TEST REPORT

Reference No.	:	WTS18S11128838W
FCC ID	:	2AGE6-2461RC
Applicant	:	Shenzhen Silver Star Intelligent Technology Co., Ltd.
Address	:	Building A1, Silver Star Hi-Tech Industrial Park, Guanguang Road, Guanlan Street, Longhua District, Shenzhen, Guangdong, China
Manufacturer	:	Shenzhen Silver Star Intelligent Technology Co., Ltd.
Address	:	Building A1, Silver Star Hi-Tech Industrial Park, Guanguang Road, Guanlan Street, Longhua District, Shenzhen, Guangdong, China
Product	:	Robot Vacuum Cleaner
Model(s)	:	K1
Additional model(s)	:	K1R, i6, i7, i9, M2, M6
Standards	:	FCC CFR47 Part 15 Section 15.249:2018
Date of Receipt sample	:	2018-11-12
Date of Test	:	2018-11-14 to 2018-12-13
Date of Issue	:	2019-01-02
Test Result	:	Pass

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
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Compiled by: Approved by:

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1 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC (The Federal Communications Commission), CEC (California energy efficiency), ISED Canada (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek (ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.

Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

1.1 Test Facility

A. Accreditations for Conformity Assessment (International)

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ SDoC(VOC/DOC)	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-

Note:

1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.
2. ISED Canada Registration No.: 7760A

B.TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd.	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

2 Contents

3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S11128838W	2018-11-12	2018-11-14 to 2018-12-13	2019-01-02	original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product(s):	Robot Vacuum Cleaner
Model(s):	K1
Additional model(s):	K1R, i6, i7, i9, M2, M6
Model Differences:	Only the model names and appearance are different, the model K1 is the tested sample.
Type of Modulation:	GFSK
Frequency Range:	2404MHz-2480MHz, 65 Channels in total
Antenna installation:	PCB Printed Antenna

4.2 Details of E.U.T.

Ratings: Input Voltage: 19V ⎓ , Charging Voltage: 19V ⎓
Main Power: 24W, Working Voltage: 14.4V ⎓
Lithium battery capacity: 2500mAh (36Wh)
Charging by DS docking station from Class 2 power supply
(Model: NLB060190W1A4S58,
Input: 100-240V~ 50/60Hz 0.4A Max, Output: 19V ⎓ 600mA,
Manufacturer: SHENZHEN NALIN ELEC. TECH. CO., LTD)

4.3 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2404	2	2405	3	2406
4	2407	5	2408	6	2409
7	2410	8	2411	9	2412
10	2413	11	2414	12	2418
13	2419	14	2420	15	2421
16	2422	17	2423	18	2424
19	2425	20	2426	21	2427
22	2428	23	2429	24	2430
25	2434	26	2435	27	2436
28	2437	29	2438	30	2439
31	2440	32	2441	33	2442
34	2443	35	2444	36	2445
37	2446	38	2450	39	2451
40	2452	41	2453	42	2454

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
43	2455	44	2456	45	2457
46	2458	47	2459	48	2460
49	2461	50	2462	51	2466
52	2467	53	2468	54	2469
55	2470	56	2471	57	2472
58	2473	59	2474	60	2475
61	2476	62	2477	63	2478
64	2479	65	2480	66	N/A

4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Tests carried out under FCC part 15.249

Test mode	Low channel	Middle channel	High channel
Transmitting	2404MHz	2442MHz	2480MHz

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions Test Site						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	EMI Test Receiver	R&S	ESCI	101155	2018-09-15	2019-09-14
2	LISN	SCHWARZBECK	NSLK 8128	8128-289	2018-09-15	2019-09-14
3	Limiter	York	MTS-IMP-136	261115-001-0024	2018-09-15	2019-09-14
4	Cable	Laplace	RF300	-	2018-07-18	2019-07-17
3m Semi-anechoic Chamber for Radiation Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP30	100091	2018-04-20	2019-04-19
2	Broad-band Horn Antenna(1-18GHz)	SCHWARZBECK	BBHA 9120 D	667	2018-05-18	2019-05-17
3	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-04-07	2019-04-06
4	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	2018-04-07	2019-04-06
5	Spectrum Analyzer	R&S	FSP40	100501	2018-11-13	2019-11-12
6	Broad-band Horn Antenna(18-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170651	2018-05-18	2019-05-17
7	Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	100472	2018-05-18	2019-05-17
8	Signal Generater	R&S	SMP22	100102	2018-09-15	2019-09-14
9	Cable	Top	18-40GHz	-	2018-09-15	2019-09-14
3m Semi-anechoic Chamber for Radiation Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	2018.04.20	2019.04.19
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2018.04.19	2019.04.18
3	Active Loop Antenna	Com-power	AL-130R	10160007	2018-04-17	2019-04-16
4	Amplifier	ANRITSU	MH648A	M43381	2018-04-20	2019-04-19
5	Cable	HUBER+SUHNER	CBL2	525178	2018-04-20	2019-04-19
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	Spectrum Analyzer	R&S	FSP30	100091	2018-04-20	2019-04-19
2.	Coaxial Cable	Top	10Hz-30GHz	-	2018-09-12	2019-09-11

3	Antenna Connector*	Realacc	45RSm	-	2018-09-12	2019-09-11
4	DC Block	Gwave	GDCB-3G-N-SMA	140307001	2018-09-12	2019-09-11
"*": The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.						

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)
Confidence interval：95%. Confidence factor:k=2	

5.3 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

6 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	Pass
Radiated Spurious Emission	15.249(a) 15.209 15.205(a)	Pass
Outside of Band Emission	15.249 15.205 15.209	Pass
Periodic Operation	15.35(c)	Pass
Bandwidth	15:215(c)	Pass
Antenna Requirement	15.203	Pass
RF Exposure	1.1307	Pass
Note: Pass=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable		

7 Conducted Emission

Test Requirement: FCC CFR 47 Part 15 Section 15.207

Test Method: ANSI C63.10:2013

Frequency Range: 150kHz to 30MHz

Class/Severity: Class B

Limit:

Frequency (MHz)	Conducted Limit (dBμV)	
	Qsi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5.0	56	46
5.0 to 30	60	50
*Decreases with the logarithm of the frequency.		

Test Result: PASS

7.1 E.U.T. Operation

Operating Environment **:**

Temperature: 25.5 °C

Humidity: 51 % RH

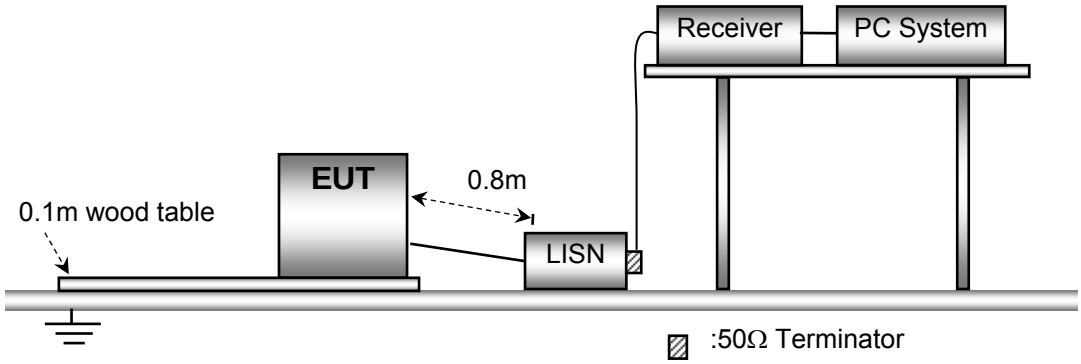
Atmospheric Pressure: 101.2kPa

EUT Operation **:**

The test was performed in transmitting mode, the worst test data (Low channel) were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013

