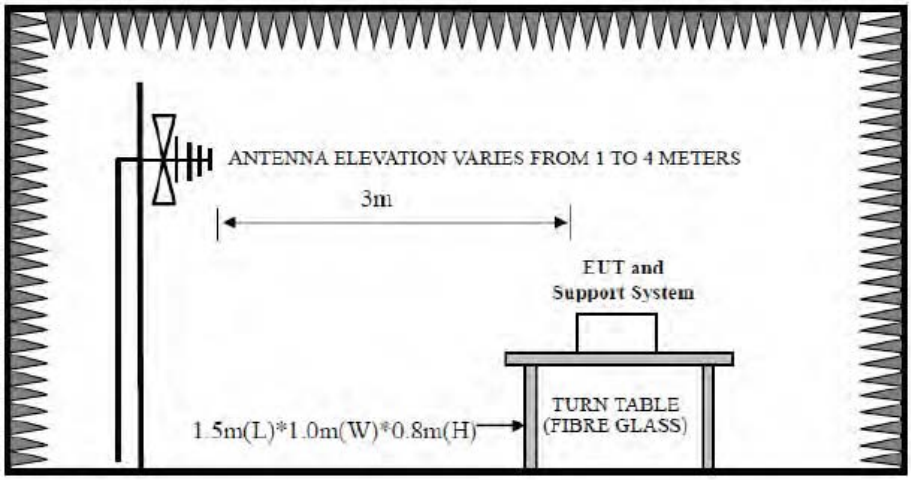
(1) Emission level dBμV = 20 log Emission level μV/m.
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument,antenna and the closest point of any part of the device or system.

3.2. Test setup

9kHz~30MHz



30~1000MHz



3.3. Spectrum Analyzer Setting

For 9KHz-150KHz

Spectrum Parameters	Setting
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

For 150KHz-30MHz

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For 30MHz-1GHz

Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1GHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

Note :

1. T is the on-time time of the duty cycle,when EUT transmit continuously with maximum output power,unit is seconds. reference section 2.8 for the on-time time.

3.4. Test Procedure

a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
c. Set the EUT transmit continuously with maximum output power.
d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
f. Spectrum analyzer setting parameters in accordance with section 8.3.
g. Repeat above procedures until all channels were measured.
h. Record the results in the test report.

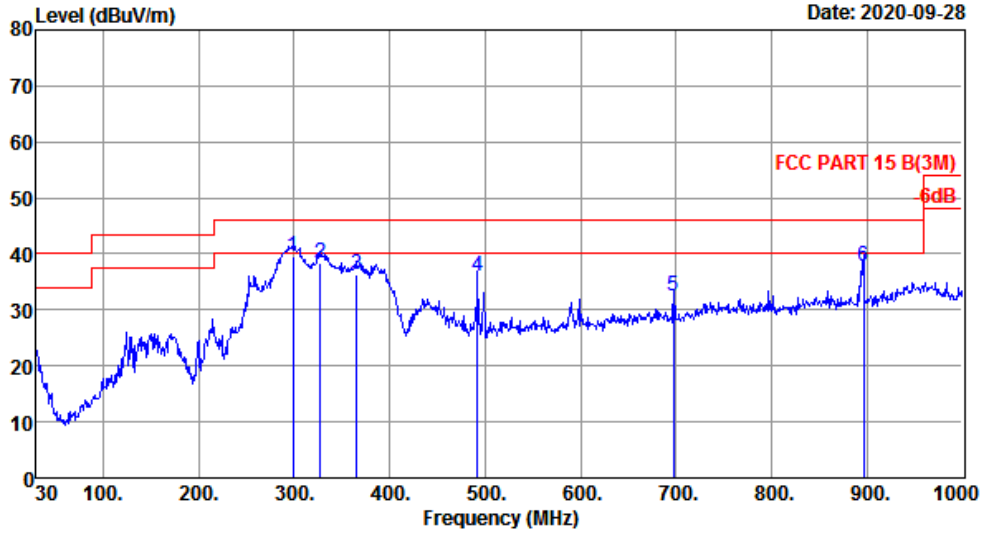
3.5. Test Result

Radiated Emissions Below 1GHz

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 3 File: \\Emc-966-2\test data\2020\RF\L\joy Intelligent.EM6 (8)



Site no. : 2# 966 chamber Data no. : 3
Dis. / Ant. : 3m 47018 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:26.6';Humi:52%;Press:101.52kPa
Engineer : Frank
EUT : Robot vacuum cleaner
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : D800
Test Mode : TX Mode
KA3601A-2401200US+CMICR18650F8M7-4S2P+
CC1

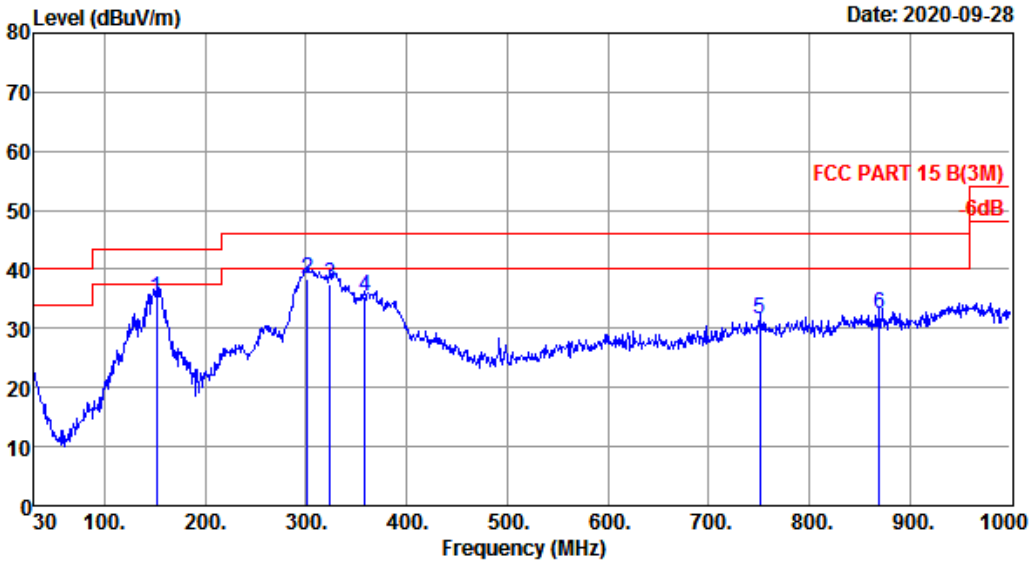
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	298.69	12.91	1.61	25.00	39.52	46.00	6.48	QP
2	327.79	13.99	1.69	22.80	38.48	46.00	7.52	QP
3	365.62	14.76	1.89	19.66	36.31	46.00	9.69	QP
4	491.72	17.77	2.27	15.94	35.98	46.00	10.02	QP
5	697.36	20.61	2.73	9.24	32.58	46.00	13.42	QP
6	896.21	23.04	3.30	11.37	37.71	46.00	8.29	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 4 File: \\Emc-966-2\test data\2020\RF\L\joy Intellgent.EM6 (8)



Site no. : 2# 966 chamber Data no. : 4
Dis. / Ant. : 3m 47018 Ant. pol. : VERTICAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:26.6';Humi:52%;Press:101.52kPa
Engineer : Frank
EUT : Robot vacuum cleaner
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : D800
Test Mode : TX Mode
KA3601A-2401200US+CMICR18650F8M7-4S2P+
CC1

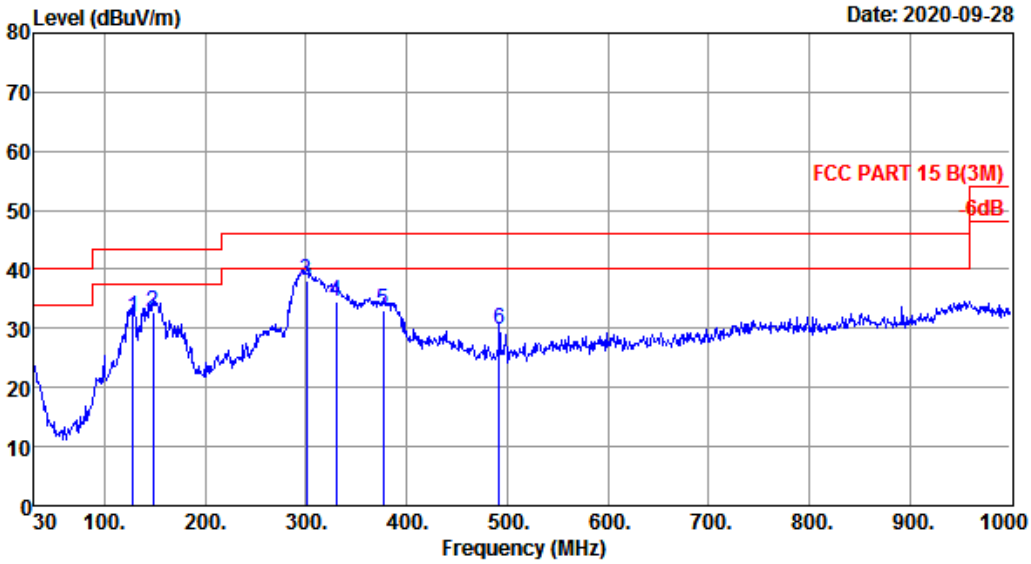
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	151.25	10.71	0.99	23.41	35.11	43.50	8.39	QP
2	301.60	12.99	1.62	23.85	38.46	46.00	7.54	QP
3	323.91	13.85	1.68	22.10	37.63	46.00	8.37	QP
4	358.83	14.49	1.87	18.94	35.30	46.00	10.70	QP
5	750.71	22.24	3.12	6.12	31.48	46.00	14.52	QP
6	870.02	23.11	3.22	6.09	32.42	46.00	13.58	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 5 File: \\Emc-966-2\test data\2020\RF\L\joy Intellgent.EM6 (8)



Site no. : 2# 966 chamber Data no. : 5
Dis. / Ant. : 3m 47018 Ant. pol. : VERTICAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:26.6';Humi:52%;Press:101.52kPa
Engineer : Frank
EUT : Robot vacuum cleaner
Power : AC 120V/60Hz
M/N : D800
Test Mode : TX Mode
CMICR18650F8M7-4S2P+MS1

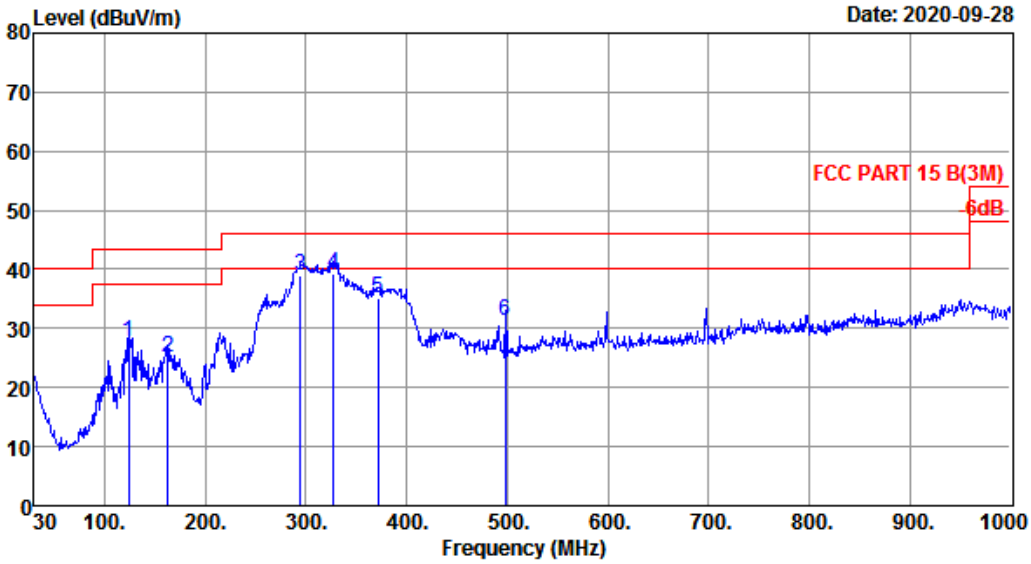
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	127.97	11.52	0.90	19.54	31.96	43.50	11.54	QP
2	148.34	10.86	1.00	20.90	32.76	43.50	10.74	QP
3	300.63	12.96	1.62	23.43	38.01	46.00	7.99	QP
4	329.73	14.06	1.70	18.92	34.68	46.00	11.32	QP
5	377.26	15.01	1.91	16.21	33.13	46.00	12.87	QP
6	491.72	17.77	2.27	9.92	29.96	46.00	16.04	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 6 File: \\Emc-966-2\test data\2020\RF\L\joy Intellgent.EM6 (8)



Site no. : 2# 966 chamber Data no. : 6
Dis. / Ant. : 3m 47018 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:26.6';Humi:52%;Press:101.52kPa
Engineer : Frank
EUT : Robot vacuum cleaner
Power : AC 120V/60Hz
M/N : D800
Test Mode : TX Mode
CMICR18650F8M7-4S2P+MS1

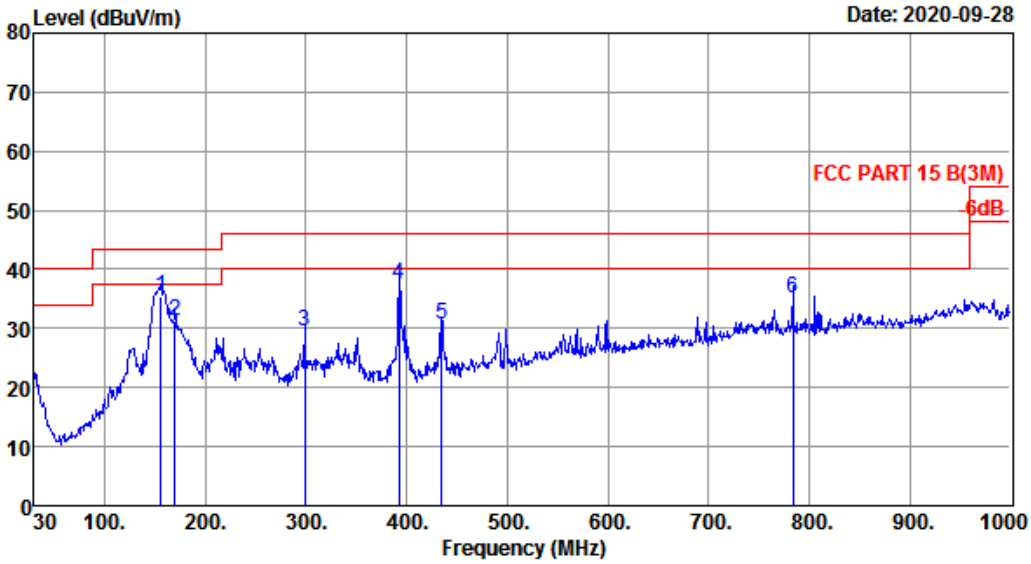
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	124.09	11.55	0.88	15.36	27.79	43.50	15.71	QP
2	162.89	9.77	1.05	14.27	25.09	43.50	18.41	QP
3	294.81	12.85	1.62	24.56	39.03	46.00	6.97	QP
4	327.79	13.99	1.69	23.72	39.40	46.00	6.60	QP
5	371.44	14.98	1.87	18.17	35.02	46.00	10.98	QP
6	498.51	17.82	2.28	11.07	31.17	46.00	14.83	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 7 File: \\Emc-966-2\test data\2020\RF\L\joy Intellgent.EM6 (8)