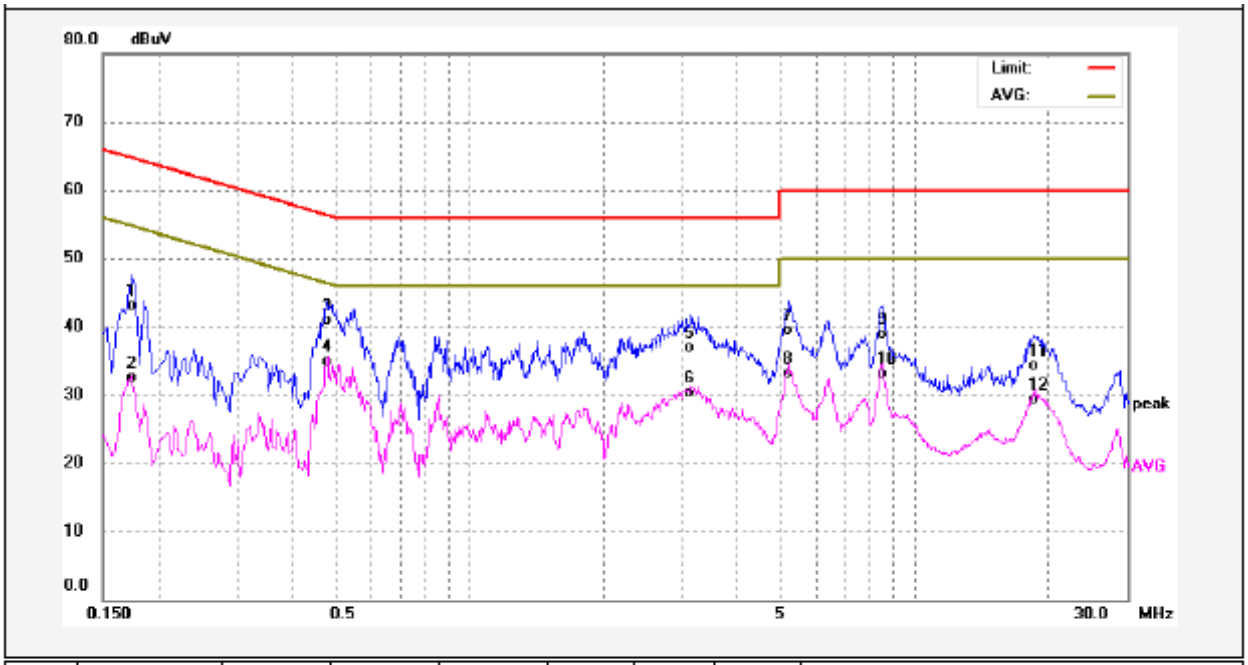


7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

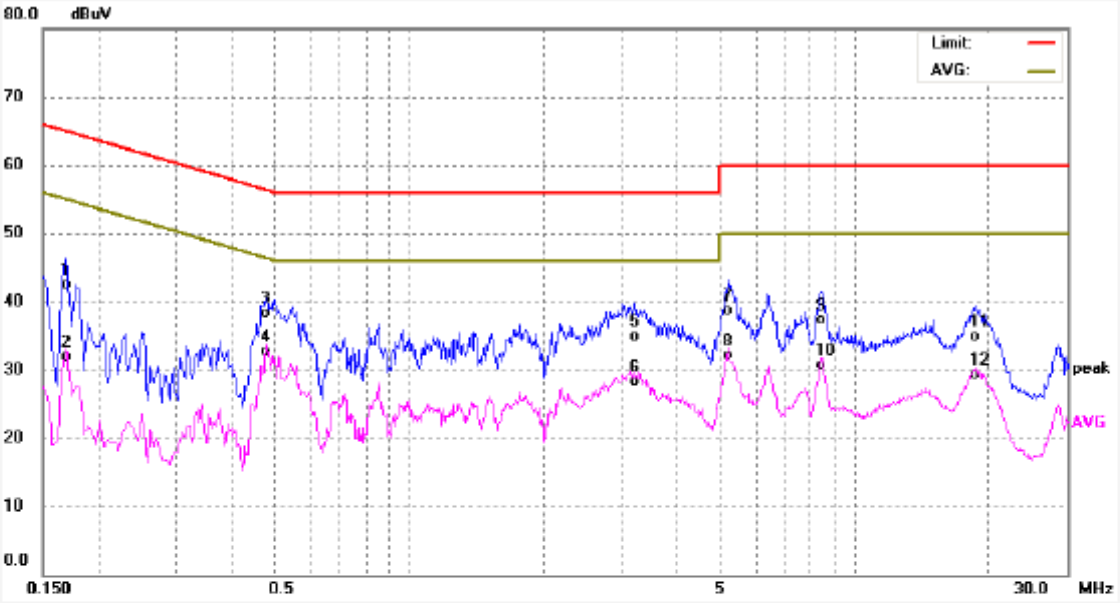
7.4 Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1740	32.74	10.29	43.03	64.76	-21.73	QP	
2	0.1740	22.26	10.29	32.55	54.76	-22.21	AVG	
3	0.4780	30.51	10.42	40.93	56.37	-15.44	QP	
4	0.4780	24.53	10.42	34.95	46.37	-11.42	AVG	
5	3.1500	26.13	10.70	36.83	56.00	-19.17	QP	
6	3.1500	19.68	10.70	30.38	46.00	-15.62	AVG	
7	5.2260	28.60	10.83	39.43	60.00	-20.57	QP	
8	5.2260	22.37	10.83	33.20	50.00	-16.80	AVG	
9	8.4180	27.73	11.11	38.84	60.00	-21.16	QP	
10	8.4180	22.04	11.11	33.15	50.00	-16.85	AVG	
11	18.5100	23.49	10.79	34.28	60.00	-25.72	QP	
12	18.5100	18.49	10.79	29.28	50.00	-20.72	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	32.20	10.29	42.49	64.96	-22.47	QP	
2	0.1700	21.64	10.29	31.93	54.96	-23.03	AVG	
3	0.4780	27.83	10.42	38.25	56.37	-18.12	QP	
4	0.4780	22.19	10.42	32.61	46.37	-13.76	AVG	
5	3.2220	24.28	10.71	34.99	56.00	-21.01	QP	
6	3.2220	17.65	10.71	28.36	46.00	-17.64	AVG	
7	5.1979	27.95	10.83	38.78	60.00	-21.22	QP	
8	5.1979	21.26	10.83	32.09	50.00	-17.91	AVG	
9	8.4060	26.24	11.11	37.35	60.00	-22.65	QP	
10	8.4060	19.57	11.11	30.68	50.00	-19.32	AVG	
11	18.7099	24.10	10.78	34.88	60.00	-25.12	QP	
12	18.7099	18.44	10.78	29.22	50.00	-20.78	AVG	

8 Radiation Spurious Emission Test

Test Requirement: FCC Part15 Paragraph 15.249&15.209&15.205

Test Method: ANSI 63.10: 2010

Measurement Distance: 3m

Test Result: PASS

15.249(a)Limit:

Fundamental frequency	Field strength of fundamental		Field strength of harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928 MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25 GHz	250	108	2500	68

15.209 Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

Note: RF Voltage(dBuV)=20 $\log_{10}$ RF Voltage(uV)

8.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 51.1 % RH

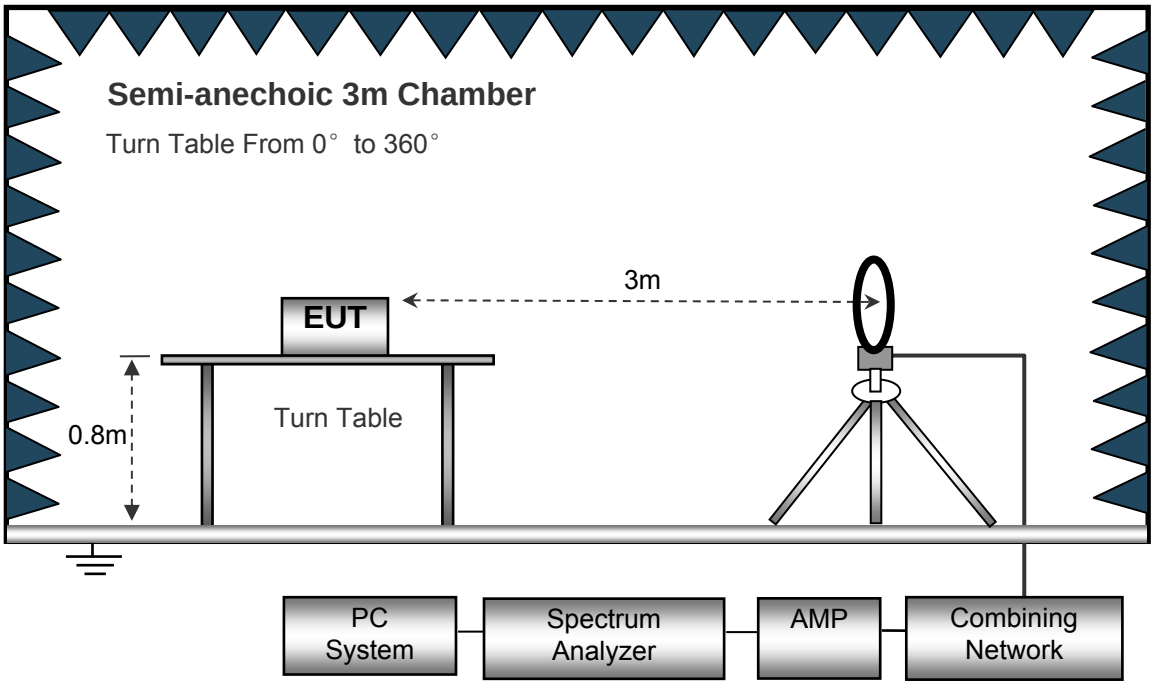
Atmospheric Pressure: 101.2kPa

EUT Operation **:**

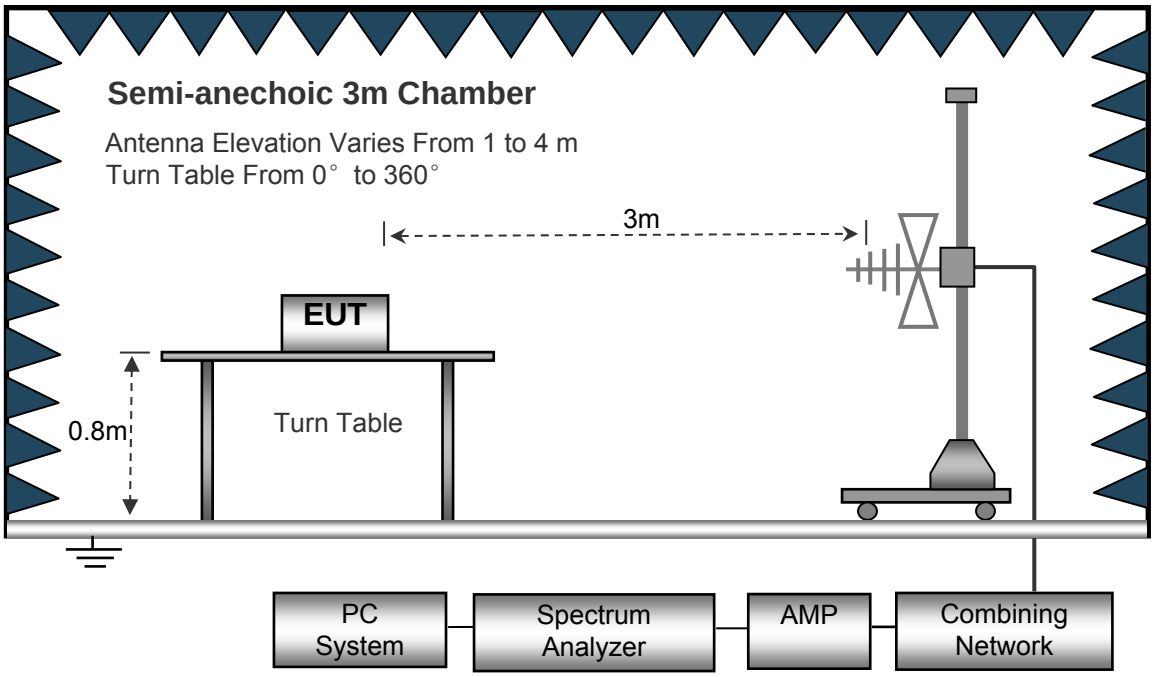
The test was performed in transmitting mode, the test data were shown in the report.

8.2 Test Setup

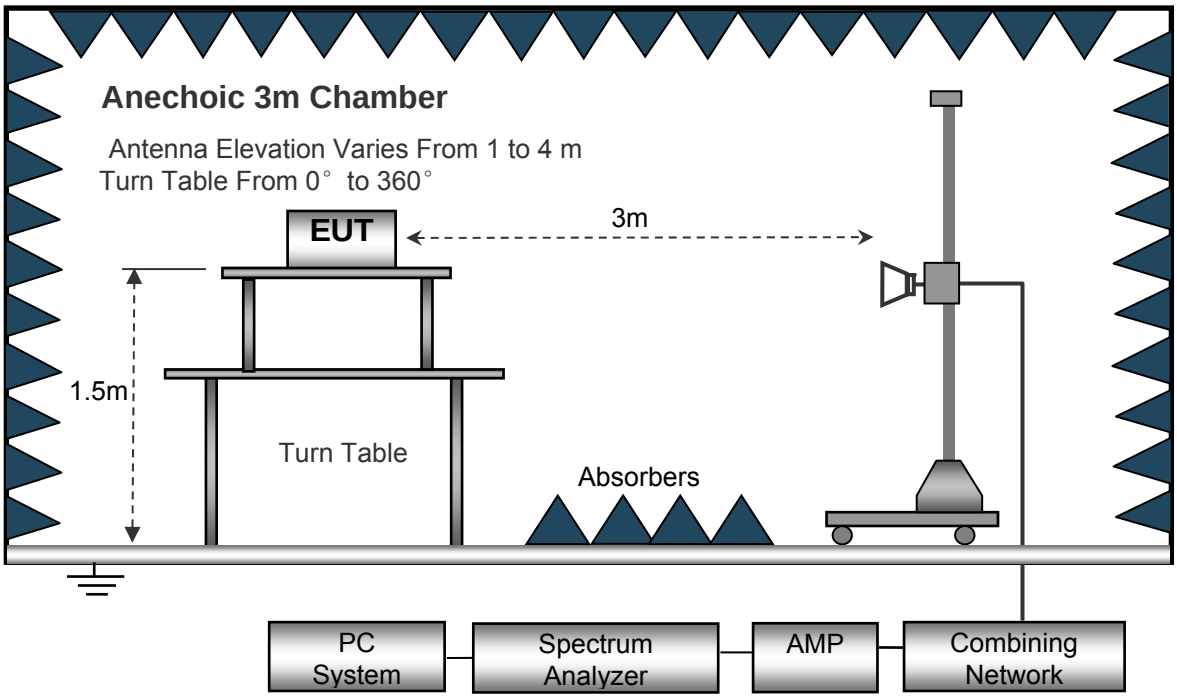
The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed	Auto
IF Bandwidth	10kHz
Video Bandwidth	10kHz
Resolution Bandwidth	10kHz

30MHz ~ 1GHz

Sweep Speed	Auto
Detector	PK
Resolution Bandwidth	100kHz
Video Bandwidth	300kHz

Above 1GHz

Sweep Speed	Auto
Detector	PK
Resolution Bandwidth	1MHz
Video Bandwidth	3MHz
Detector	Ave.
Resolution Bandwidth	1MHz
Video Bandwidth	10Hz

8.4 Test Procedure

1. 1The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane; For above1GHz, the EUT is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

8.5 Test Result

Test Frequency: 9 kHz ~ 30 MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency: 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Low Channel									
144.33	54.49	QP	355	1.4	H	-16.65	37.84	43.50	-5.66
144.33	44.86	QP	238	1.8	V	-16.65	28.21	43.50	-15.29
2404.00	95.64	PK	78	1.7	V	-12.99	82.65	114.00	-31.35
4808.00	54.51	PK	195	1.6	V	0.84	55.35	74.00	-18.65
7212.00	50.02	PK	34	1.7	V	3.54	53.56	74.00	-20.44
2317.06	55.59	PK	339	1.5	V	-13.19	42.40	74.00	-31.60
2384.07	52.96	PK	110	1.4	H	-13.14	39.82	74.00	-34.18
2497.75	54.32	PK	276	1.7	V	-13.08	41.24	74.00	-32.76

AV=PK + Duty Cycle Correction Factor					
Frequency(MHz)	PK(dBμV/m)	Duty Cycle Correction Factor (dB)	AV(dBμV/m)	Limit(dBμV/m)	Margin(dB)
2404.00	82.65	-25.73	56.92	94.00	-37.08
4808.00	55.35	-25.73	29.62	54.00	-44.38
7212.00	53.56	-25.73	27.83	54.00	-46.17
2317.06	42.40	-25.73	16.67	54.00	-57.33
2384.07	39.82	-25.73	14.09	54.00	-59.91
2497.75	41.24	-25.73	15.51	54.00	-58.49

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Middle Channel									
144.33	53.51	QP	90	1.1	H	-16.65	36.86	43.50	-6.64
144.33	46.24	QP	178	1.4	V	-16.65	29.59	43.50	-13.91
2442.00	94.55	PK	220	1.1	V	-12.93	81.62	114.00	-32.38
4884.00	55.64	PK	360	1.3	V	1.64	57.28	74.00	-16.72
7326.00	51.07	PK	262	1.4	V	3.50	54.57	74.00	-19.43
2344.79	56.25	PK	347	1.3	V	-13.19	43.06	74.00	-30.94
2369.05	52.08	PK	342	2.0	H	-13.14	38.94	74.00	-35.06
2498.16	52.77	PK	81	1.5	V	-13.08	39.69	74.00	-34.31

AV=PK + Duty Cycle Correction Factor					
Frequency(MHz)	PK(dBμV/m)	Duty Cycle Correction Factor (dB)	AV(dBμV/m)	Limit(dBμV/m)	Margin(dB)
2442.00	81.62	-25.73	55.89	94.00	-38.11
4884.00	57.28	-25.73	31.55	54.00	-42.45
7326.00	54.57	-25.73	28.84	54.00	-45.16
2344.79	43.06	-25.73	17.33	54.00	-56.67
2369.05	38.94	-25.73	13.21	54.00	-60.79
2498.16	39.69	-25.73	13.96	54.00	-60.04

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK High Channel									
144.33	52.23	QP	177	1.6	H	-16.65	35.58	43.50	-7.92
144.33	47.24	QP	280	1.2	V	-16.65	30.59	43.50	-12.91
2480.00	93.92	PK	75	2.0	V	-12.95	80.97	114.00	-33.03
4960.00	58.13	PK	312	1.2	V	2.44	60.57	74.00	-13.43
7440.00	51.27	PK	29	1.0	V	3.46	54.73	74.00	-19.27
2327.60	56.93	PK	204	1.6	V	-13.19	43.74	74.00	-30.26
2377.67	54.16	PK	266	1.3	H	-13.14	41.02	74.00	-32.98
2497.06	54.50	PK	132	1.2	V	-13.08	41.42	74.00	-32.58

AV=PK + Duty Cycle Correction Factor					
Frequency(MHz)	PK(dBμV/m)	Duty Cycle Correction Factor (dB)	AV(dBμV/m)	Limit(dBμV/m)	Margin(dB)
2480.00	80.97	-25.73	55.24	94.00	-38.76
4960.00	60.57	-25.73	34.84	54.00	-39.16
7440.00	54.73	-25.73	29.00	54.00	-45.00
2327.60	43.74	-25.73	18.01	54.00	-55.99
2377.67	41.02	-25.73	15.29	54.00	-58.71
2497.06	41.42	-25.73	15.69	54.00	-58.31

Test Frequency: From 18GHz to 25GHz

The measurements were more than 20 dB below the limit and not reported.

9 Periodic Operation

The duty cycle was determined by the following equation:

To calculate the actual field intensity, the duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion

Duty Cycle (%) =Total On interval in a complete pulse train/ Length of a complete pulse train * %

Duty Cycle Correction Factor (dB) =20 * Log_{10} (Duty Cycle)

Low Channel	
Total transmission time(ms)	2.48
Length of a complete transmission period(ms)	48.00
Duty Cycle(%)	5.17
Duty Cycle Correction Factor(dB)	-25.73

High Channel	
Total transmission time(ms)	2.48
Length of a complete transmission period(ms)	48.00
Duty Cycle(%)	5.17
Duty Cycle Correction Factor(dB)	-25.73

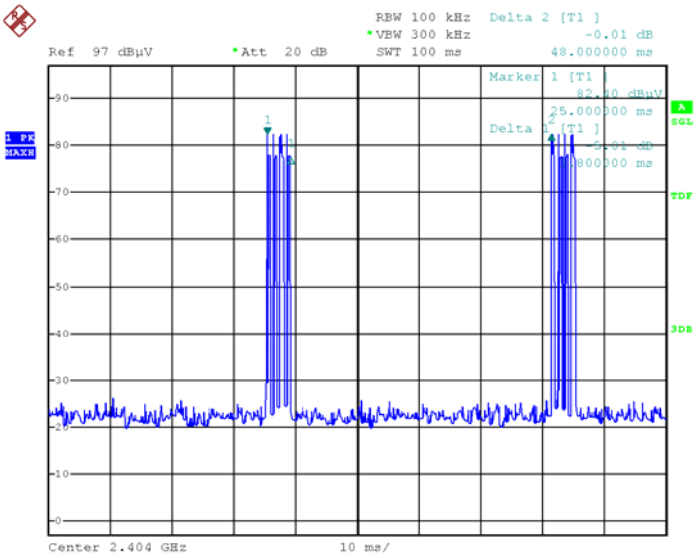
High Channel	
Total transmission time(ms)	2.48
Length of a complete transmission period(ms)	48.00
Duty Cycle(%)	5.17
Duty Cycle Correction Factor(dB)	-25.73

Refer to the duty cycle plot (as below)

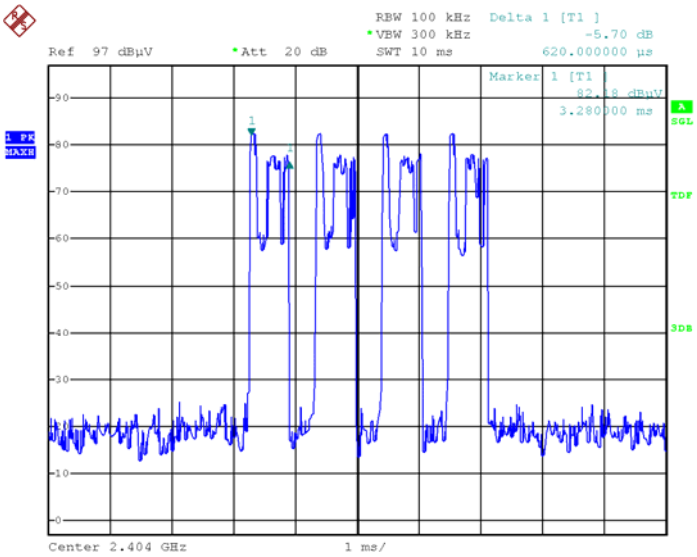
Test plots

Low Channel

Period

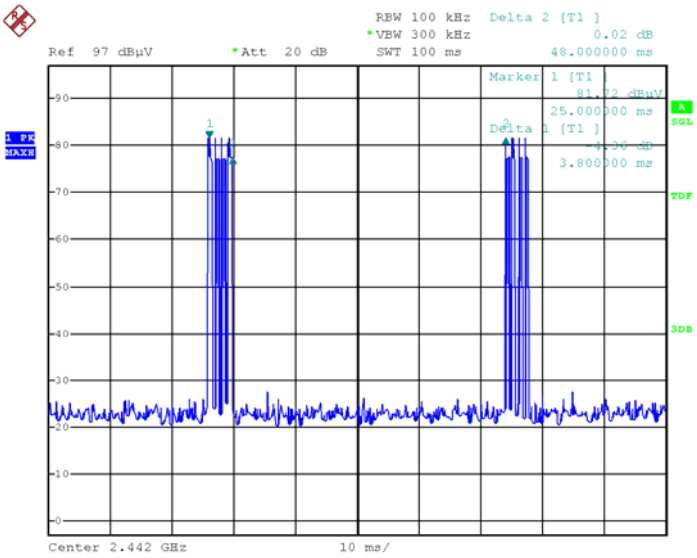


Pulse

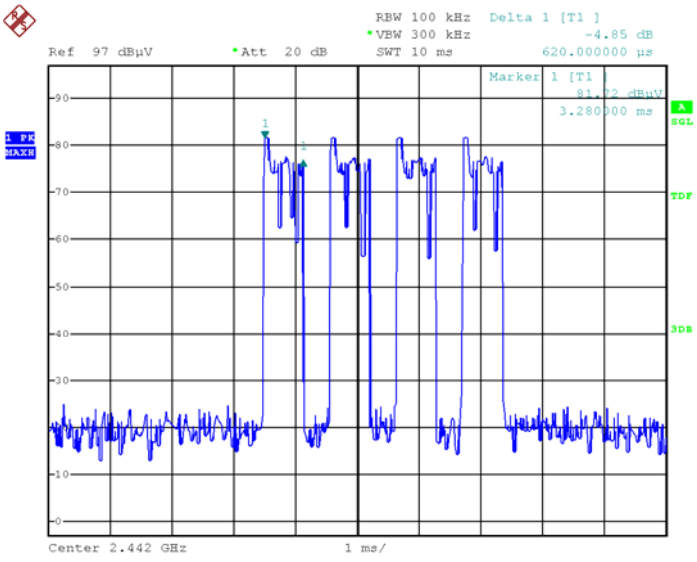


Middle Channel

Period

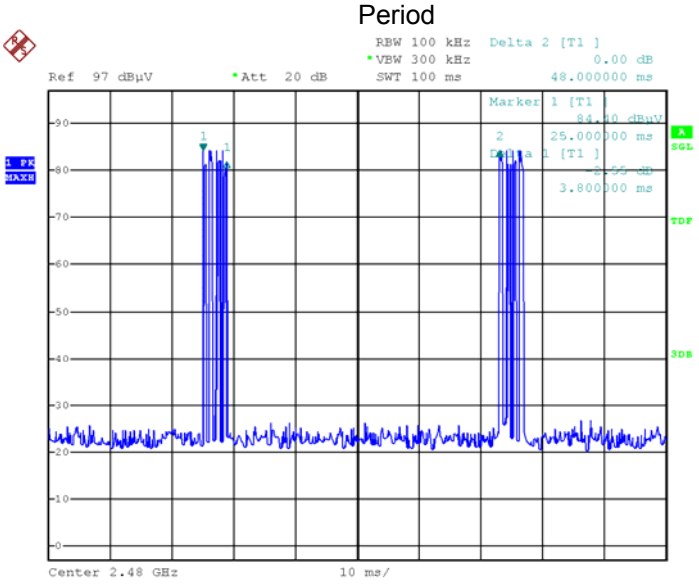


Pulse

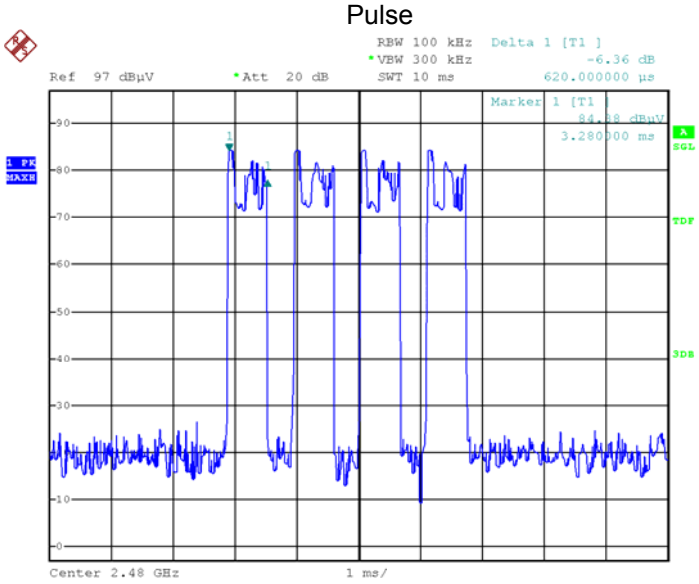


High Channel

Period



Pulse



10 Outside of Band Emission

Test Requirement: 15.249(d):Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Method: ANSI C63.10:2013