Site no. : 2# 966 chamber Data no. : 7
Dis. / Ant. : 3m 47018 Ant. pol. : VERTICAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:26.6';Humi:52%;Press:101.52kPa
Engineer : Frank
EUT : Robot vacuum cleaner
Power : DC 14.4V From Battery
M/N : D800
Test Mode : TX Mode
CMICR18650F8M7-4S2P+PR-500EV-11630

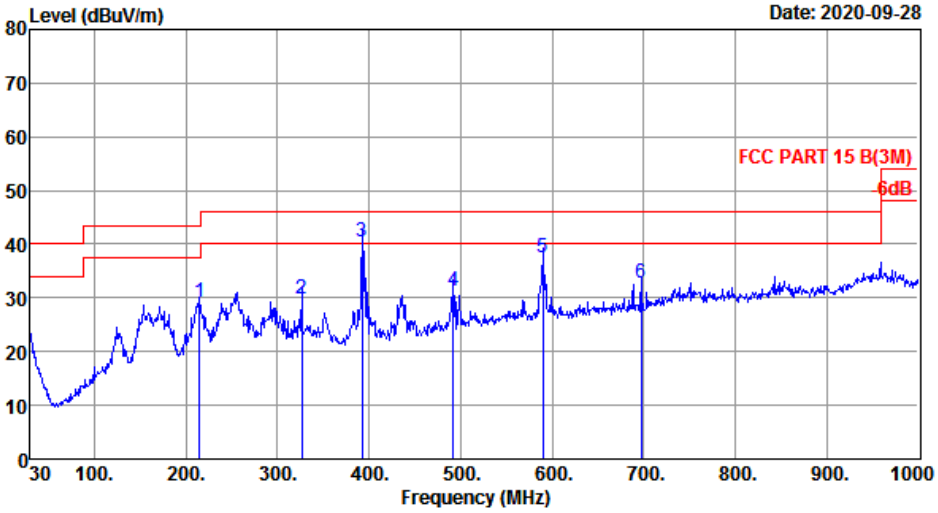
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	156.10	10.43	1.04	23.94	35.41	43.50	8.09	QP
2	169.68	9.08	1.05	21.10	31.23	43.50	12.27	QP
3	298.69	12.91	1.61	14.99	29.51	46.00	16.49	QP
4	392.78	15.74	1.82	19.83	37.39	46.00	8.61	QP
5	434.49	16.53	2.01	12.04	30.58	46.00	15.42	QP
6	783.69	22.39	2.92	9.77	35.08	46.00	10.92	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 8 File: \\Emc-966-2\test data\2020\RF\L\joy Intellgent.EM6 (8)



Site no. : 2# 966 chamber Data no. : 8
Dis. / Ant. : 3m 47018 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:26.6';Humi:52%;Press:101.52kPa
Engineer : Frank
EUT : Robot vacuum cleaner
Power : DC 14.4V From Battery
M/N : D800
Test Mode : TX Mode
CMICR18650F8M7-4S2P+PR-500EV-11630

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	215.27	8.80	1.22	19.22	29.24	43.50	14.26	QP
2	326.82	13.95	1.69	14.20	29.84	46.00	16.16	QP
3	392.78	15.74	1.82	22.92	40.48	46.00	5.52	QP
4	491.72	17.77	2.27	11.39	31.43	46.00	14.57	QP
5	589.69	19.79	2.52	15.09	37.40	46.00	8.60	QP
6	697.36	20.61	2.73	9.45	32.79	46.00	13.21	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

4. AC POWER LINE CONDUCTED EMISSIONS

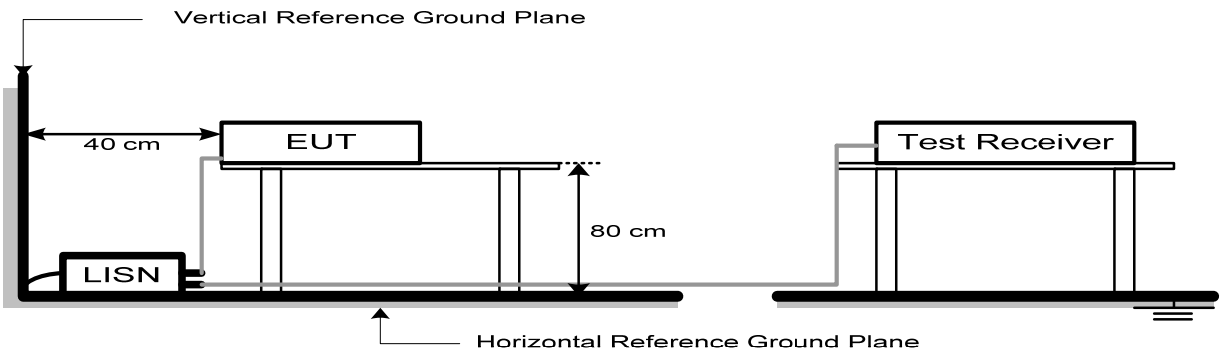
4.1. Limit

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

Note:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transiton frequencies.

4.2. Test Setup



4.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP/AVG
Trace Mode	Max Hold

4.4. Test Procedure

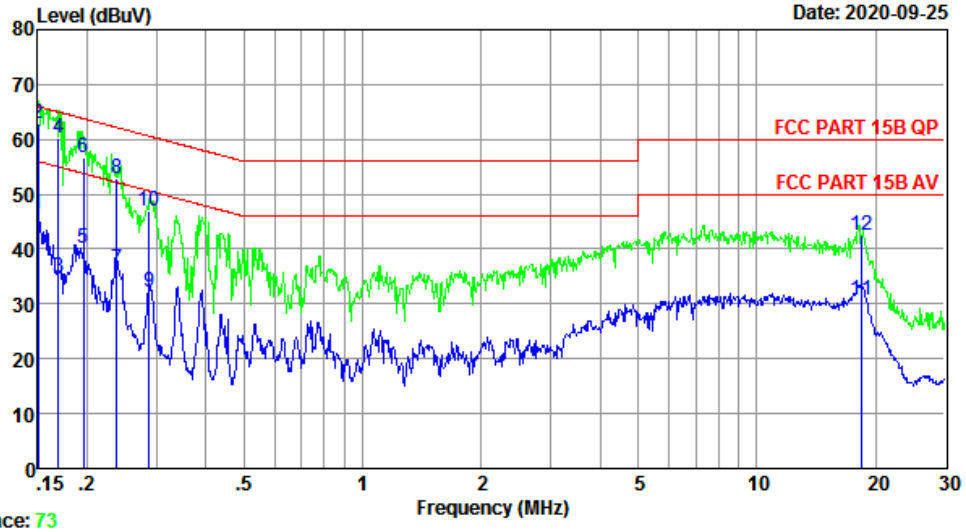
a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
b. The EUT Power connected to the power mains through a line impedance stabilization network.
c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
d. Set the EUT transmit continuously with maximum output power.
e. Spectrum analyzer setting parameters in accordance with section 9.3.
f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.
g. Record the results in the test report.

4.5. Test Result

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 74 File: \\Emc-ce-1\Test data\2020\RF\L\JOY Intelligent.EM6 (88)



Site no : 844 Shield Room Data no. : 74
Env. / Ins. : Temp:25.5'C Humi:52% Press:101.50kPa LINE Phase : LINE
Limit : FCC PART 15B QP
Engineer : ZSX
EUT : Robot vacuum cleaner
Power : DC 24V From Adapter Input AC 240V/60Hz
M/N : D800
Test Mode : TX Mode
KA3601A-2401200US+CMICR18650F8M7-4S2P+
CC1

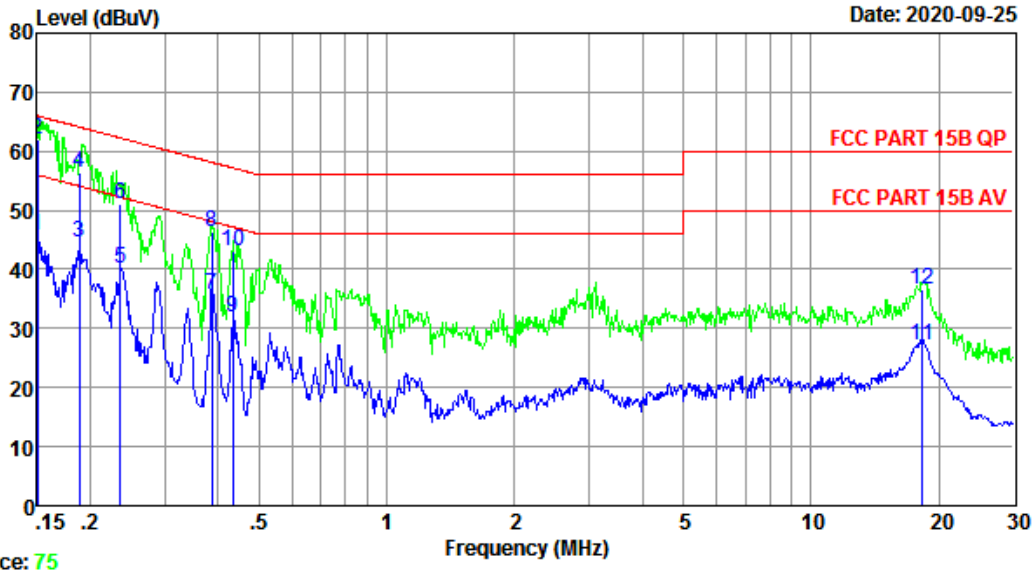
	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1500	9.79	9.69	26.88	46.36	56.00	9.64	Average
2	0.1500	9.79	9.69	43.32	62.80	66.00	3.20	QP
3	0.1690	9.79	9.69	15.40	34.88	55.01	20.13	Average
4	0.1690	9.79	9.69	40.72	60.20	65.01	4.81	QP
5	0.1955	9.80	9.77	20.72	40.29	53.80	13.51	Average
6	0.1955	9.80	9.77	37.26	56.83	63.80	6.97	QP
7	0.2378	9.70	9.92	16.78	36.40	52.17	15.77	Average
8	0.2378	9.70	9.92	33.24	52.86	62.17	9.31	QP
9	0.2878	9.65	9.92	12.50	32.07	50.59	18.52	Average
10	0.2878	9.65	9.92	27.49	47.06	60.59	13.53	QP
11	18.4258	9.87	10.14	10.58	30.59	50.00	19.41	Average
12	18.4258	9.87	10.14	22.45	42.46	60.00	17.54	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin=Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 76 File: \\Emc-ce-1\Test data\2020\RF\L\JOY Intelligent.EM6 (88)



Trace: 75

Site no : 844 Shield Room Data no. : 76
Env. / Ins. : Temp:25.5'C Humi:52% Press:101.50kPa LINE Phase : NEUTRAL
Limit : FCC PART 15B QP
Engineer : ZSX
EUT : Robot vacuum cleaner
Power : DC 24V From Adapter Input AC 240V/60Hz
M/N : D800
Test Mode : TX Mode
KA3601A-2401200US+CMICR18650F8M7-4S2P+
CC1

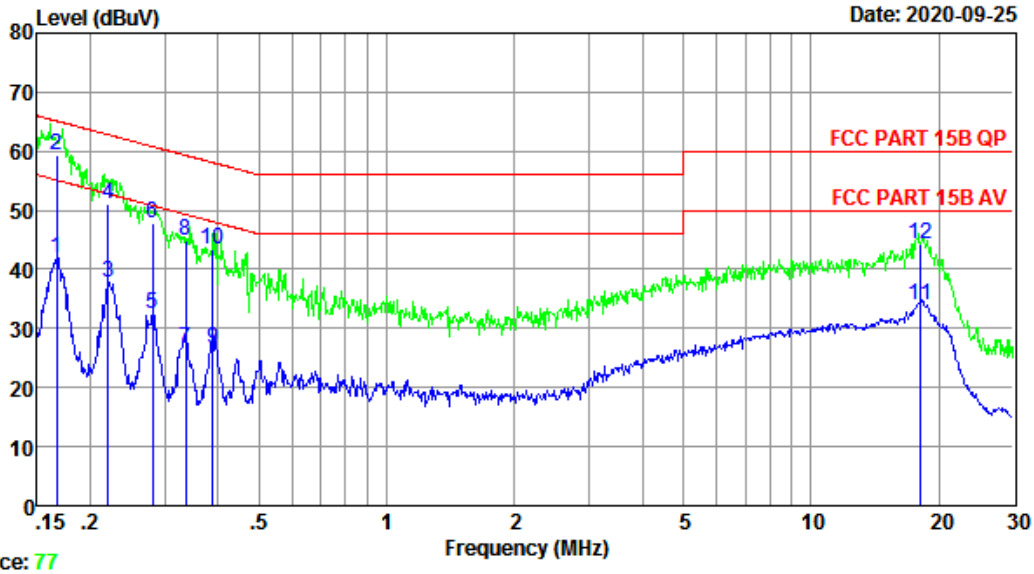
	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1500	9.62	9.69	26.30	45.61	56.00	10.39	Average
2	0.1500	9.62	9.69	42.65	61.96	66.00	4.04	QP
3	0.1884	9.69	9.77	25.08	44.54	54.11	9.57	Average
4	0.1884	9.69	9.77	36.97	56.43	64.11	7.68	QP
5	0.2353	9.71	9.92	20.45	40.08	52.26	12.18	Average
6	0.2353	9.71	9.92	31.57	51.20	62.26	11.06	QP
7	0.3872	9.76	9.92	15.96	35.64	48.12	12.48	Average
8	0.3872	9.76	9.92	26.64	46.32	58.12	11.80	QP
9	0.4328	9.77	9.92	12.16	31.85	47.20	15.35	Average
10	0.4328	9.77	9.92	23.28	42.97	57.20	14.23	QP
11	18.2316	9.69	10.15	7.39	27.23	50.00	22.77	Average
12	18.2316	9.69	10.15	16.67	36.51	60.00	23.49	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin=Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 78 File: \\Emc-ce-1\Test data\2020\RF\L\JOY Intelligent.EM6 (88)



Site no : 844 Shield Room Data no. : 78
Env. / Ins. : Temp:25.5'C Humi:52% Press:101.50kPa LINE Phase : LINE
Limit : FCC PART 15B QP
Engineer : ZSX
EUT : Robot vacuum cleaner
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : D800
Test Mode : TX Mode
KA3601A-2401200US+CMICR18650F8M7-4S2P+
CC1