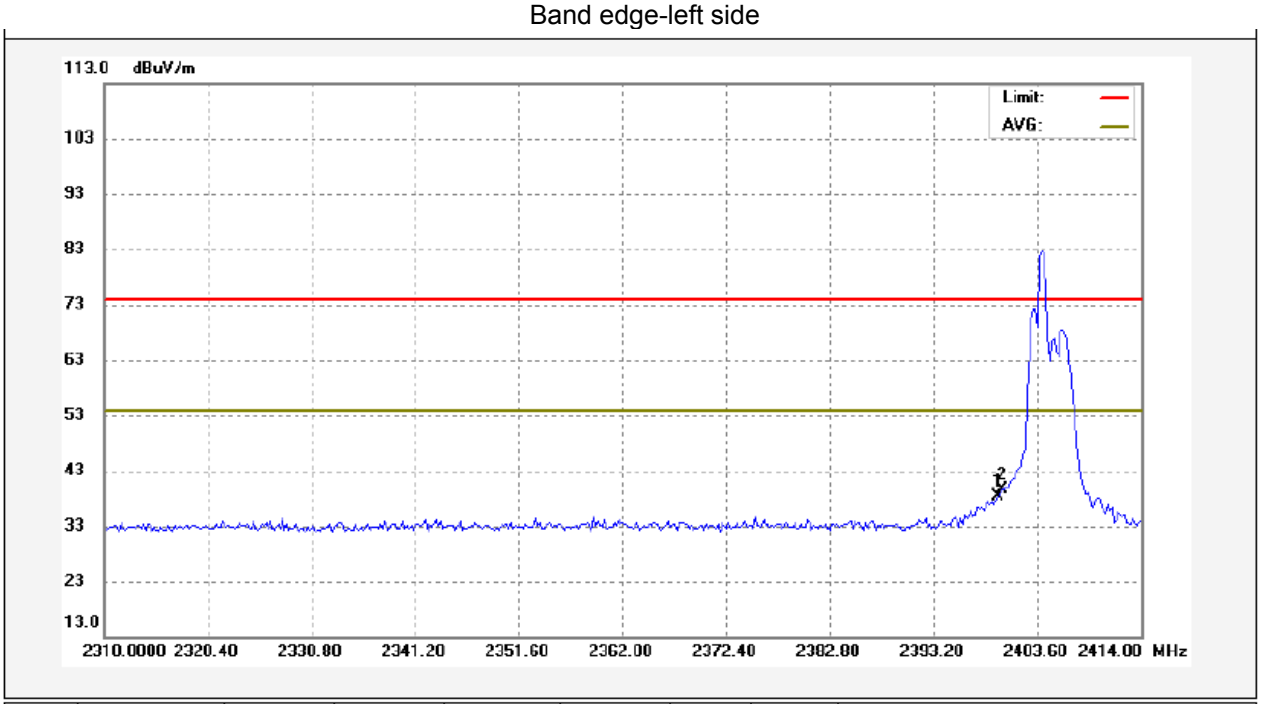
Test Mode: Transmitting

10.1 Test Procedure

Refer to section 8.4 of this test report.

10.2 Test Result

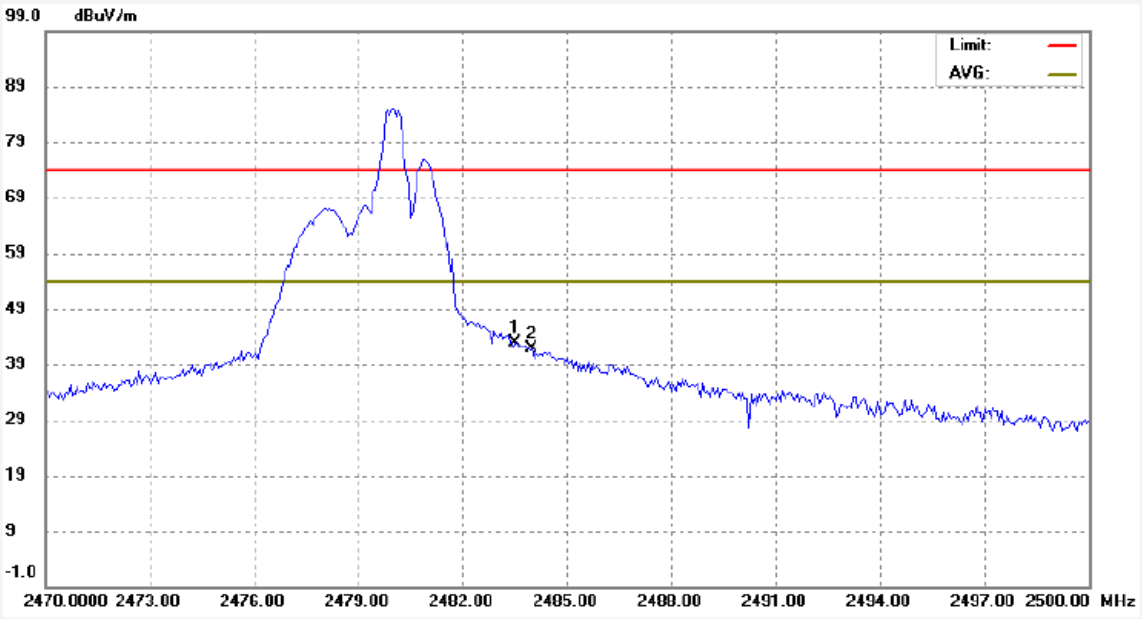
Band edge-left side



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2399.648	51.21	-12.92	38.29	74.00	-35.71	peak	
2	2400.000	52.58	-12.92	39.66	74.00	-34.34	peak	

Remark: The worst case (Vertical) was recoded.

Band edge-right side



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2483.500	55.92	-12.95	42.97	74.00	-31.03	peak	
2	2483.980	54.93	-12.95	41.98	74.00	-32.02	peak	

Remark: The worst case (Vertical) was recoded.

11 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.215(c)

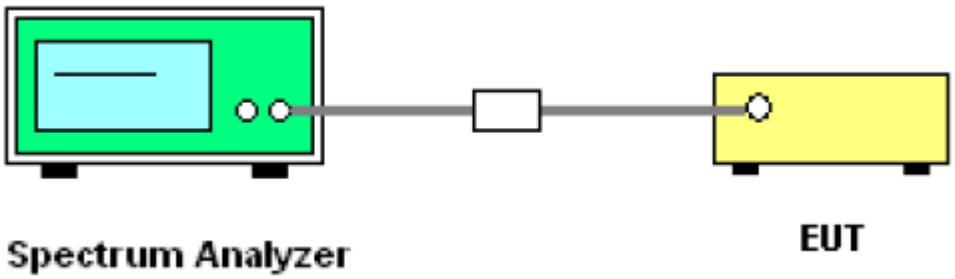
Test Method: ANSI C63.10:2013

Test Mode: Transmitting

11.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 30 kHz, VBW =100 kHz, Span=1MHz

11.2 Test Setup

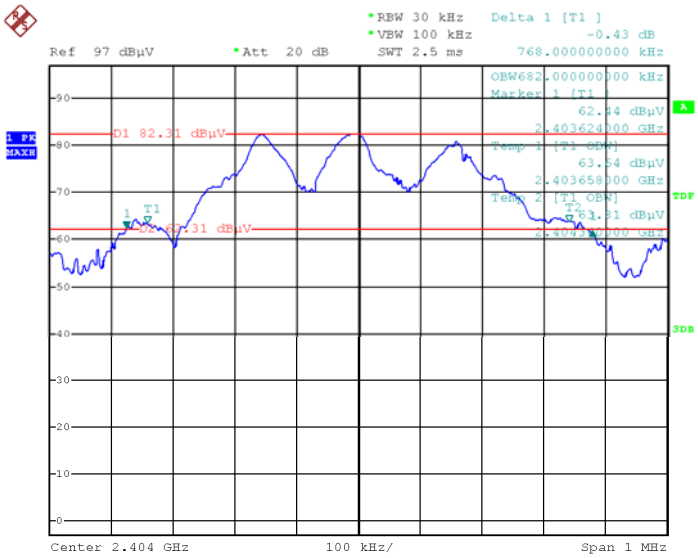


11.3 Test Result

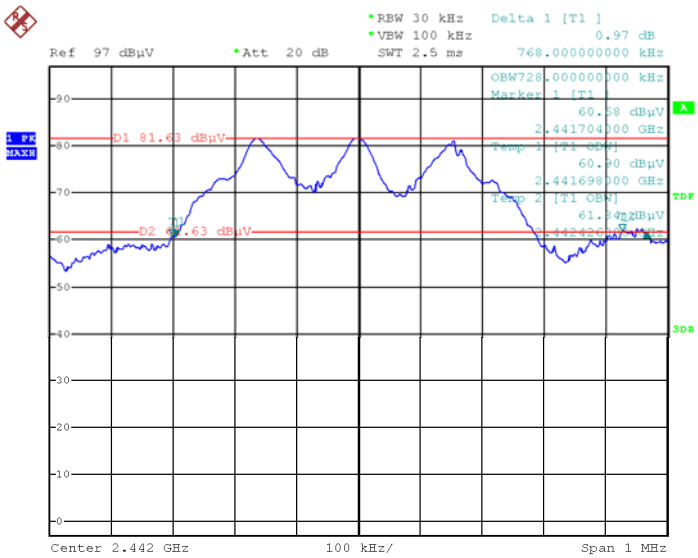
Operation mode	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low channel	768.00	682.00
Middle channel	768.00	728.00
High channel	768.00	724.00

Test result plot as follows:

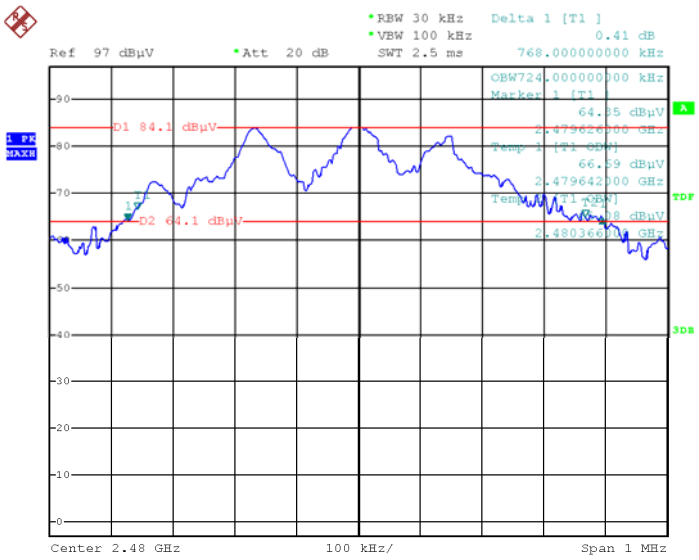
Mode: Low channel



Mode: Middle channel



Mode: High channel



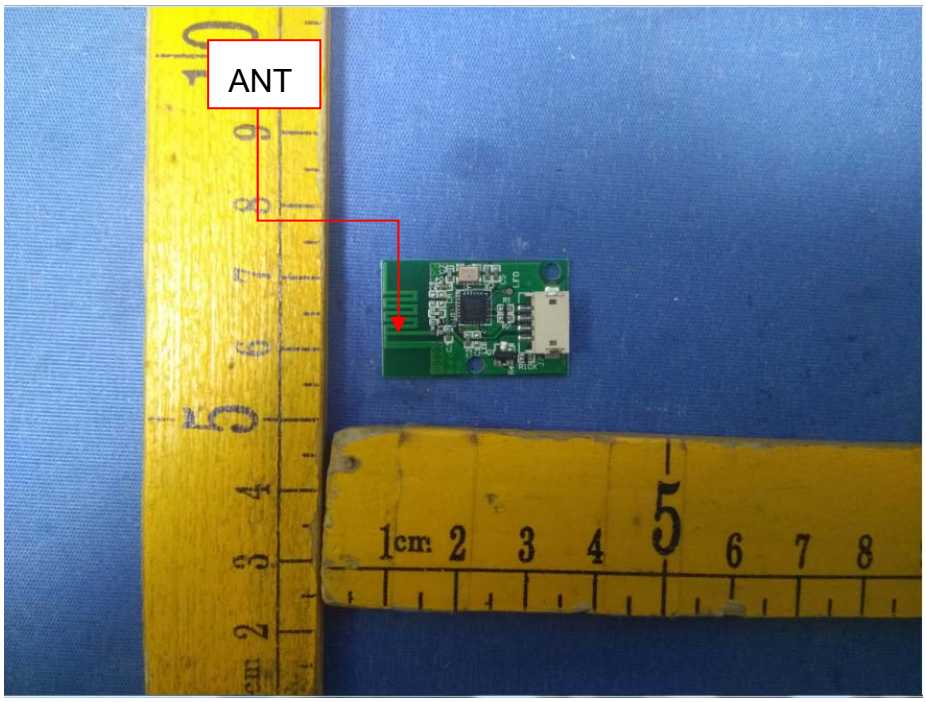
12 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Result:

The EUT has one PCB Printed Antenna, the gain is 0dBi. meets the requirements of FCC 15.203.



13 FCC ID: 2AGE6-2461RC RF Exposure Report

Test Requirement: FCC Part 1.1307

Evaluation Method: FCC Part 2.1091 & KDB 447498 D01 General RF Exposure Guidance v06

13.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

13.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz; *Plane-wave equivalent power density

13.3 MPE Calculation Method

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)
P = output power to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, R=20cm, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (dBi)	Antenna Gain (numeric)	Source-based time-averaged maximum output power(dBm	Source-based time-averaged maximum output power(mW)	Power Density (mW/cm2)	Limit of Power Density (mW/cm2)	Reult
0	1.0	-12.55	0.056	0.0000111	1	Compliance

Note: the following is Source-based time-averaged maximum output power Calculation

Frequency	Source-based time-averaged maximum output power	Substituted (0dBm)	Source-based time-averaged maximum output power
(MHz)	(dBμV/m)	(dBμV/m)	(dBm)
2404	82.65	95.20	-12.55

13.4 Result: Compliance

No SAR measurement is required.

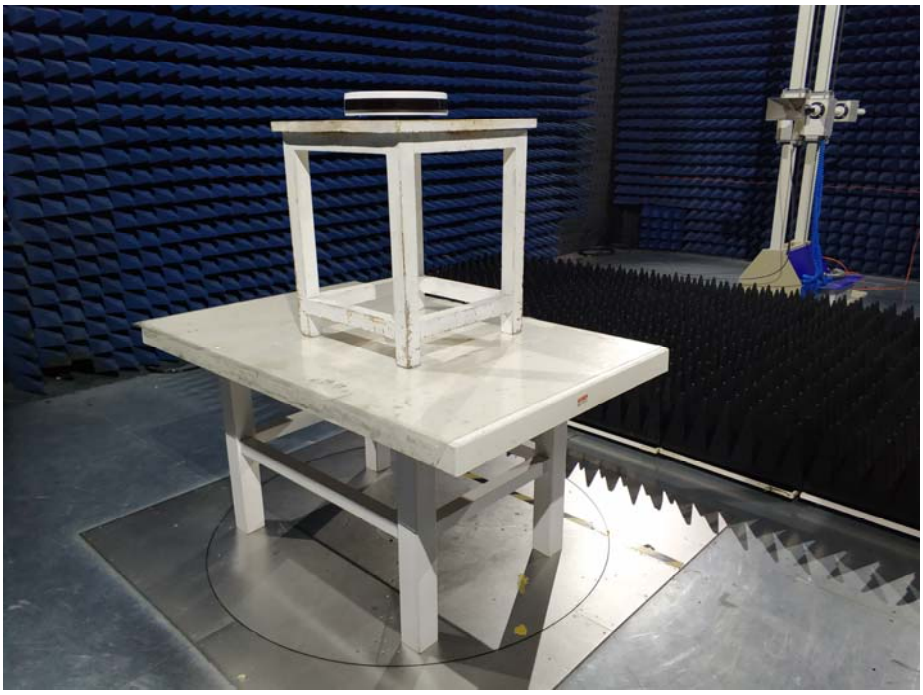
14 Photographs- Model K1 Test Setup Photos

14.1 Photograph - Radiation Spurious Emission

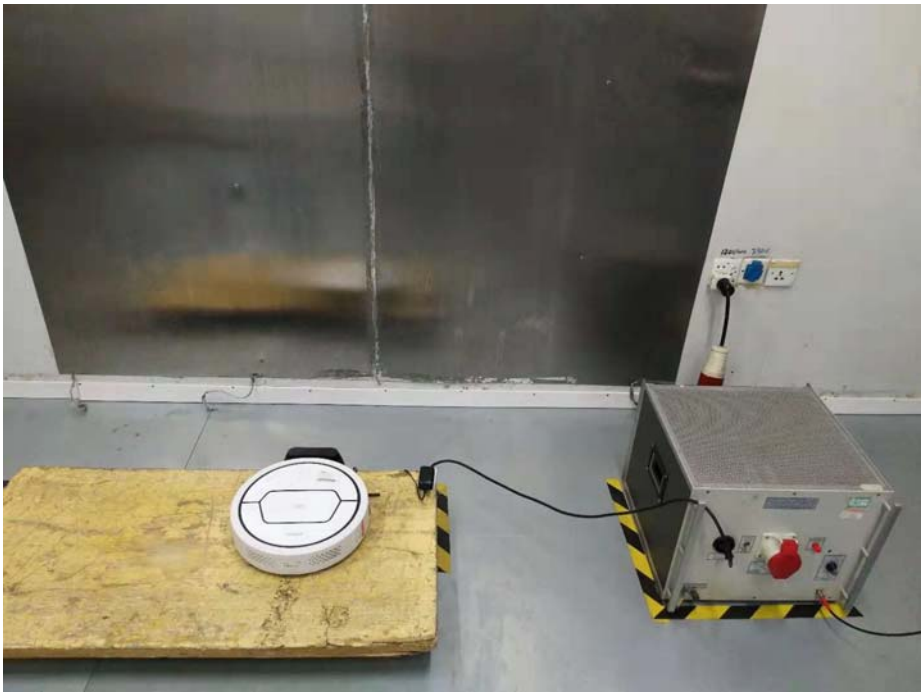
Test frequency from 9 kHz to 30MHz

Test frequency from 30MHz to 1GHz

Test frequency above 1GHz

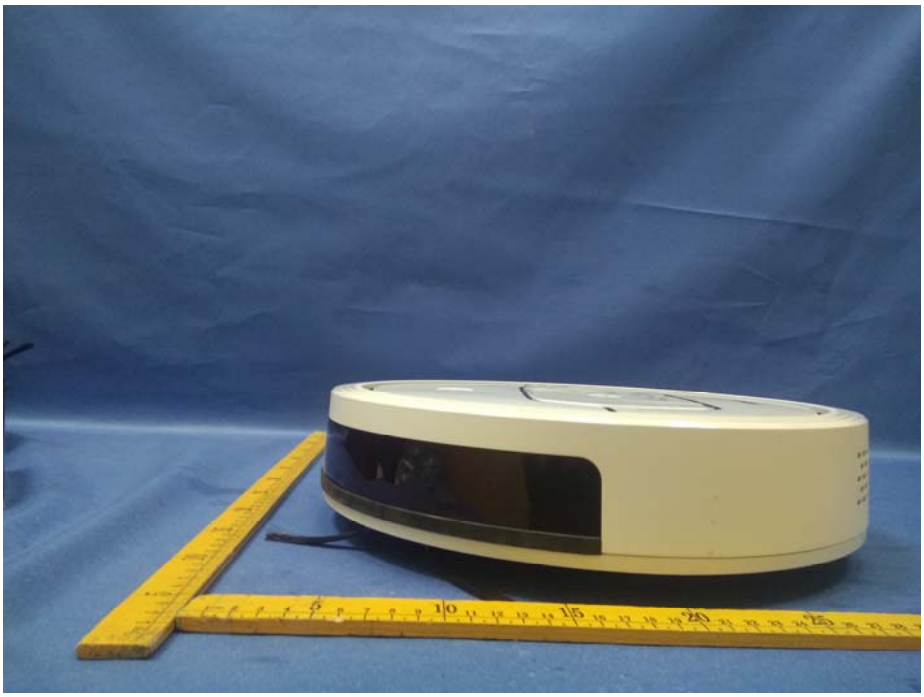


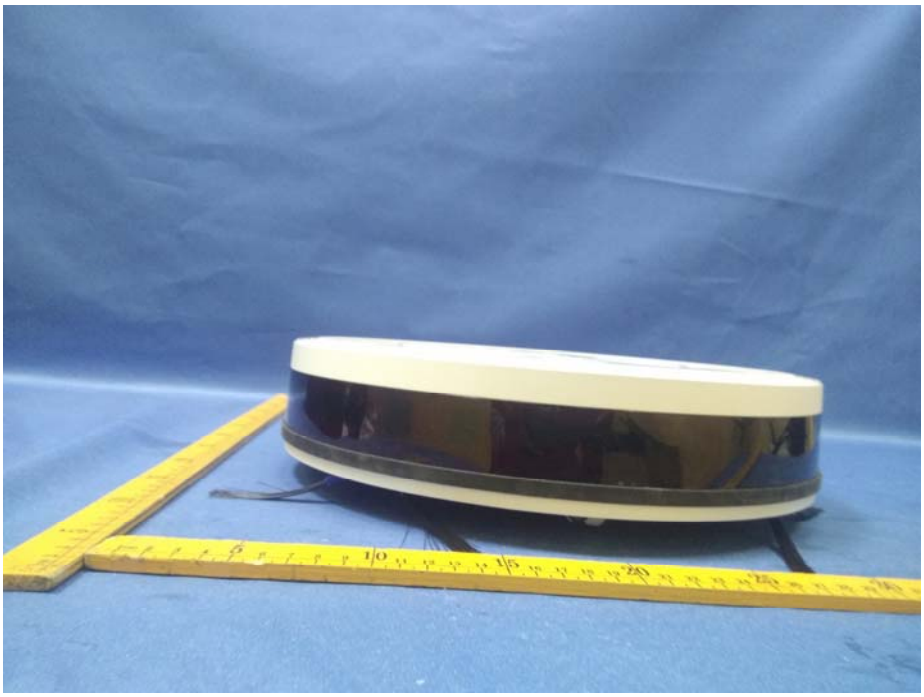
14.2 Photograph – Conducted Emission Test Setup