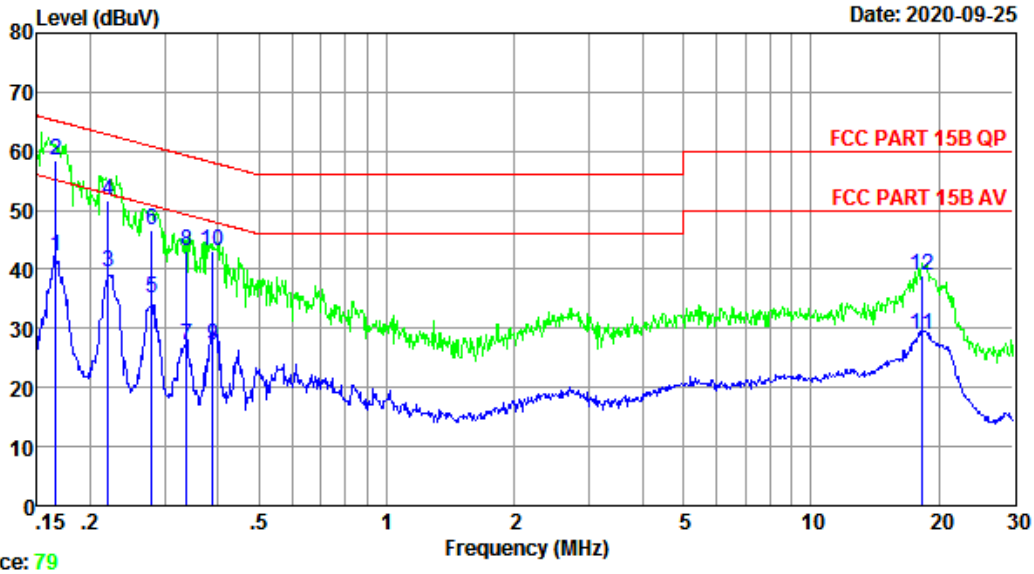
	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1668	9.79	9.69	22.57	42.05	55.12	13.07	Average
2	0.1668	9.79	9.69	39.97	59.45	65.12	5.67	QP
3	0.2208	9.75	9.84	18.11	37.70	52.79	15.09	Average
4	0.2208	9.75	9.84	31.59	51.18	62.79	11.61	QP
5	0.2803	9.65	9.92	12.88	32.45	50.81	18.36	Average
6	0.2803	9.65	9.92	28.27	47.84	60.81	12.97	QP
7	0.3356	9.68	9.92	7.10	26.70	49.31	22.61	Average
8	0.3356	9.68	9.92	25.28	44.88	59.31	14.43	QP
9	0.3893	9.84	9.92	6.92	26.68	48.08	21.40	Average
10	0.3893	9.84	9.92	23.72	43.48	58.08	14.60	QP
11	18.1352	9.87	10.14	14.04	34.05	50.00	15.95	Average
12	18.1352	9.87	10.14	24.34	44.35	60.00	15.65	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin=Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 80 File: \\Emc-ce-1\Test data\2020\RF\L\JOY Intelligent.EM6 (88)



Trace: 79

Site no : 844 Shield Room Data no. : 80
Env. / Ins. : Temp:25.5'C Humi:52% Press:101.50kPa LINE Phase : NEUTRAL
Limit : FCC PART 15B QP
Engineer : ZSX
EUT : Robot vacuum cleaner
Power : DC 24V From Adapter Input AC 120V/60Hz
M/N : D800
Test Mode : TX Mode
KA3601A-2401200US+CMICR18650F8M7-4S2P+
CC1

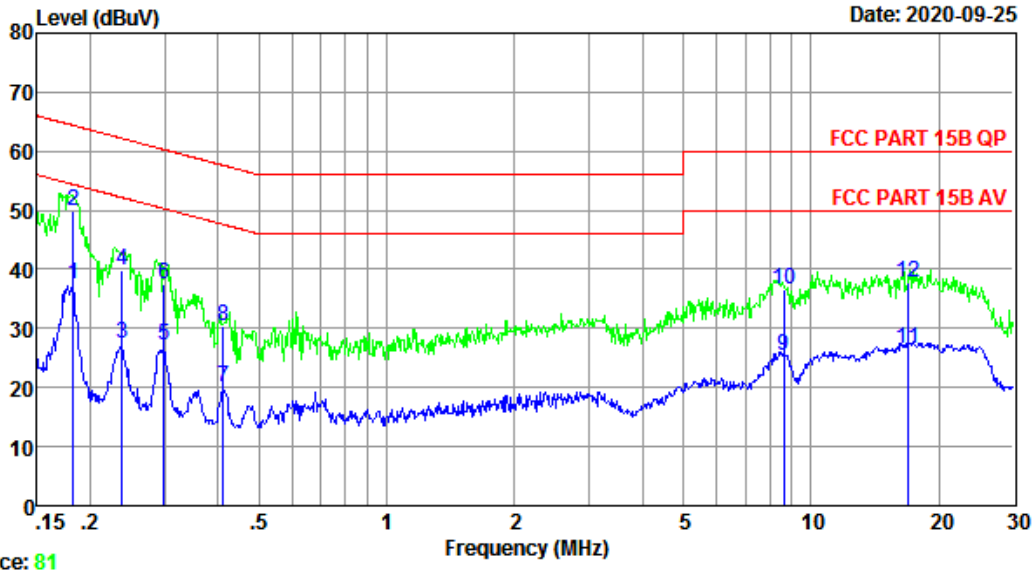
	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1659	9.62	9.69	22.87	42.18	55.16	12.98	Average
2	0.1659	9.62	9.69	39.26	58.57	65.16	6.59	QP
3	0.2208	9.70	9.84	19.90	39.44	52.79	13.35	Average
4	0.2208	9.70	9.84	31.97	51.51	62.79	11.28	QP
5	0.2788	9.72	9.92	15.43	35.07	50.85	15.78	Average
6	0.2788	9.72	9.92	26.97	46.61	60.85	14.24	QP
7	0.3374	9.74	9.92	7.51	27.17	49.27	22.10	Average
8	0.3374	9.74	9.92	23.37	43.03	59.27	16.24	QP
9	0.3893	9.76	9.92	7.58	27.26	48.08	20.82	Average
10	0.3893	9.76	9.92	23.29	42.97	58.08	15.11	QP
11	18.3284	9.69	10.15	9.19	29.03	50.00	20.97	Average
12	18.3284	9.69	10.15	19.21	39.05	60.00	20.95	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin=Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 82 File: \\Emc-ce-1\Test data\2020\RF\L\JOY Intelligent.EM6 (88)



Site no : 844 Shield Room Data no. : 82
Env. / Ins. : Temp:25.5'C Humi:52% Press:101.50kPa LINE Phase : LINE
Limit : FCC PART 15B QP
Engineer : ZSX
EUT : Robot vacuum cleaner
Power : AC 120V/60Hz
M/N : D800
Test Mode : TX Mode
CMICR18650F8M7-4S2P+MS1

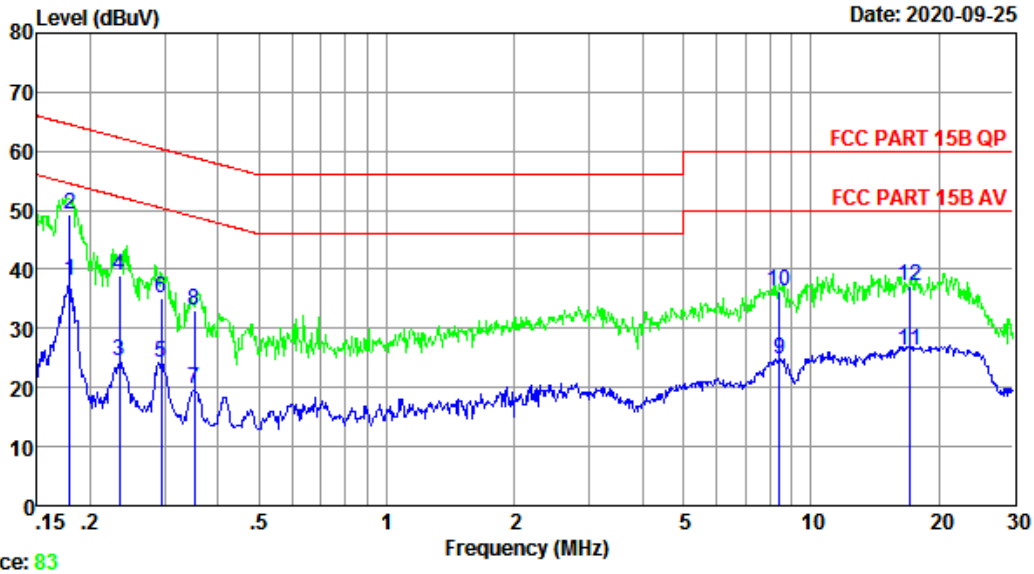
	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1825	9.80	9.77	17.94	37.51	54.37	16.86	Average
2	0.1825	9.80	9.77	30.35	49.92	64.37	14.45	QP
3	0.2378	9.70	9.92	7.84	27.46	52.17	24.71	Average
4	0.2378	9.70	9.92	20.29	39.91	62.17	22.26	QP
5	0.2987	9.60	9.92	7.70	27.22	50.28	23.06	Average
6	0.2987	9.60	9.92	17.97	37.49	60.28	22.79	QP
7	0.4127	9.84	9.92	0.20	19.96	47.59	27.63	Average
8	0.4127	9.84	9.92	10.53	30.29	57.59	27.30	QP
9	8.6373	9.86	10.06	5.32	25.24	50.00	24.76	Average
10	8.6373	9.86	10.06	16.65	36.57	60.00	23.43	QP
11	16.9282	9.87	10.14	6.70	26.71	50.00	23.29	Average
12	16.9282	9.87	10.14	17.67	37.68	60.00	22.32	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin=Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 84 File: \\Emc-ce-1\Test data\2020\RF\L\JOY Intelligent.EM6 (88)



Trace: 83

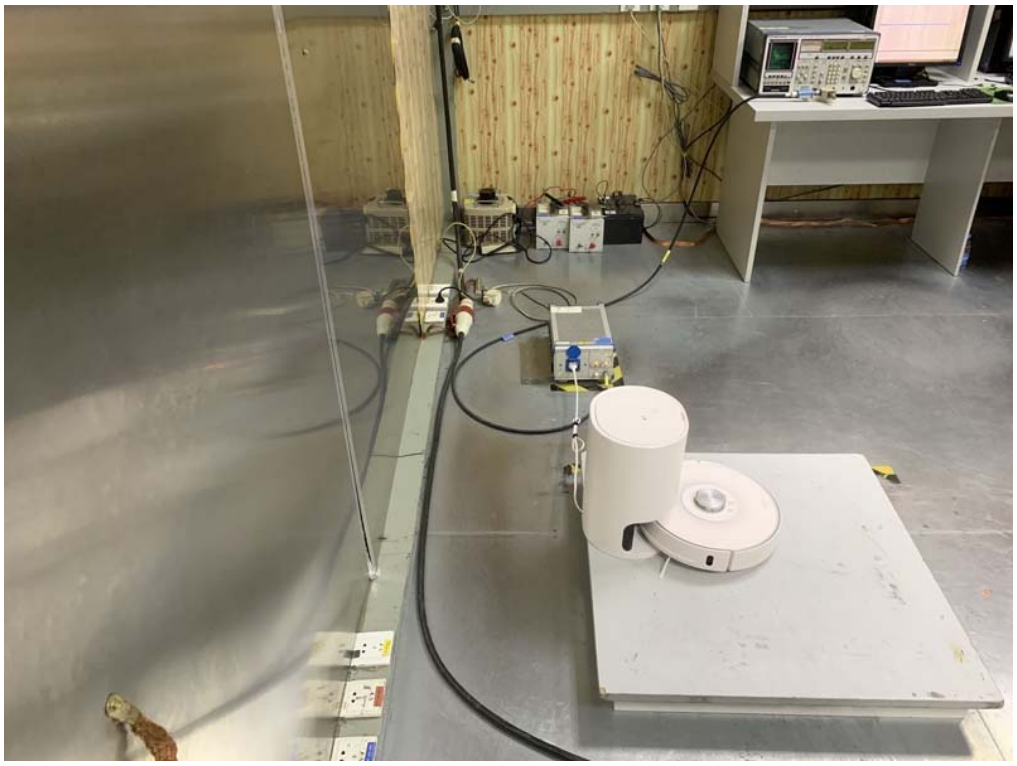
Site no : 844 Shield Room Data no. : 84
Env. / Ins. : Temp:25.5'C Humi:52% Press:101.50kPa LINE Phase : NEUTRAL
Limit : FCC PART 15B QP
Engineer : ZSX
EUT : Robot vacuum cleaner
Power : AC 120V/60Hz
M/N : D800
Test Mode : TX Mode
CMICR18650F8M7-4S2P+MS1

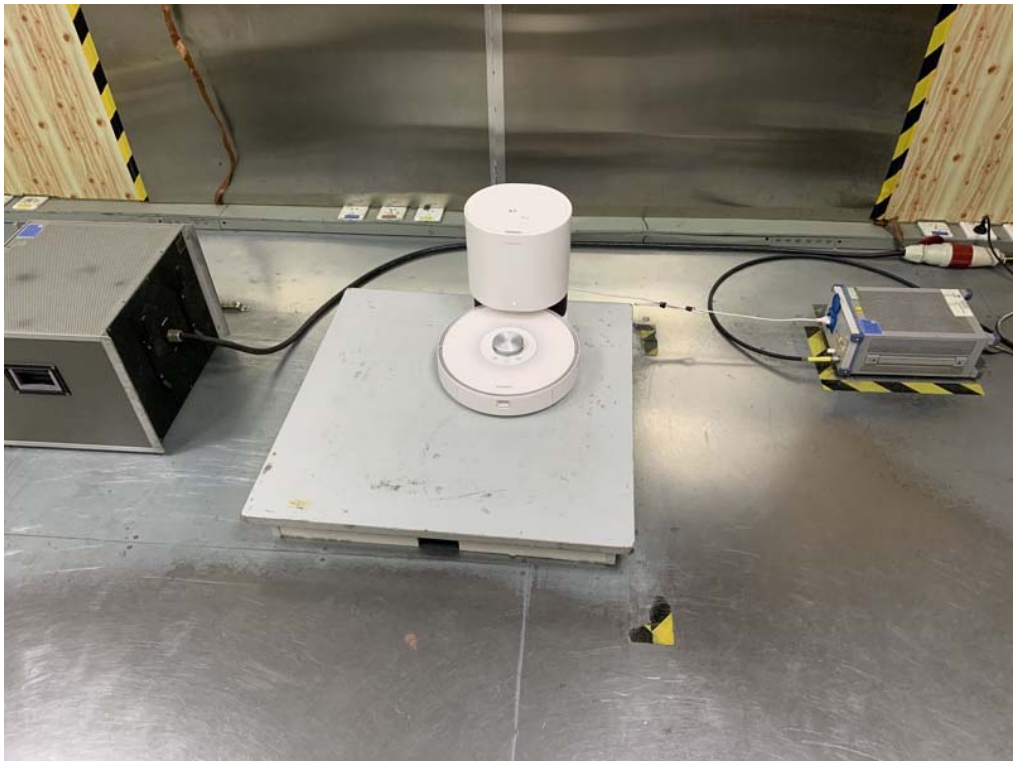
	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1787	9.69	9.77	18.63	38.09	54.55	16.46	Average
2	0.1787	9.69	9.77	29.79	49.25	64.55	15.30	QP
3	0.2341	9.71	9.92	4.80	24.43	52.30	27.87	Average
4	0.2341	9.71	9.92	19.26	38.89	62.30	23.41	QP
5	0.2940	9.73	9.92	4.63	24.28	50.41	26.13	Average
6	0.2940	9.73	9.92	15.37	35.02	60.41	25.39	QP
7	0.3520	9.74	9.92	0.09	19.75	48.91	29.16	Average
8	0.3520	9.74	9.92	13.34	33.00	58.91	25.91	QP
9	8.4115	9.86	10.06	4.78	24.70	50.00	25.30	Average
10	8.4115	9.86	10.06	16.41	36.33	60.00	23.67	QP
11	17.0181	9.76	10.14	6.29	26.19	50.00	23.81	Average
12	17.0181	9.76	10.14	17.34	37.24	60.00	22.76	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin=Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

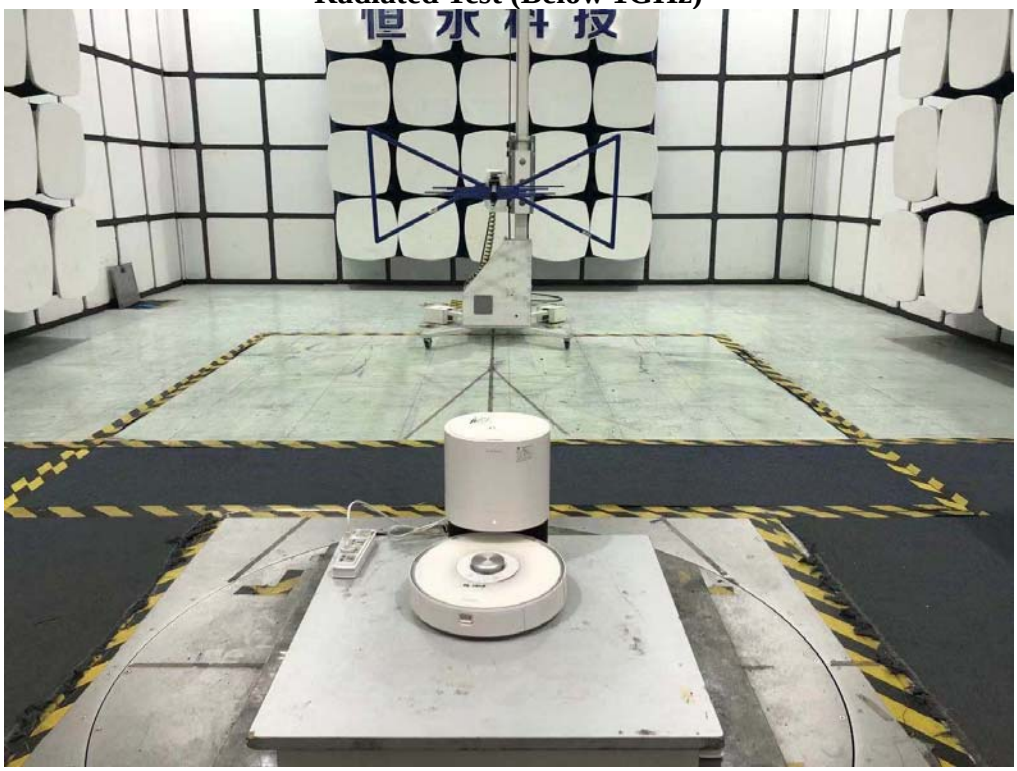
5. TEST SETUP PHOTO

Conducted Test





Radiated Test (Below 1GHz)