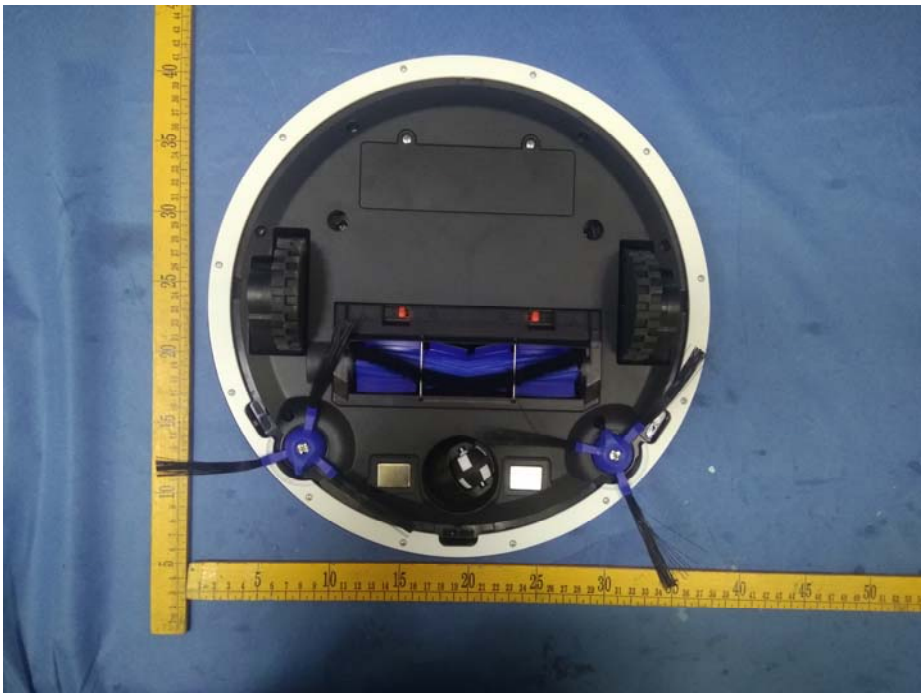


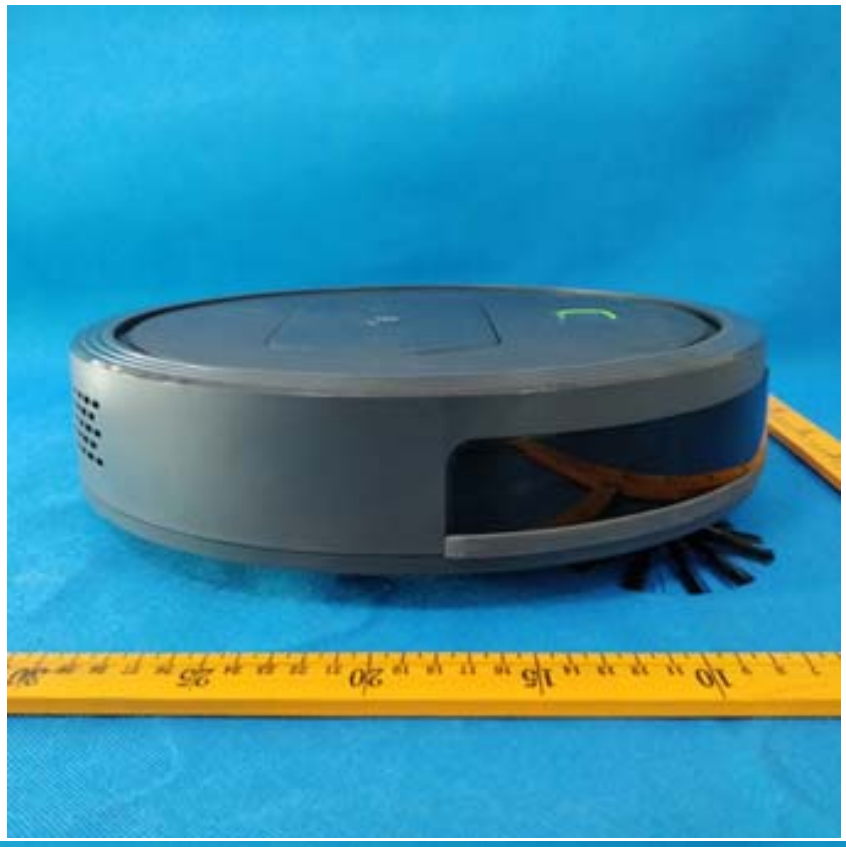
15 Photographs - Constructional Details

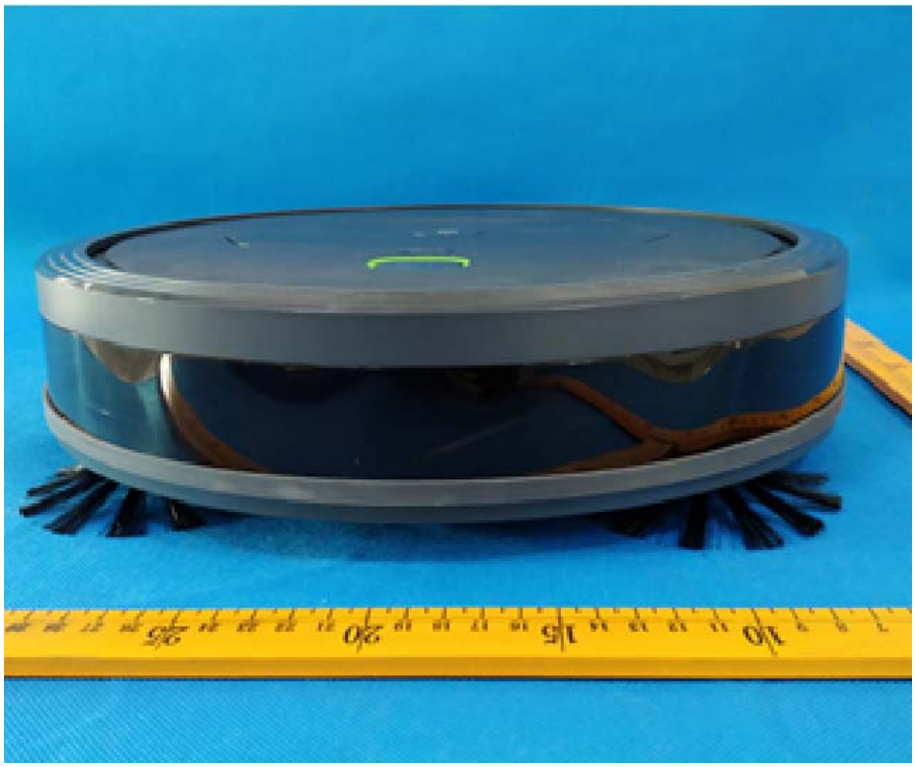
15.1 Photographs –Model K1 External Photos