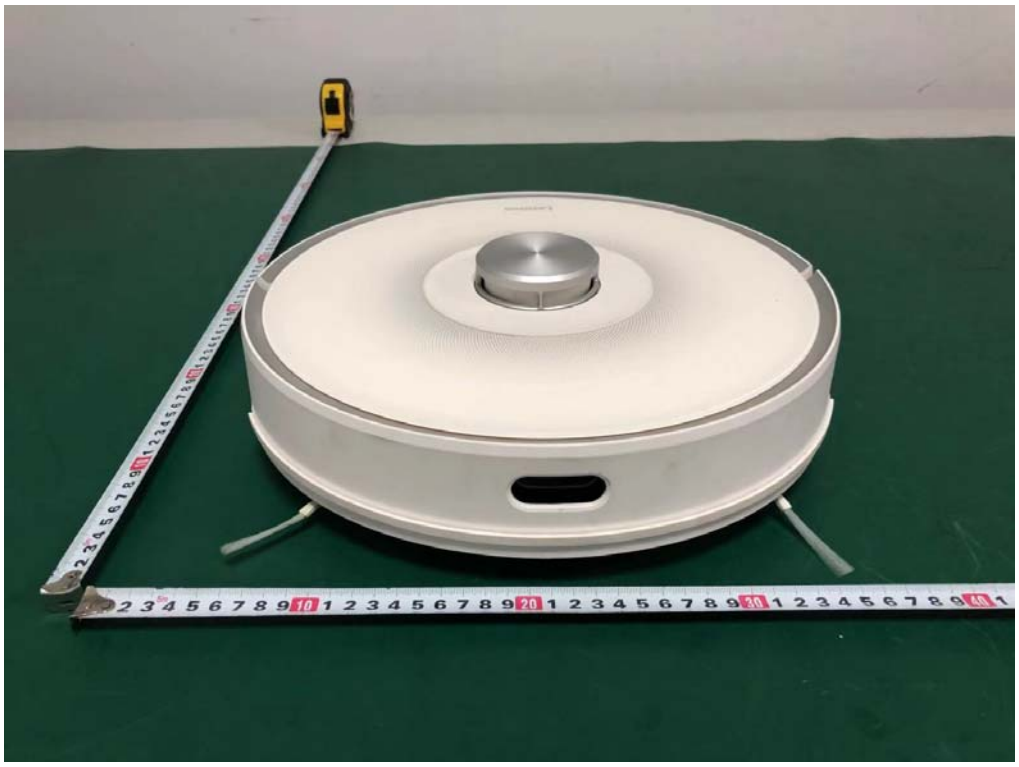
6. EUT PHOTO

External Photos

M/N: D800

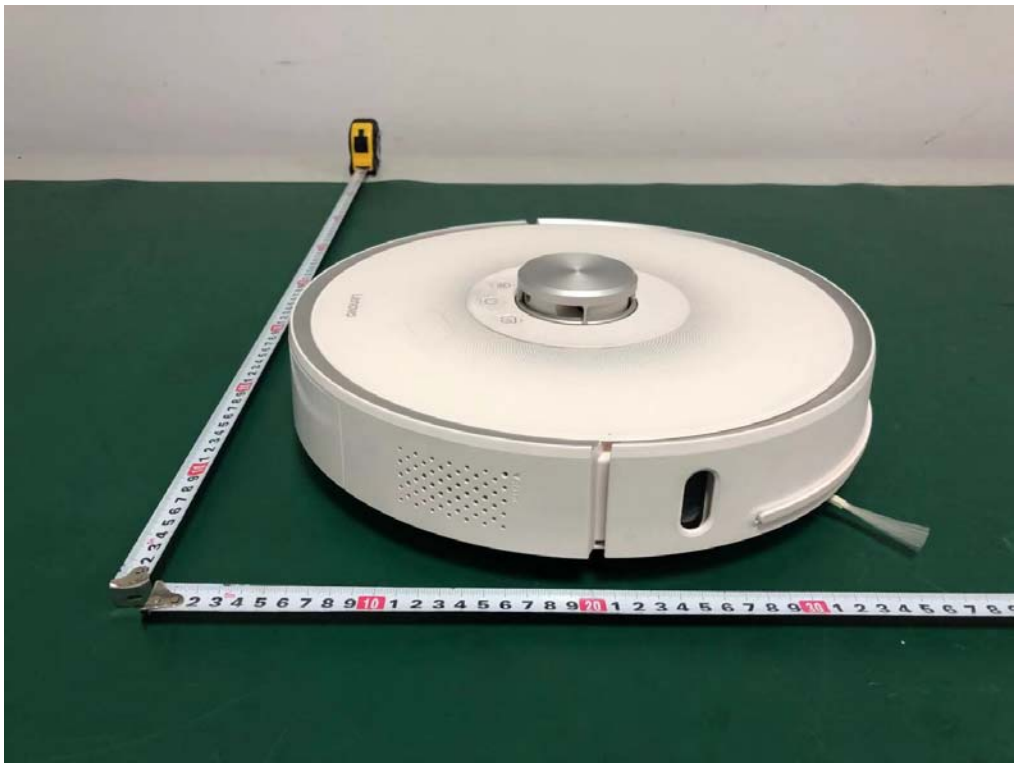
External Photos

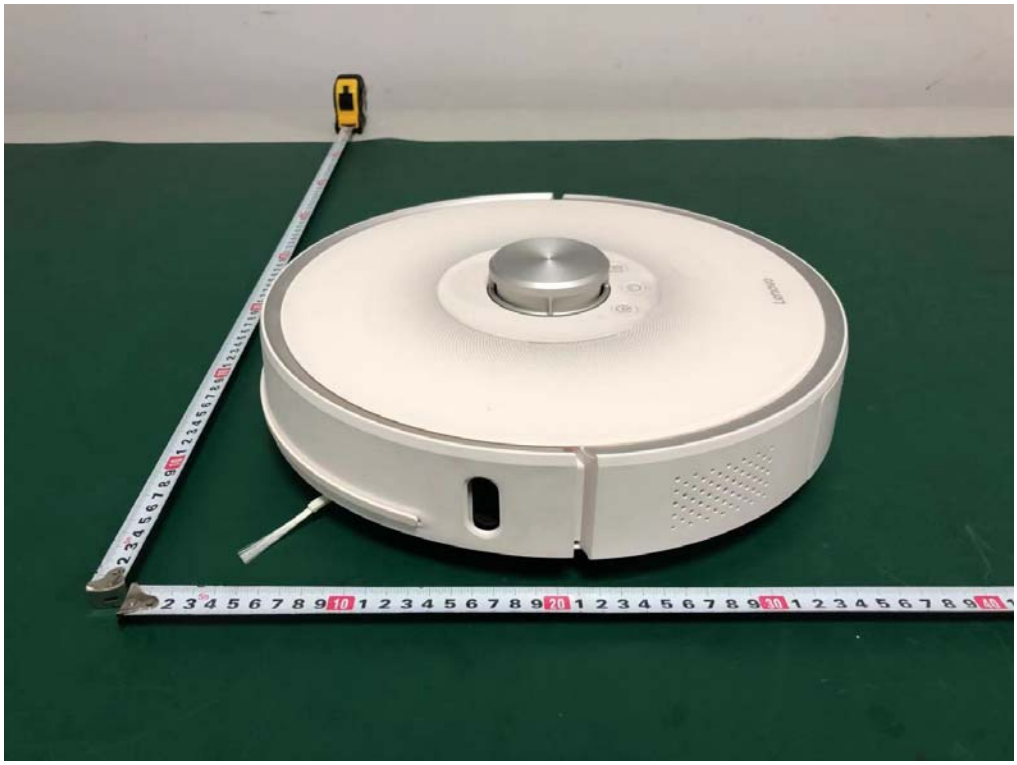
M/N: D800



External Photos

M/N: D800



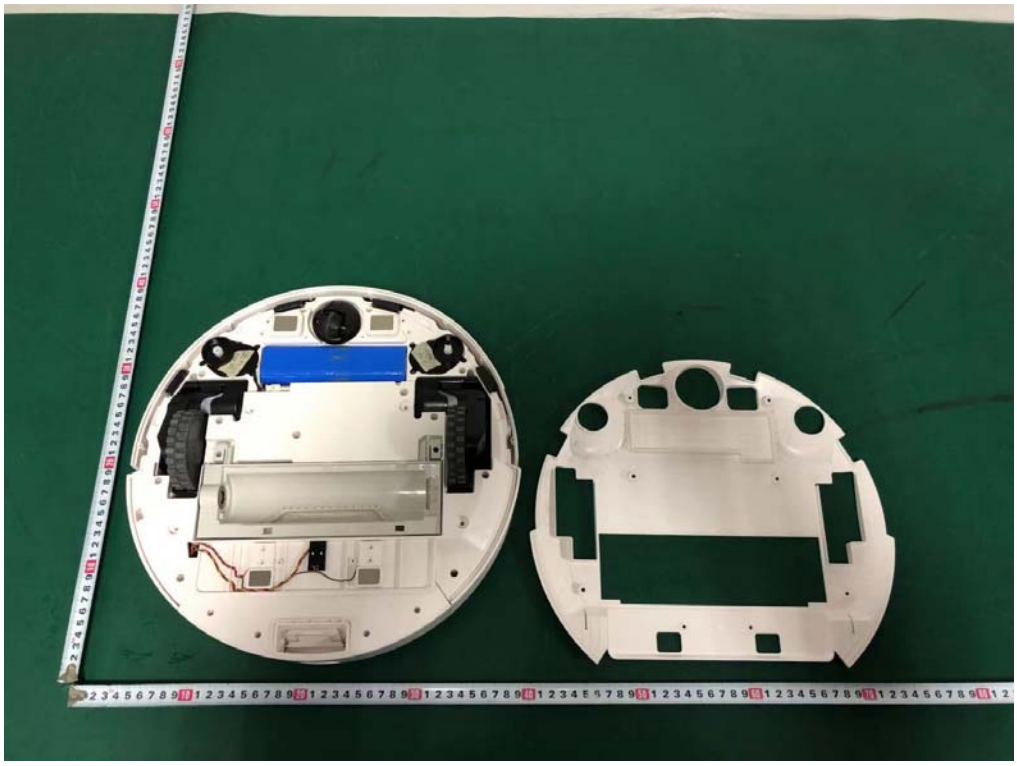


Supply Power

Supply Power

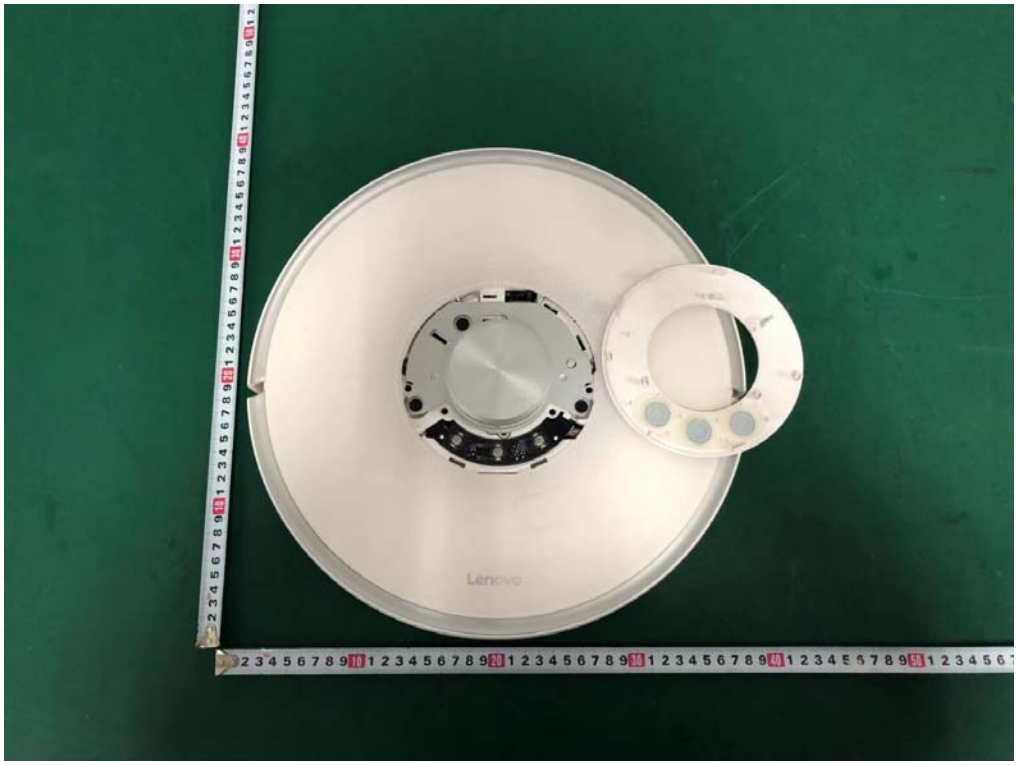
Internal Photos

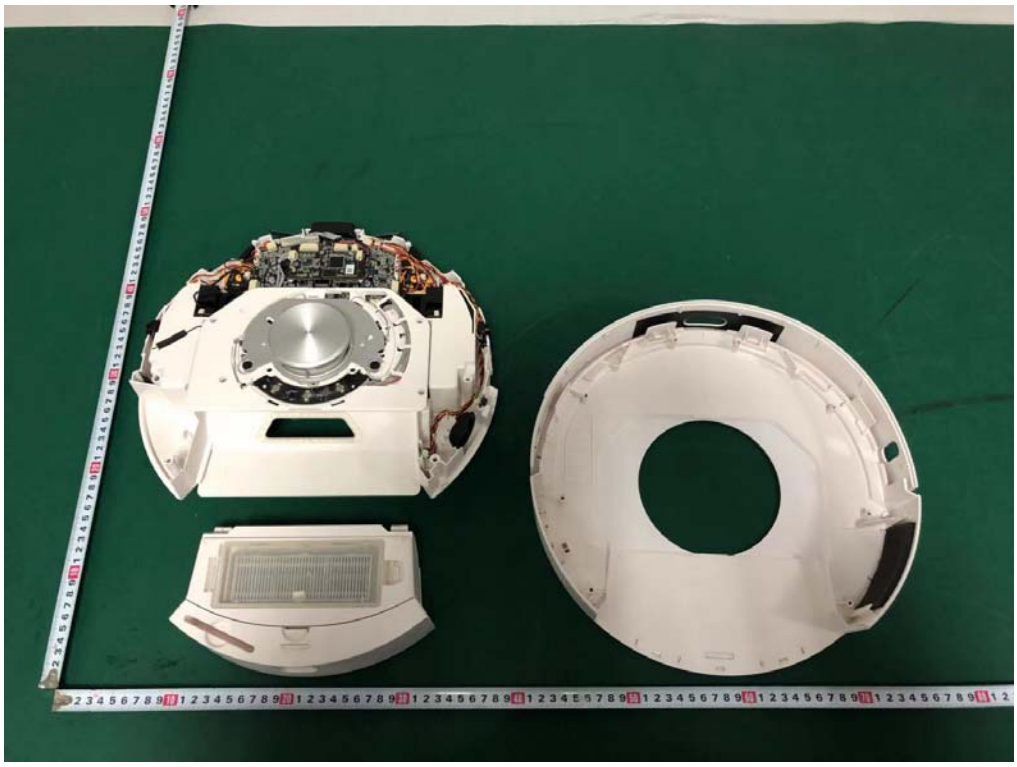
M/N: D800



Internal Photos

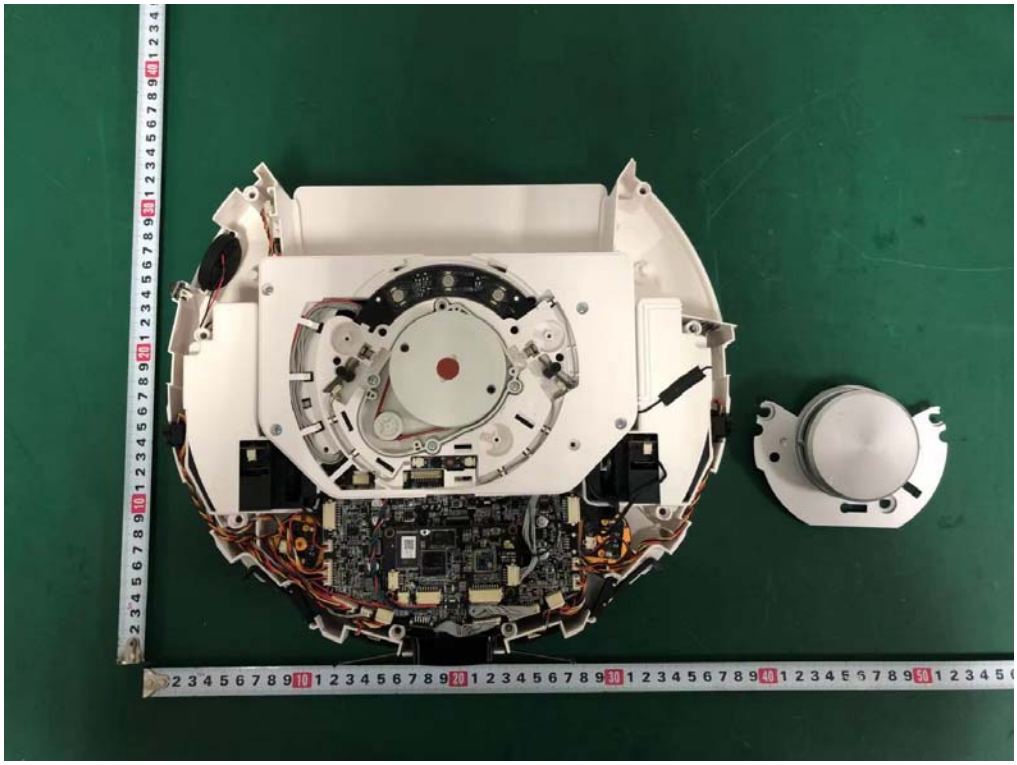
M/N: D800

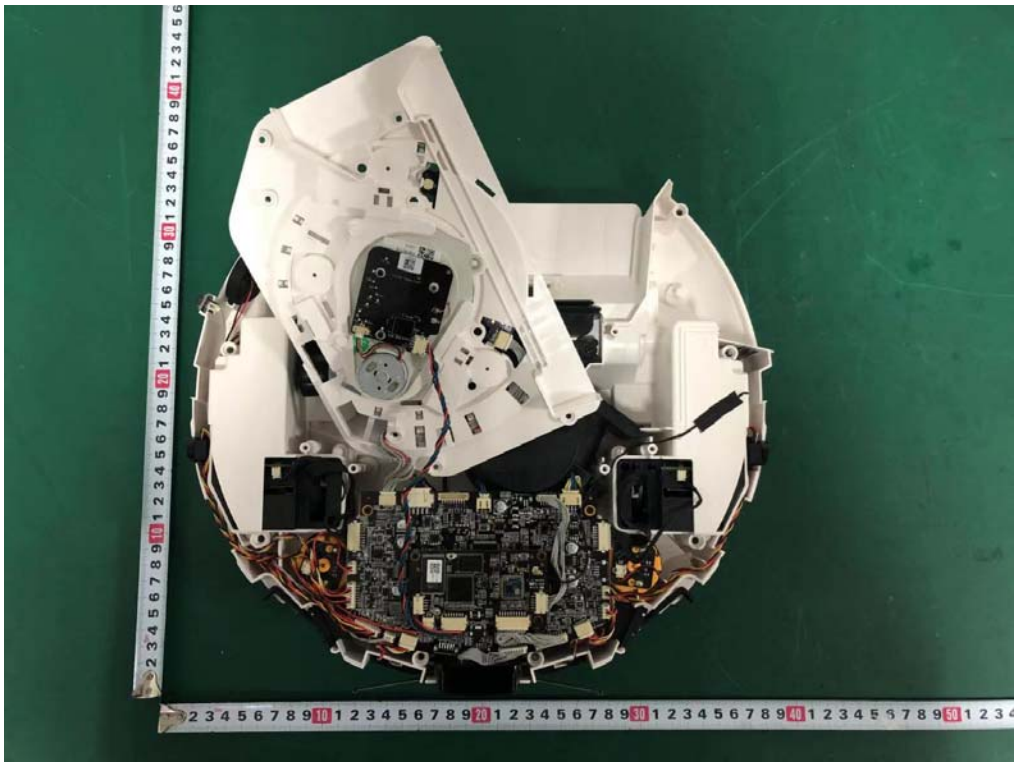




Internal Photos

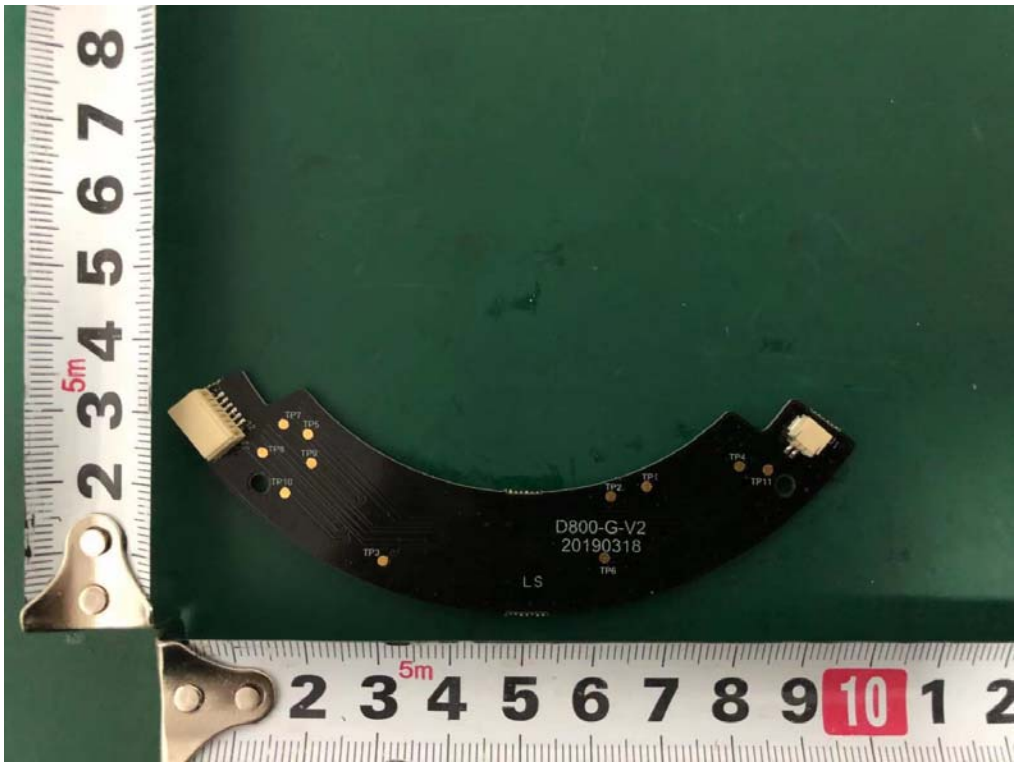
M/N: D800





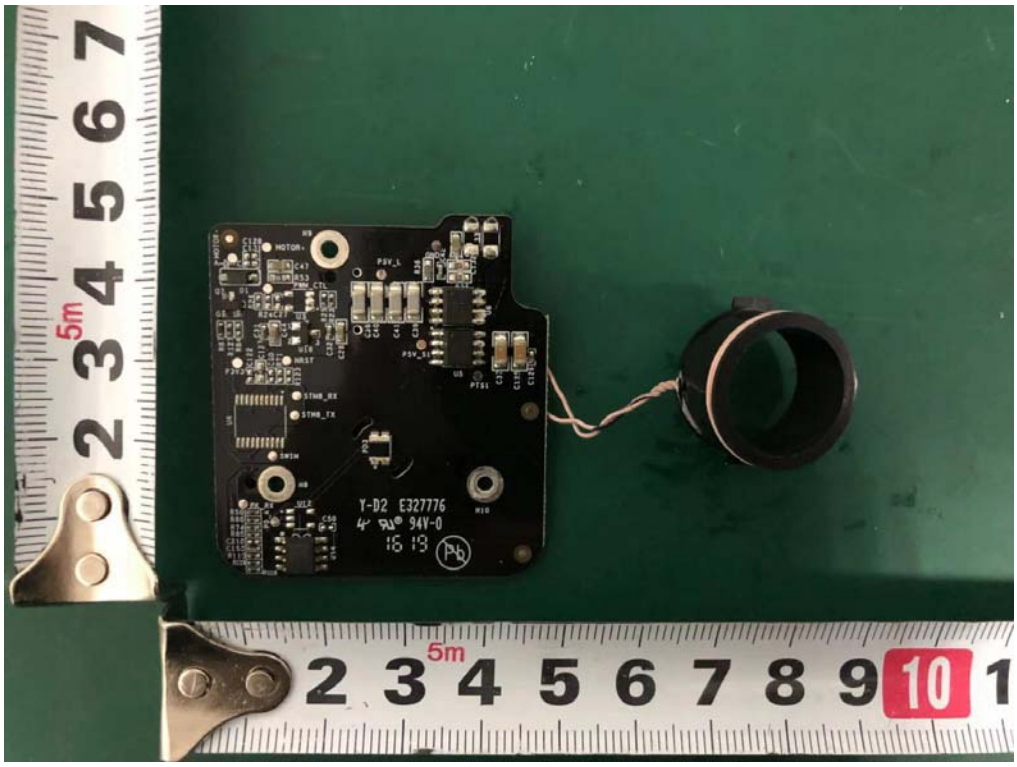
Internal Photos

M/N: D800



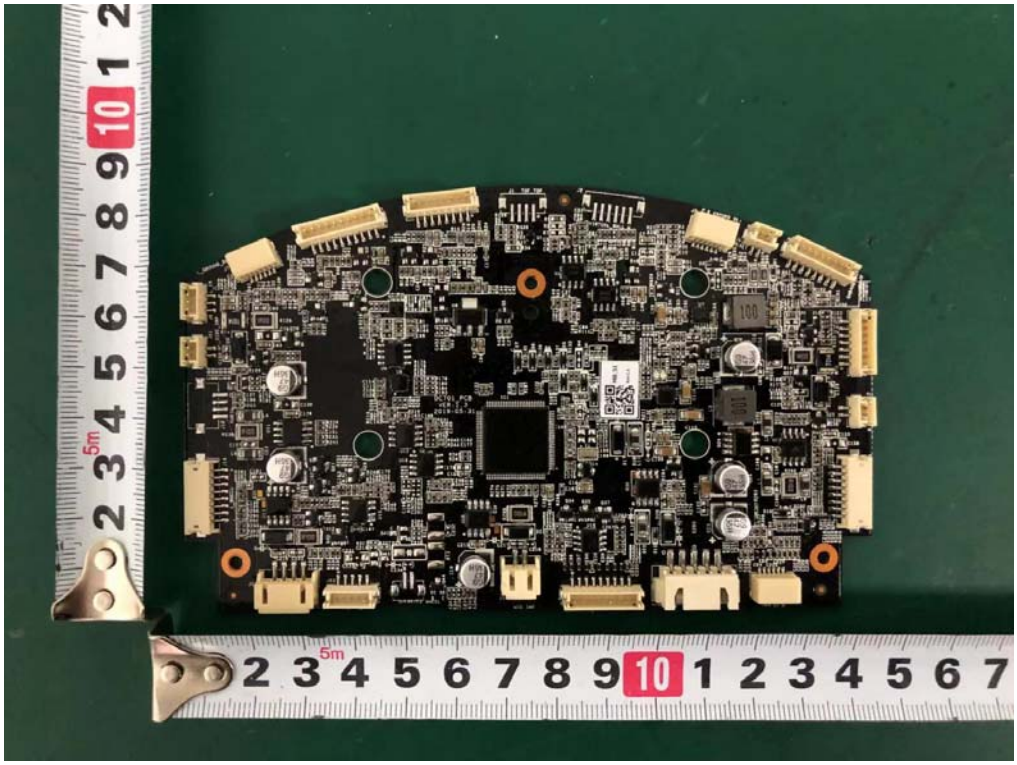
Internal Photos

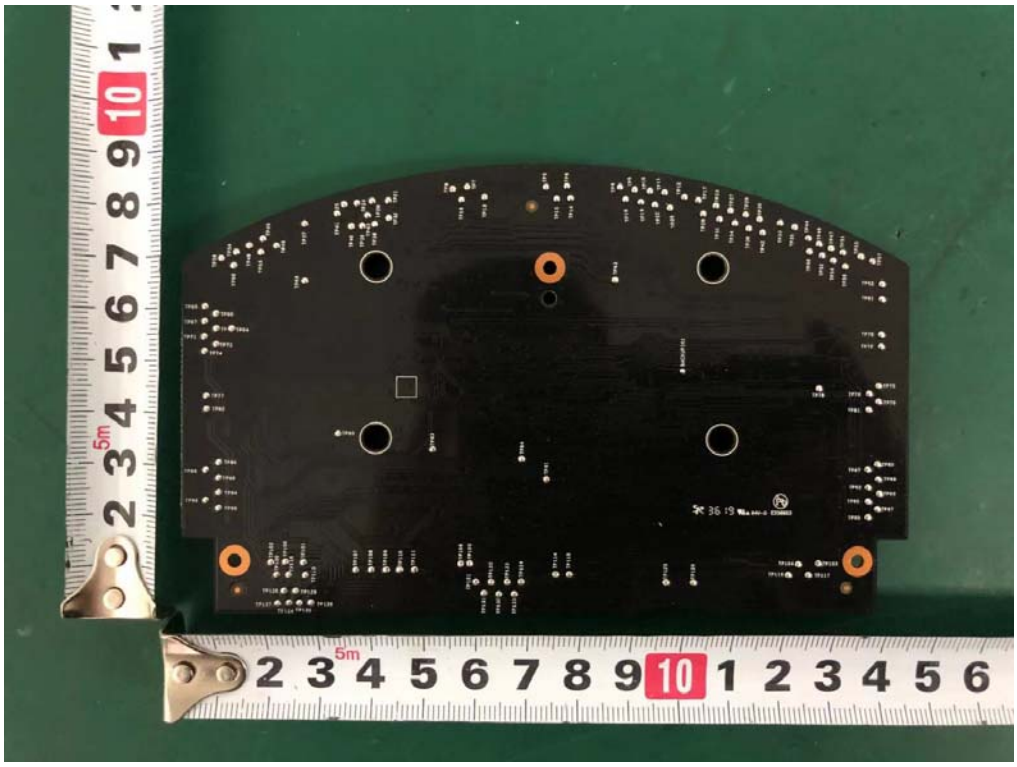
M/N: D800



Internal Photos

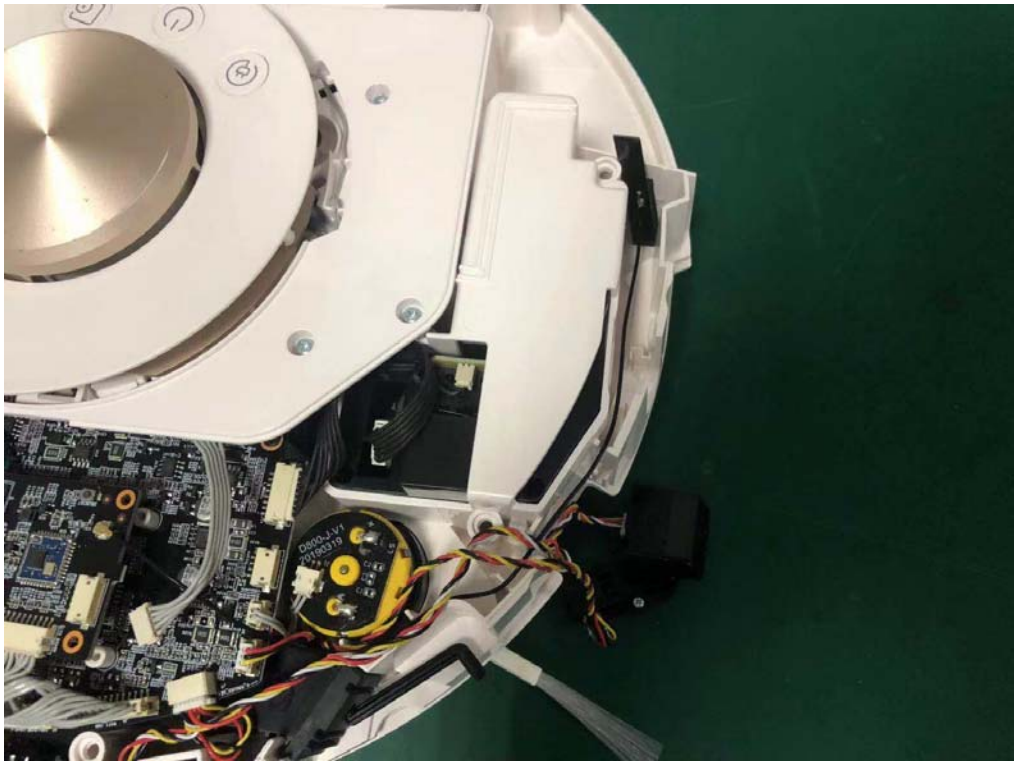
M/N: D800

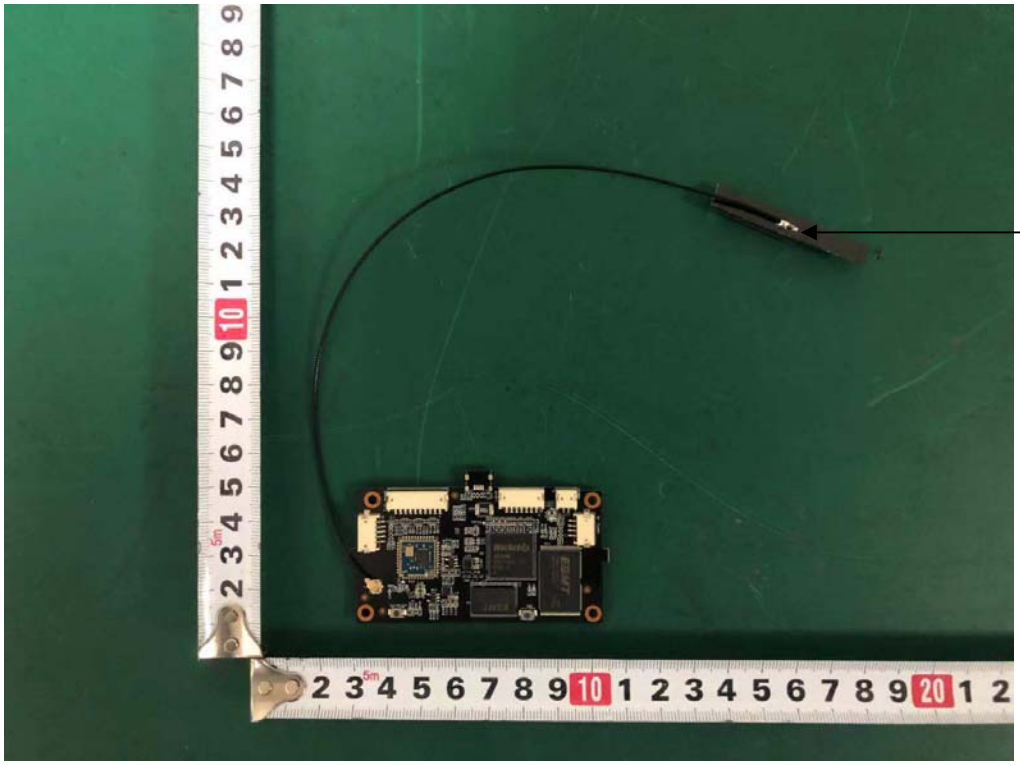




Internal Photos

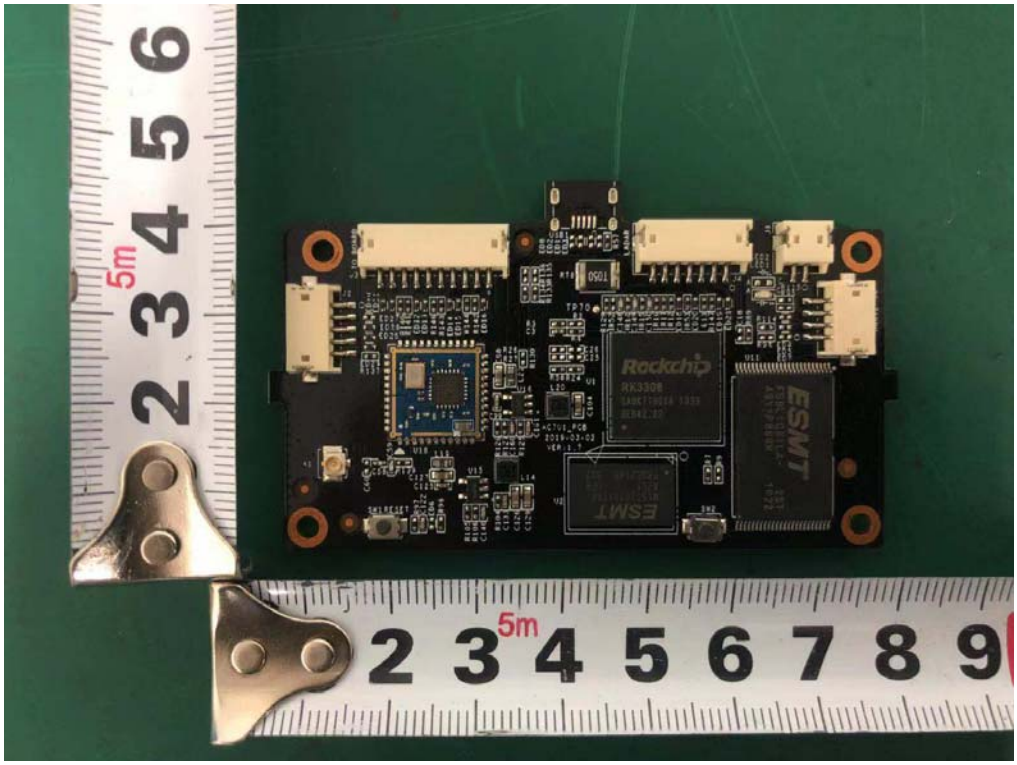
M/N: D800

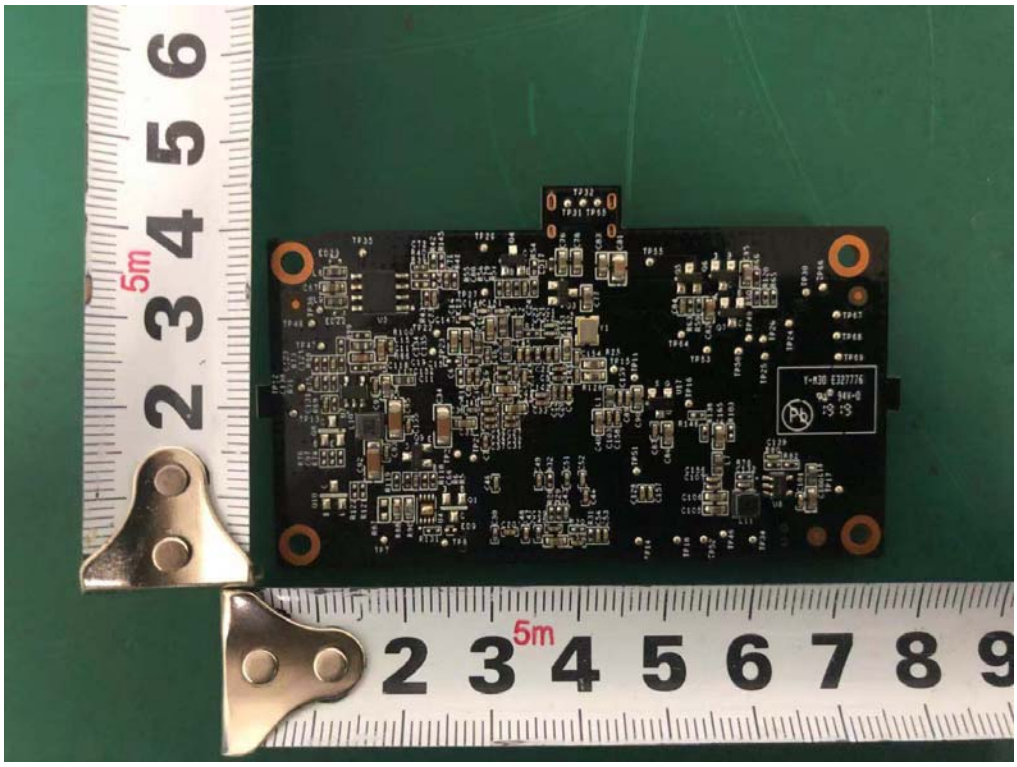




Internal Photos