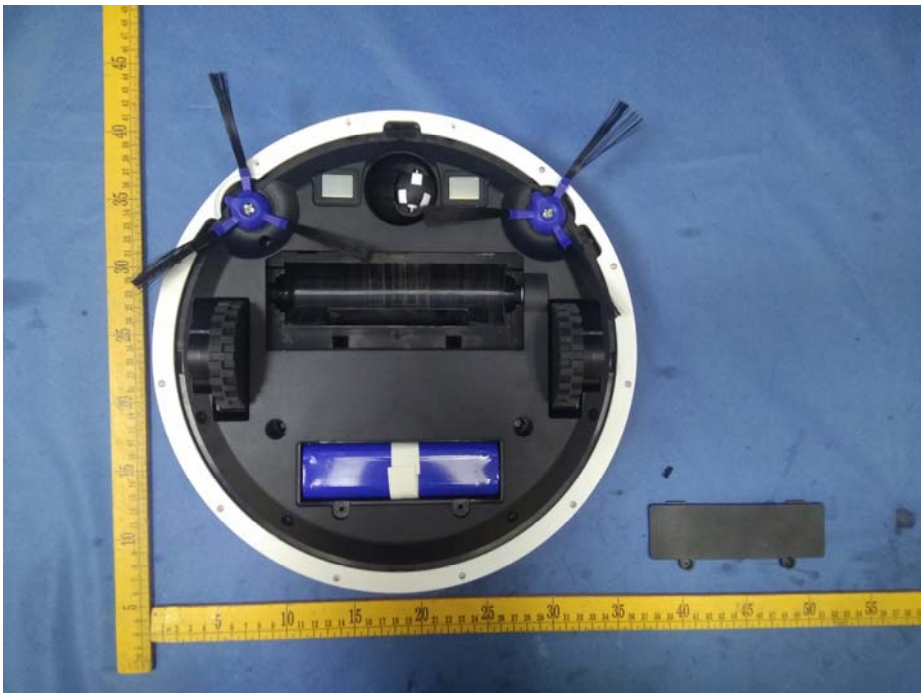


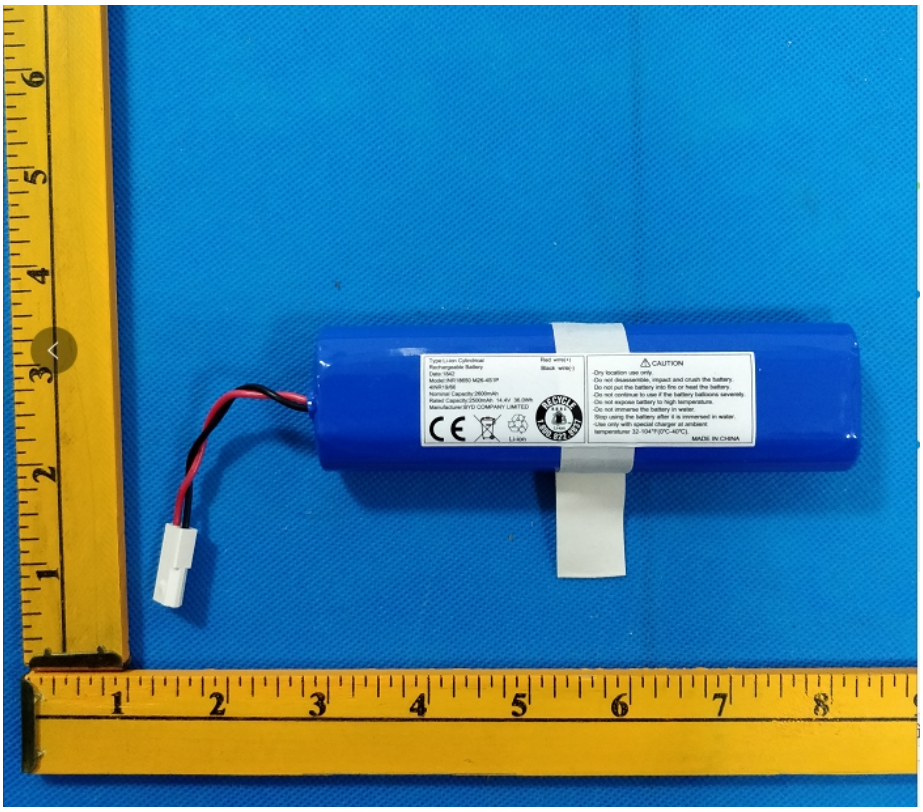


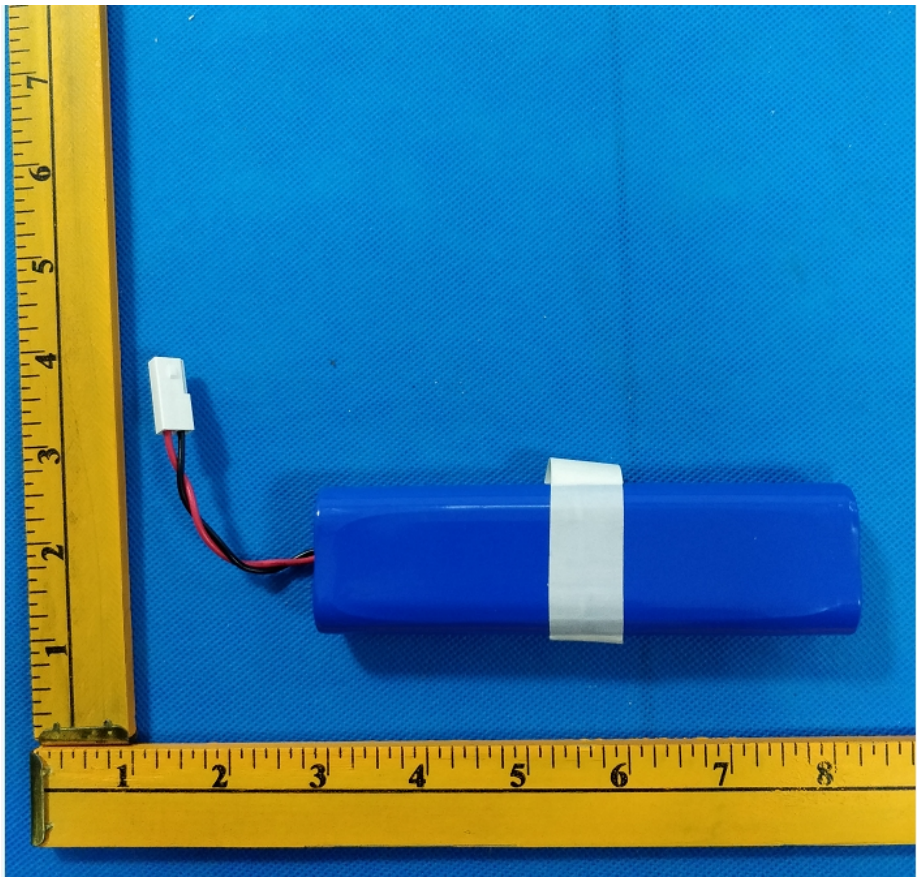


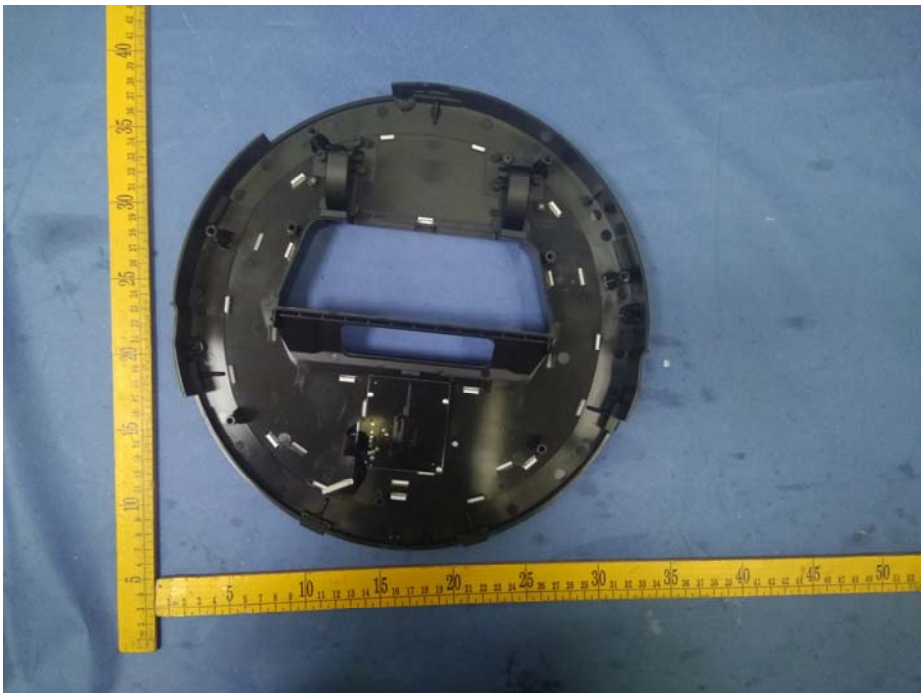


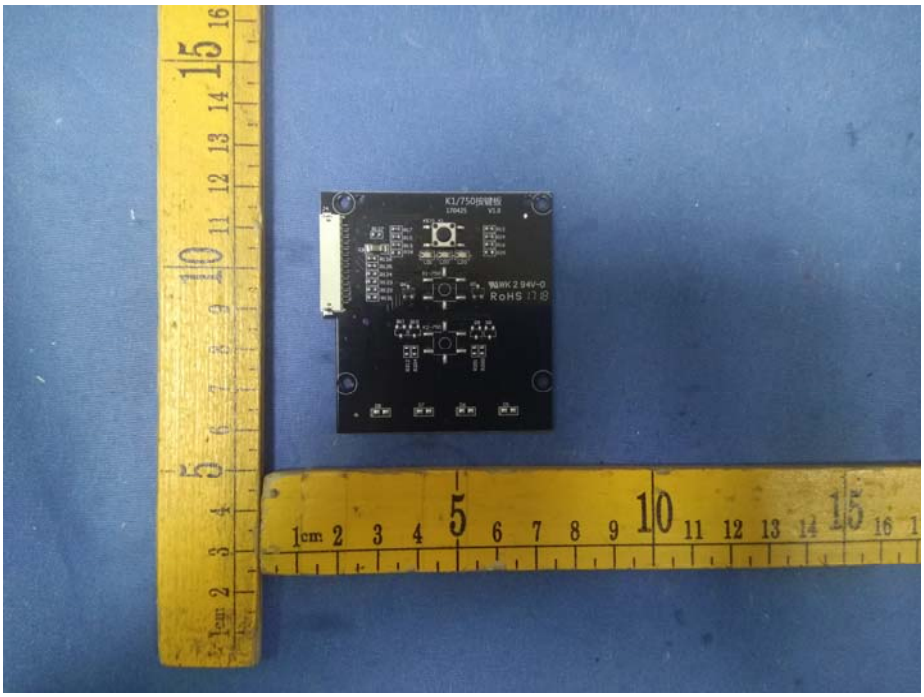
15.2 Photographs – Model K1 Internal Photos