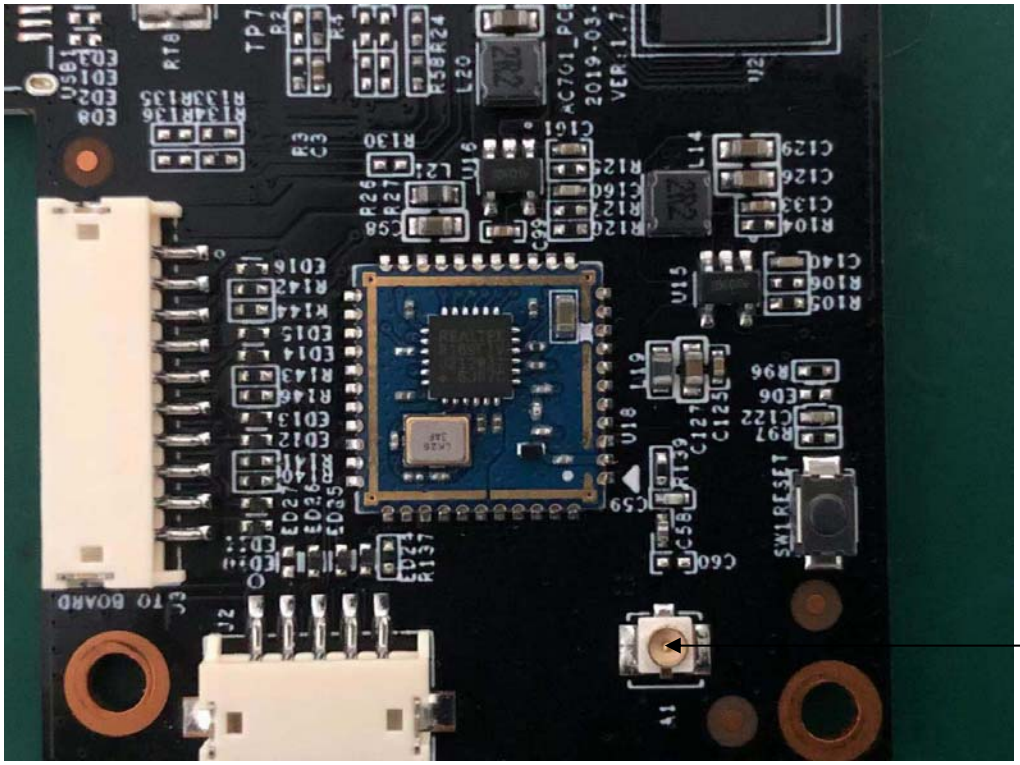
M/N: D800





Internal Photos

M/N: D800

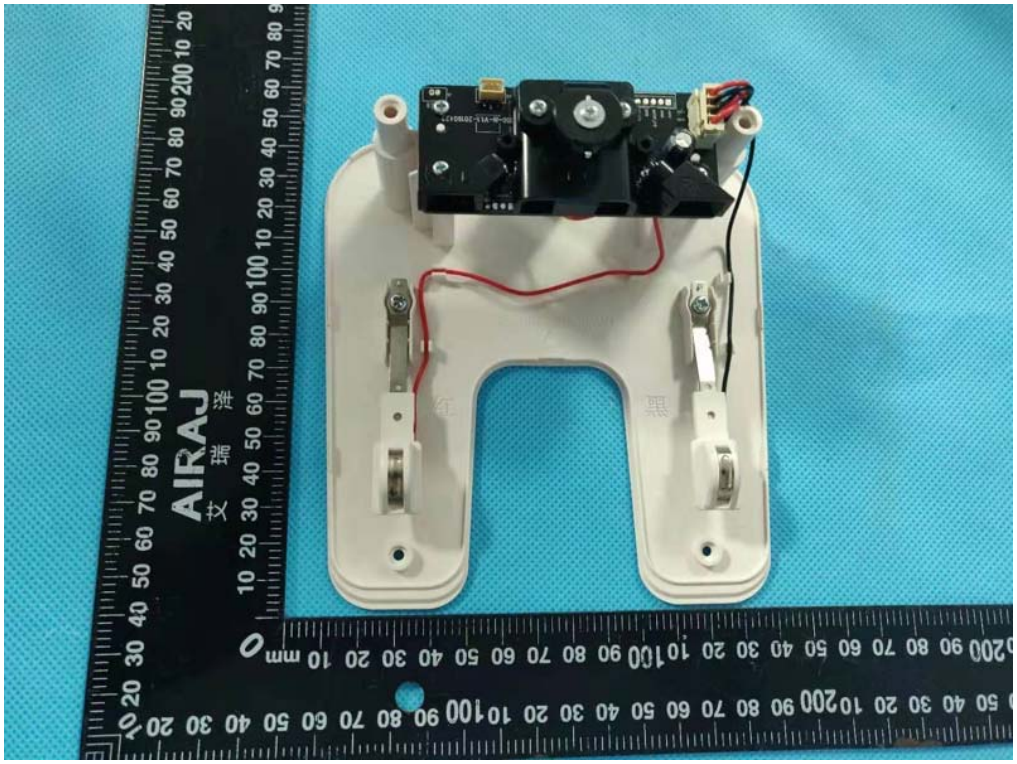


External Photos

M/N: D800

Internal Photos

M/N: D800



External Photos

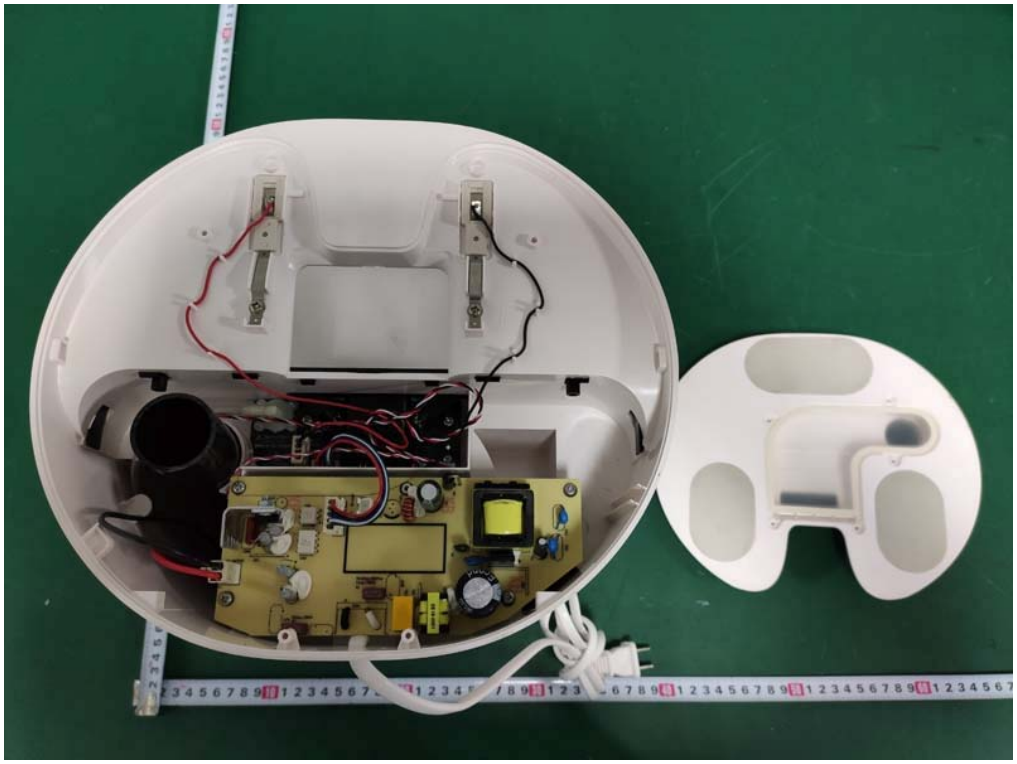
M/N: D800

External Photos

M/N: D800

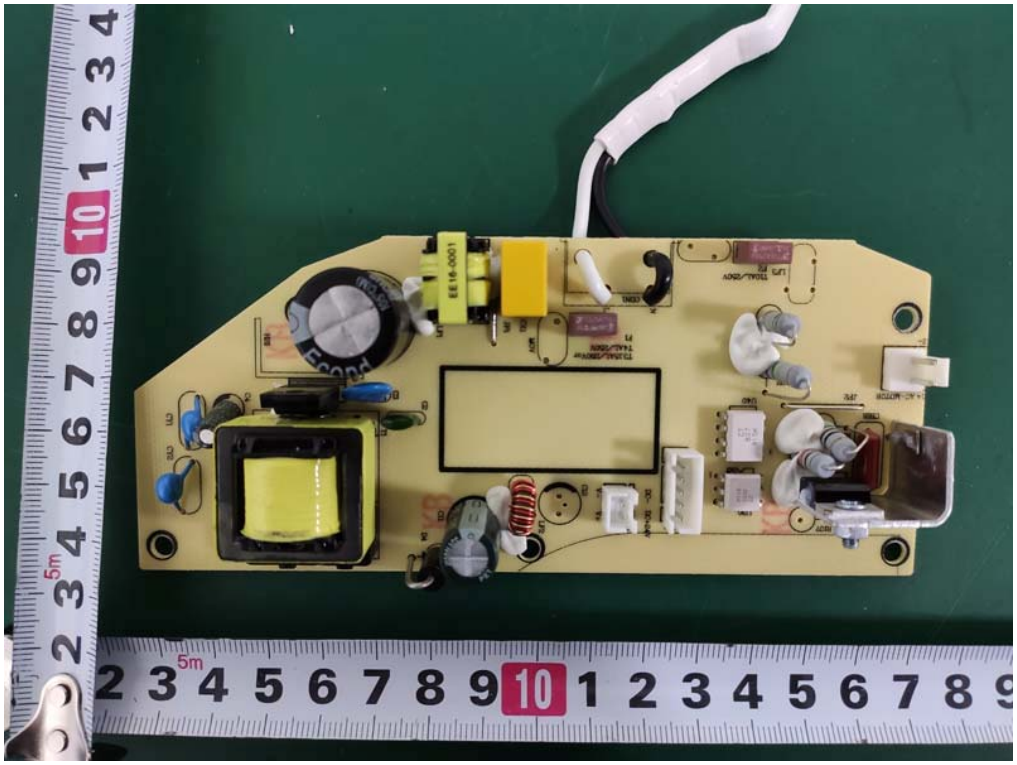
Internal Photos

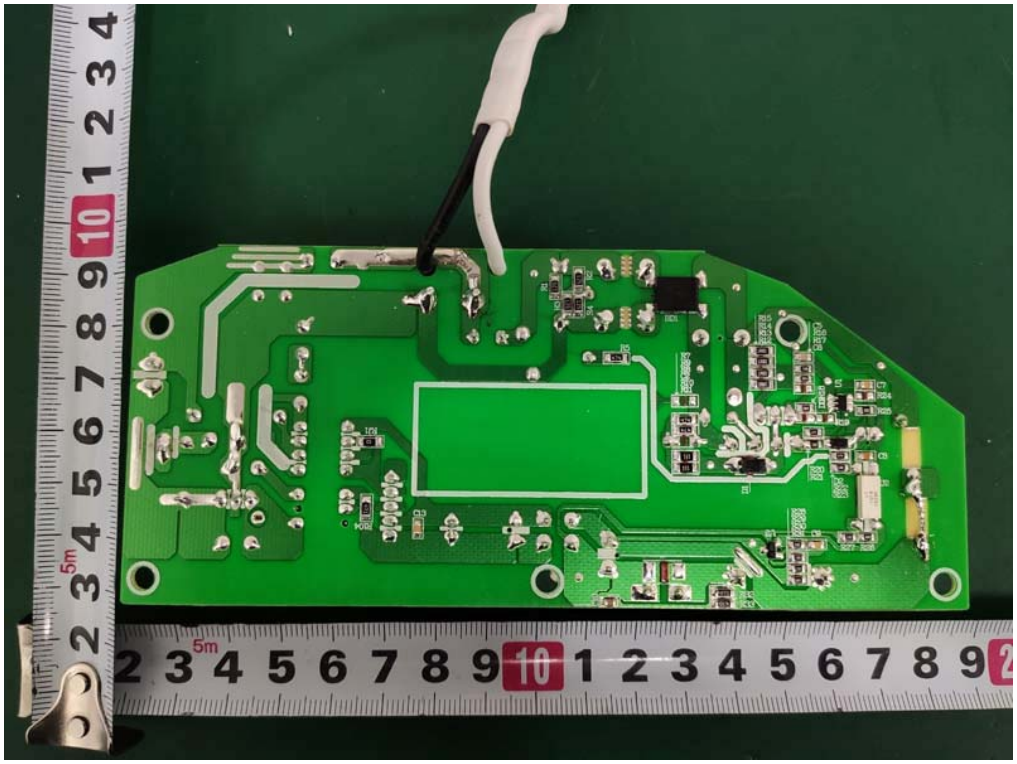
M/N: D800



Internal Photos

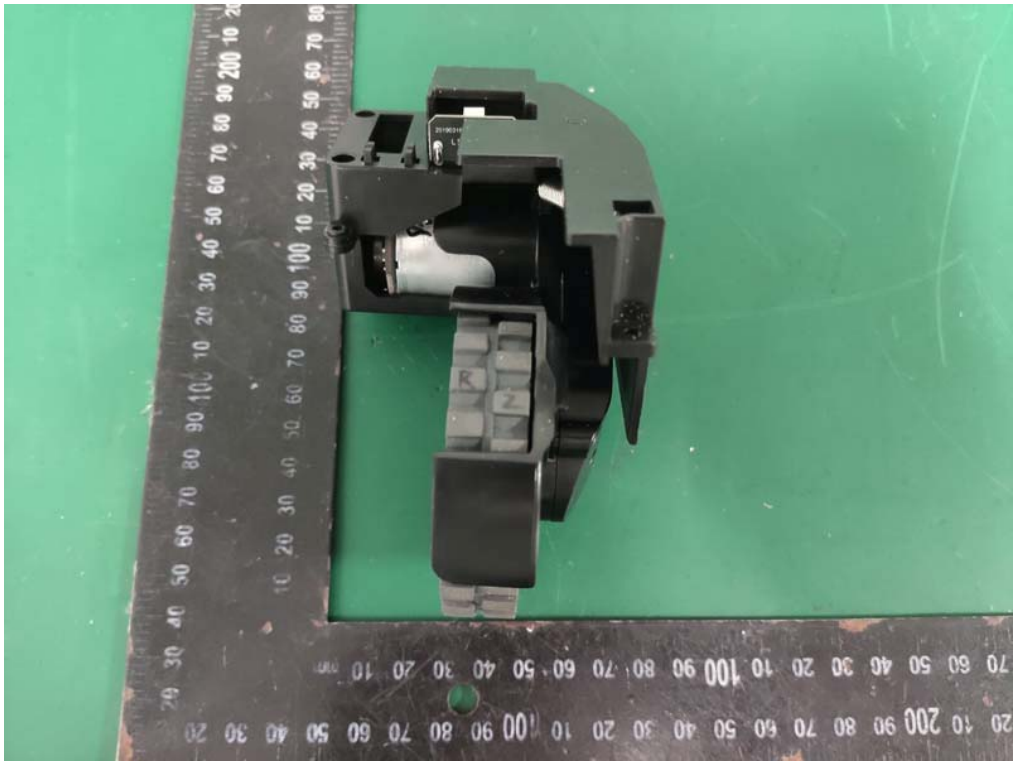
M/N: D800

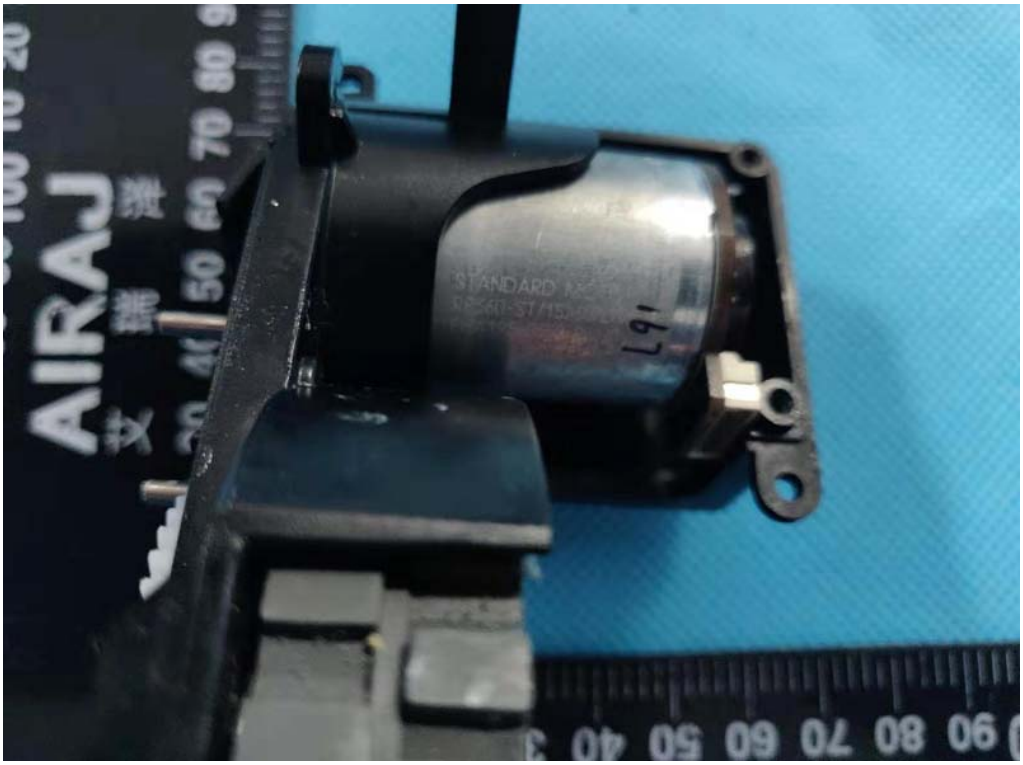




Internal Photos

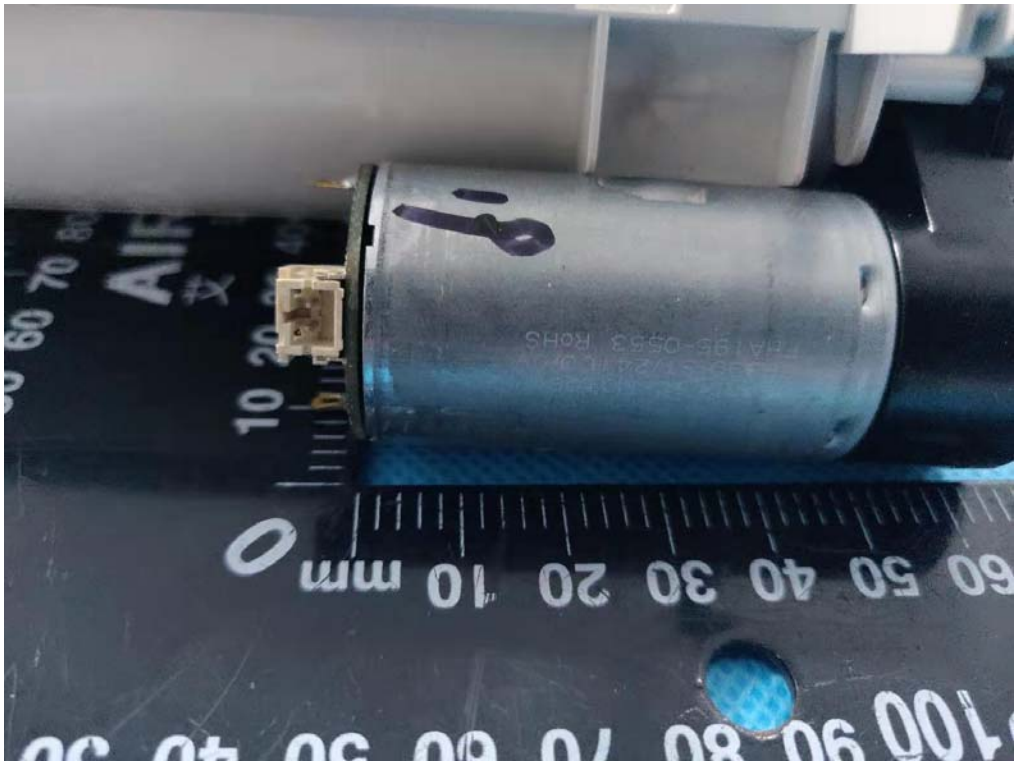
M/N: D800





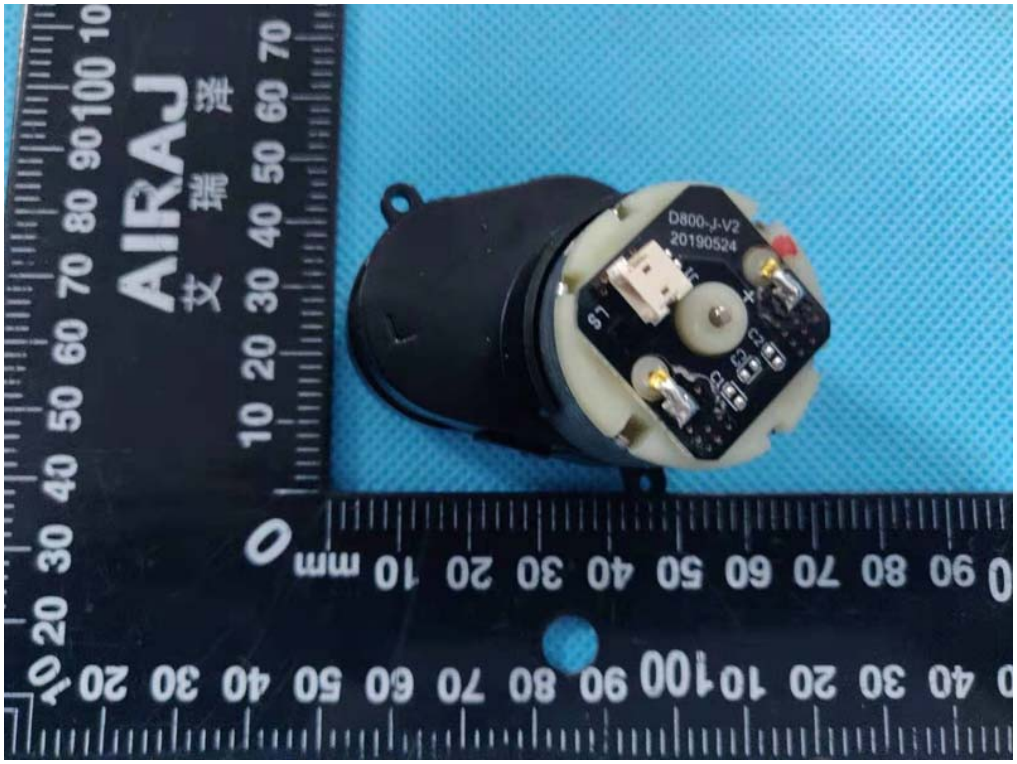
Internal Photos

M/N: D800



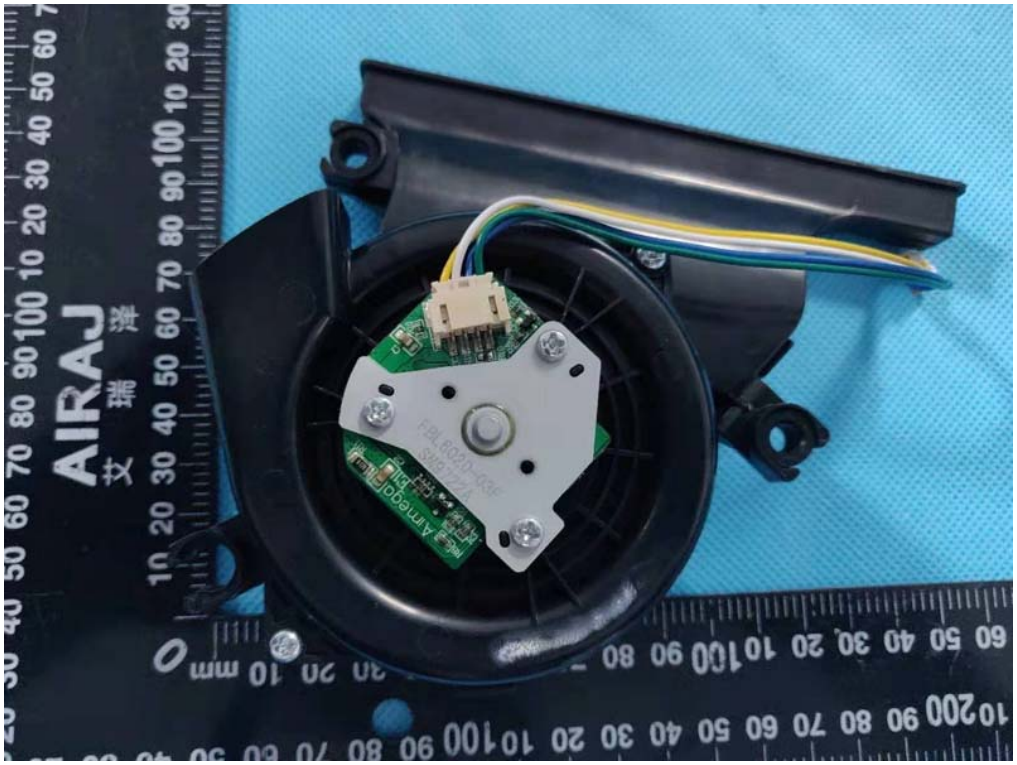
Internal Photos

M/N: D800



Internal Photos

M/N: D800



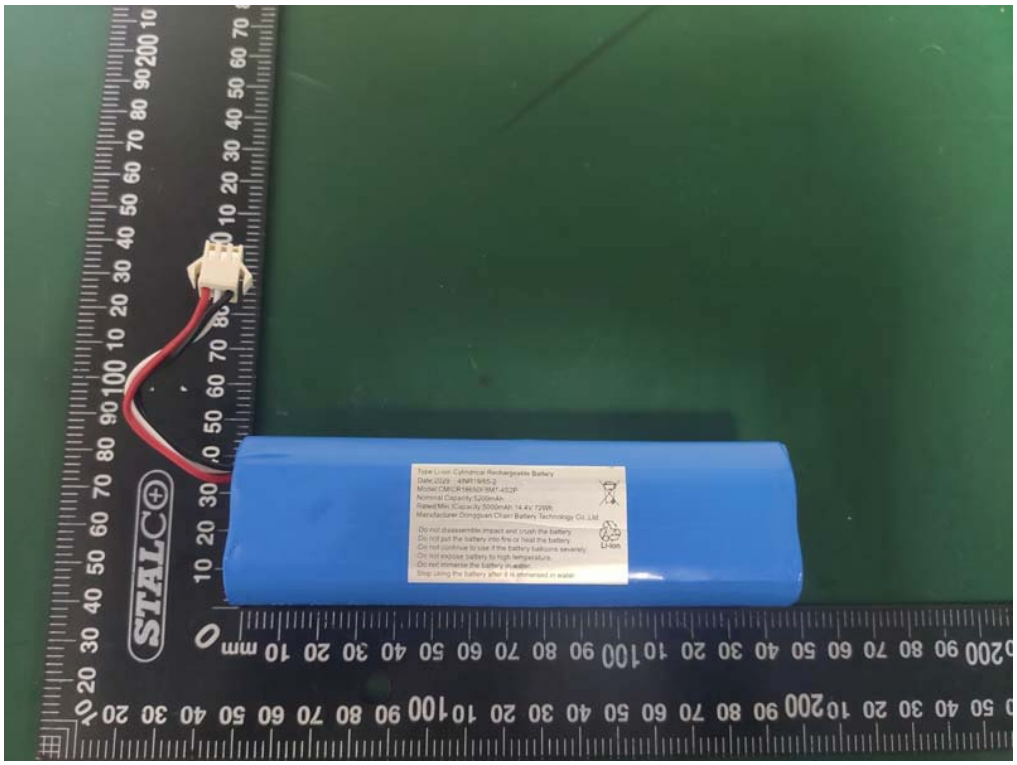
Internal Photos

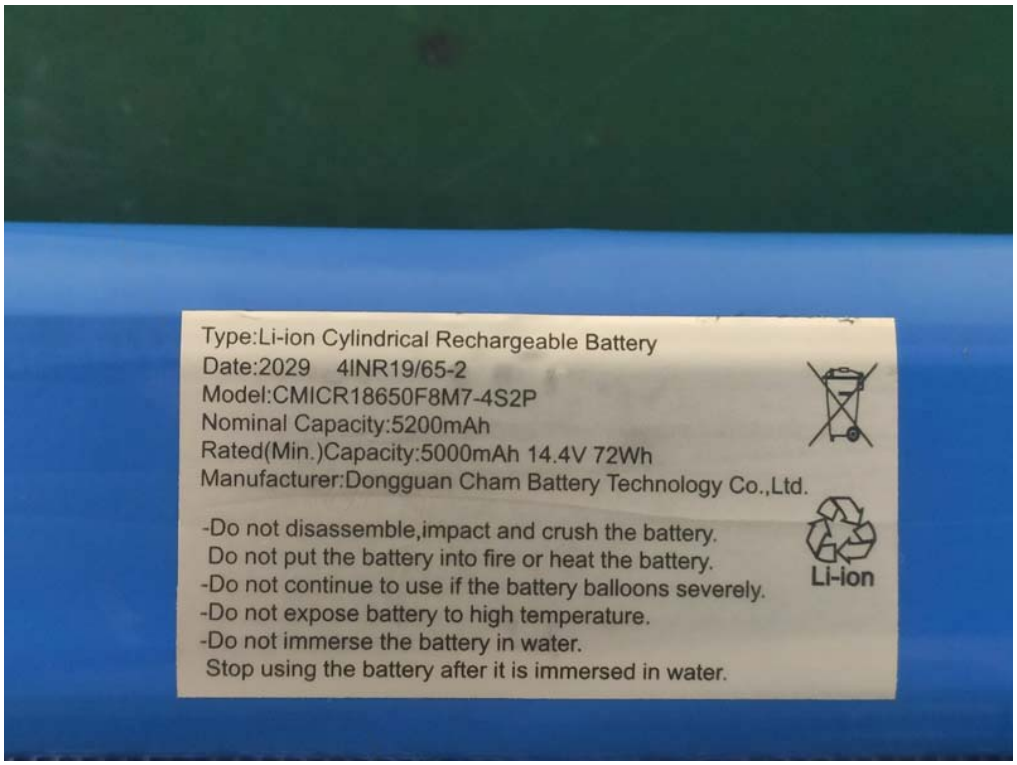
M/N: D800

New accessories

Internal Photos

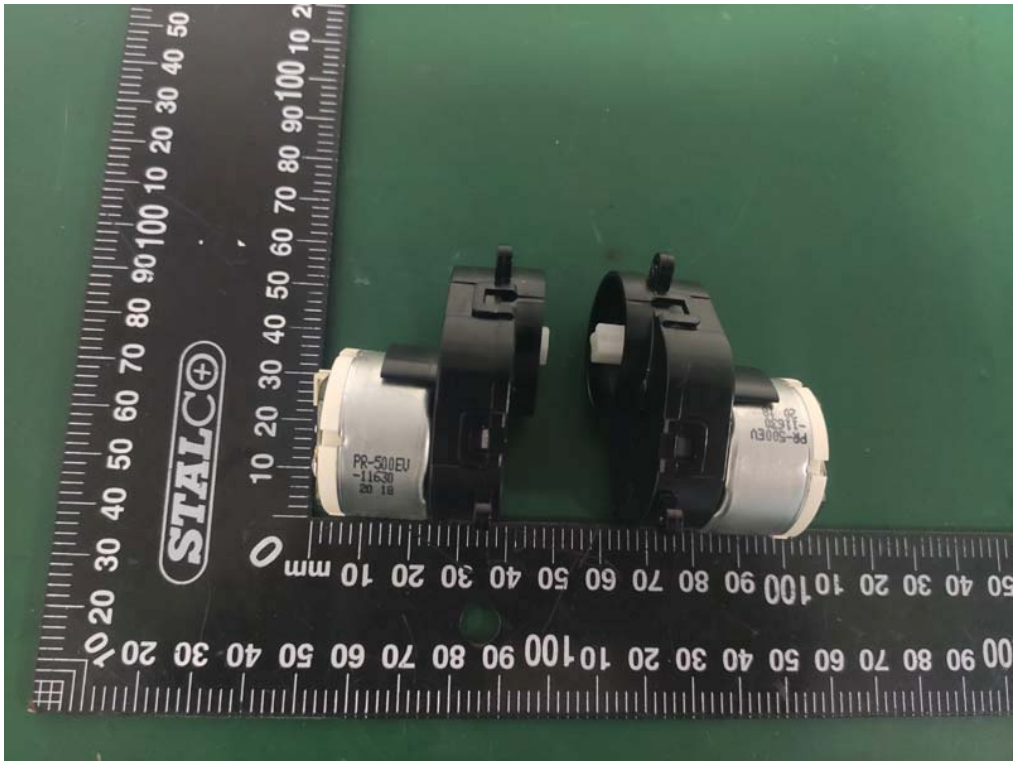
M/N: D800





Internal Photos

M/N: D800



Internal Photos

M/N: D800

End of Test Report