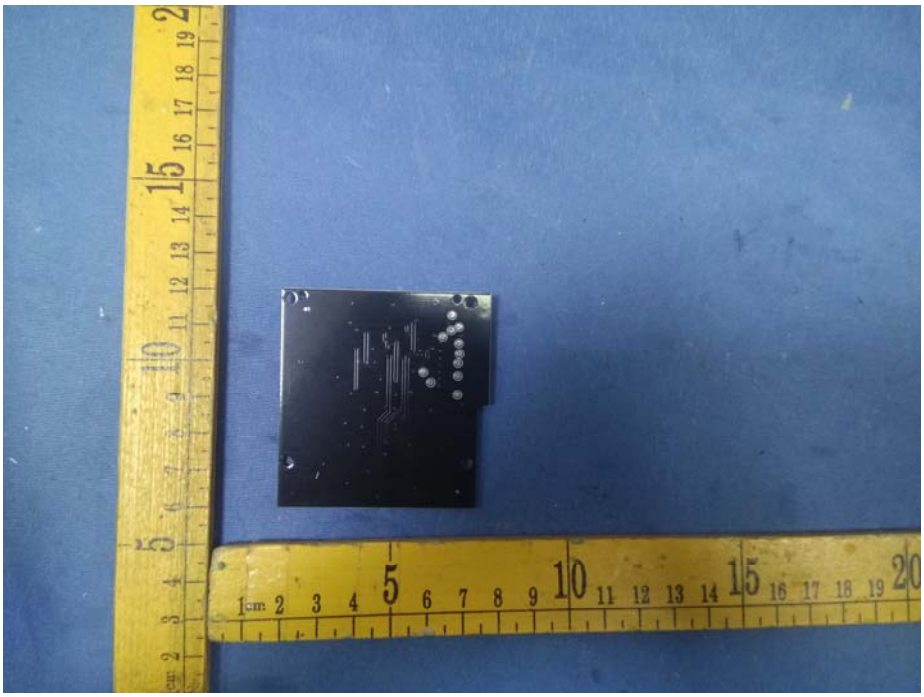


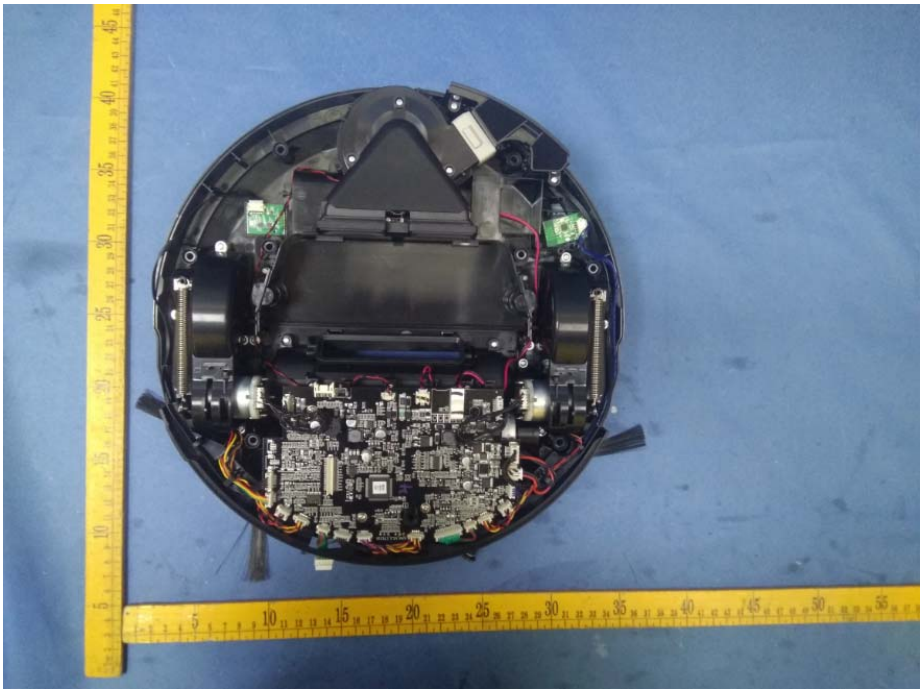


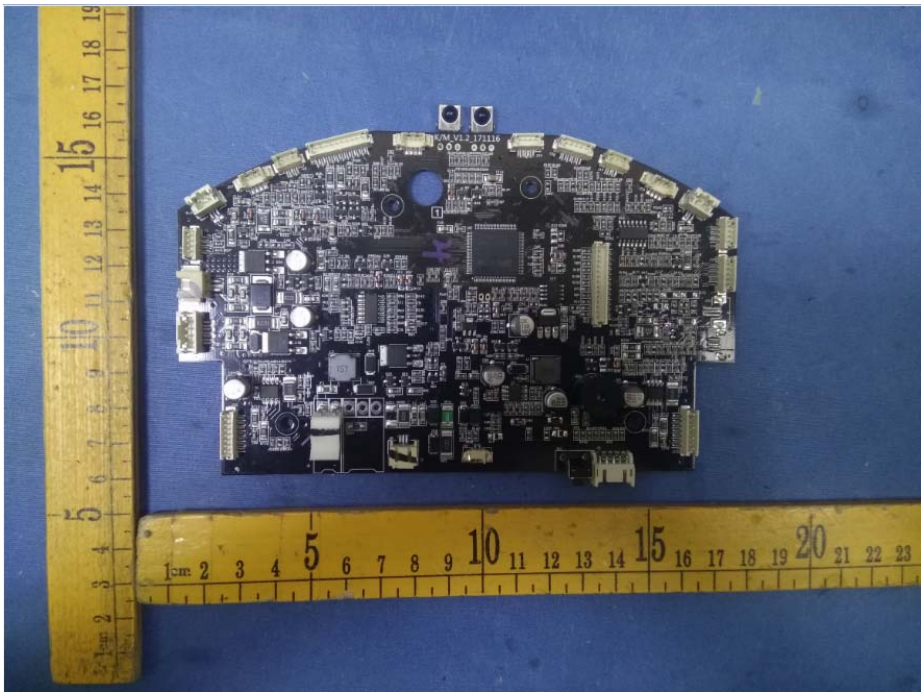


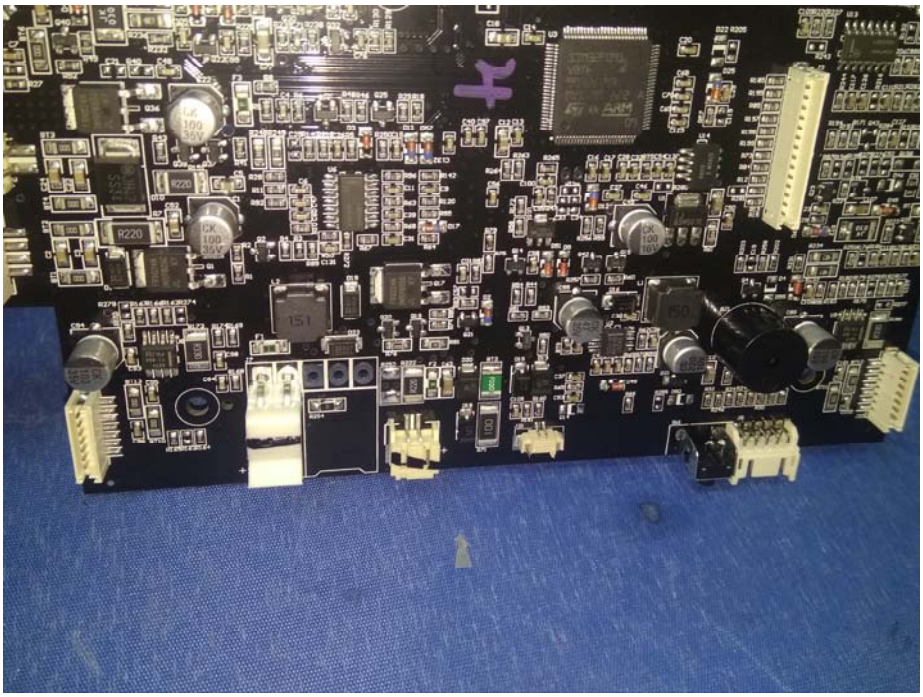


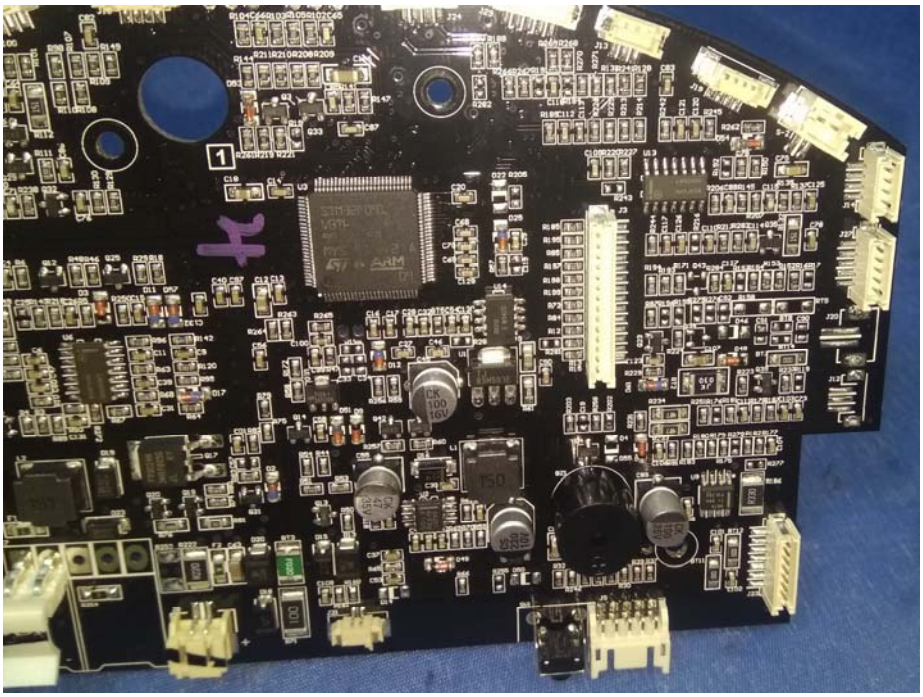


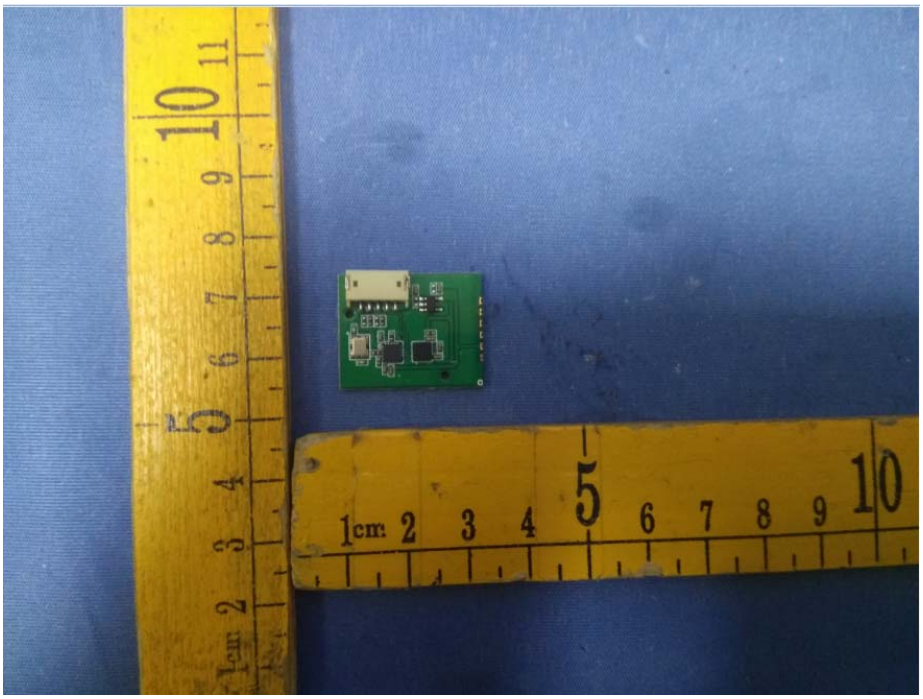


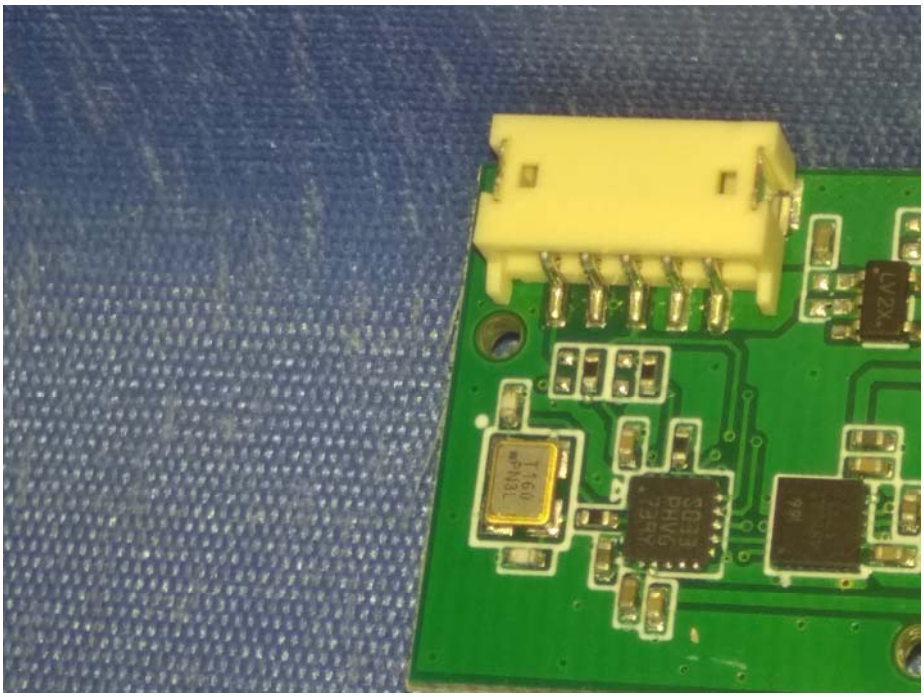


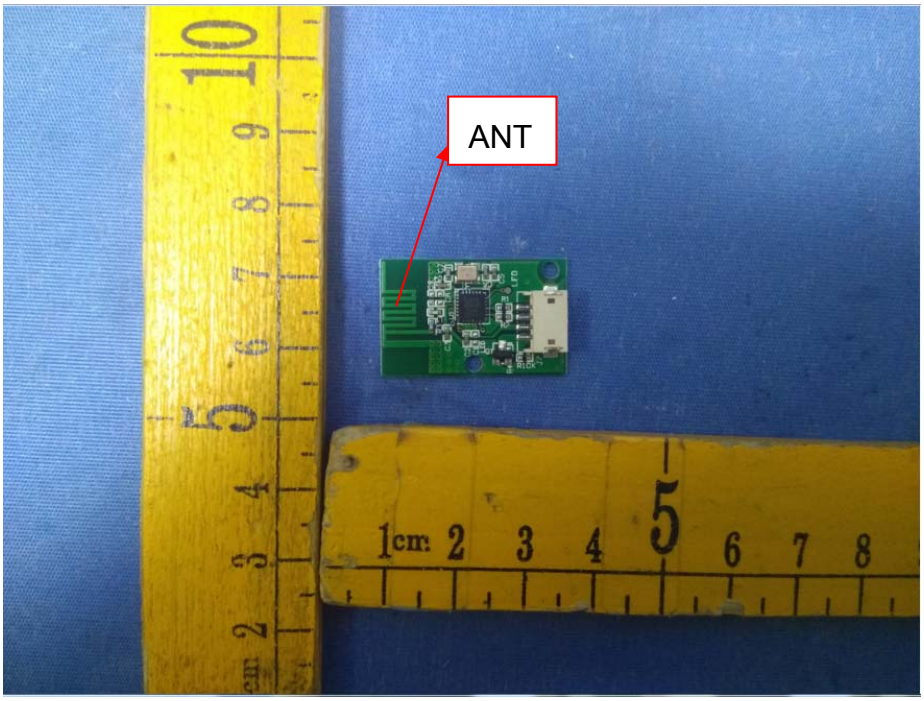


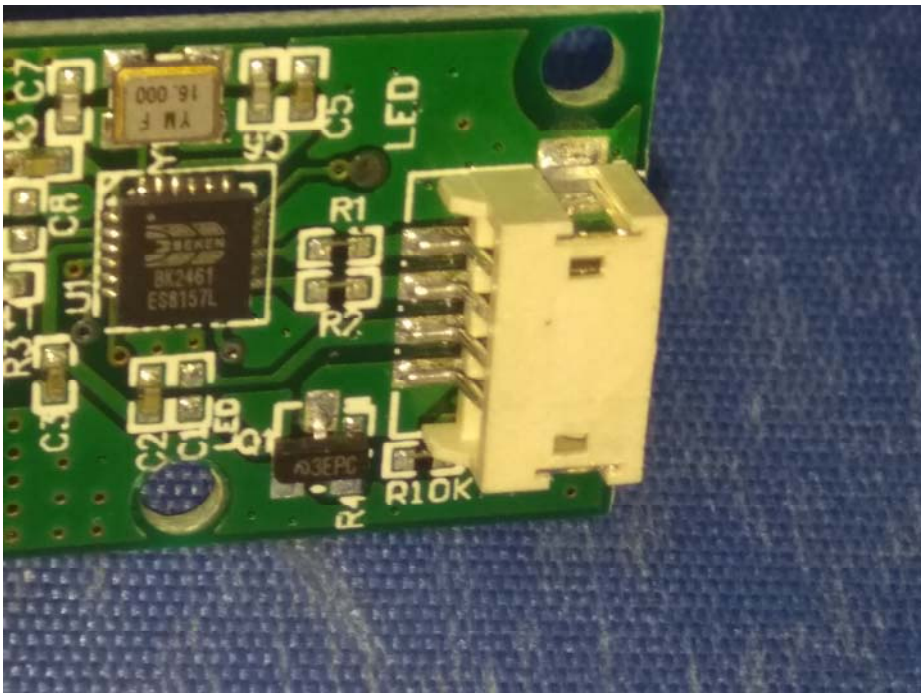


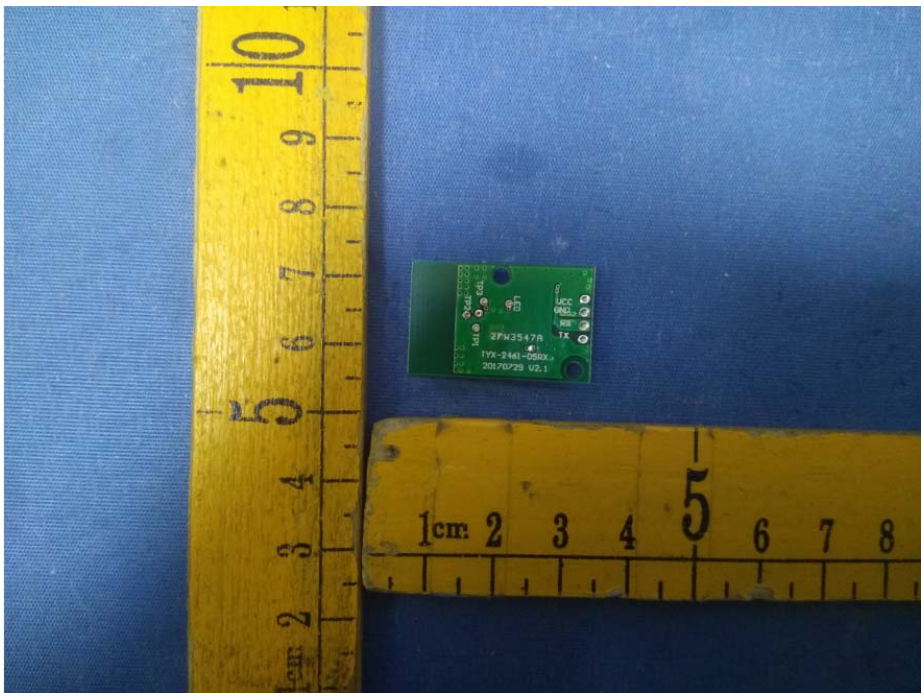







ANT
1cm 2 3 4 5 6 7 8





======End of Report======