



TEST REPORT

FCC ID: 2ALXT-C094BT

For

Dongguan Songwei Electric Technology Co., Ltd.

Electric Heater

Model No. : WU-31628094CBT/WU-13533BE/WU31533BT/WU-31733L

Trade Name : N/A

Prepared for : Dongguan Songwei Electric Technology Co., Ltd.
Address : No., 75, Dapianmei Rd., Da Pian Mei Village, Da Ling Shan Town, Dong
: Guan City, Guang Dong Province, China

Prepared by : Shenzhen Alpha Product Testing Co., Ltd.
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Report No. : T1870581 01

Date of Receipt : April 10, 2017

Date of Test : April 10, 2017- April 27, 2017

Date of Report : April 27, 2017

Version Number : REV0

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DECLARATION

Applicant : Dongguan Songwei Electric Technology Co., Ltd.
 Manufacturer : Dongguan Songwei Electric Technology Co., Ltd.
 Product : Electric Heater

(A) Model No. : WU-31628094CBT/WU-13533BE/WU31533BT/WU-31733L

(B) Trade Name : N/A

(C) Power supply : AC 120V/60Hz

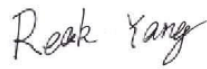
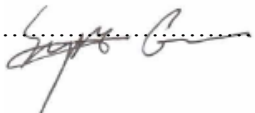
Measurement Standard Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2016,
 ANSI C63.10:2013**

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....:	Reak Yang Project Engineer	
Approved by (name + signature).....:	Simple Guan Project Manager	
Date of issue.....	April 26, 2017	

1. General Information

1.1. Description of Device (EUT)

EUT	:	Electric Heater
Model No.	:	WU-31628094CBT/WU-13533BE/WU31533BT/WU-31733L
DIFF.	:	There is no difference between all the models, except the appearance and model name, so this report performs the model WU-31628094CBT.
Trade mark	:	N/A
Power supply	:	AC 120V/60Hz
Radio Technology	:	Bluetooth 4.0
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK
Antenna Type	:	Integrated Antenna, max gain 2.8dBi.
Software version	:	N/A
Hardware version	:	Ver 4.1
Applicant	:	Dongguan Songwei Electric Technology Co., Ltd.
Address	:	No., 75, Dapianmei Rd., Da Pian Mei Village, Da Ling Shan Town, Dong Guan City, Guang Dong Province, China
Manufacturer	:	Dongguan Songwei Electric Technology Co., Ltd.
Address	:	No., 75, Dapianmei Rd., Da Pian Mei Village, Da Ling Shan Town, Dong Guan City, Guang Dong Province, China
Adapter	:	N/A

1.2. Description of Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road,

Bao'an, Shenzhen, China

March 25, 2015 File on Federal Communication Commission

Registration Number: 203110

July 18, 2014 Certificated by IC

Registration Number: 12135A

1.3. Test Procedure

POWER LINE CONDUCTED INTERFERENCE:

The test procedure used was ANSI Standard ANSI C63.4:2014 using a 50 u H LISN. Both Lines were observed. The bandwidth of the receiver was 10kHz with an appropriate sweep speed. The ambient temperature of the EUT was 25°C with a humidity of 58%.

RADIATION INTERFERENCE:

The test procedure used was ANSI Standard ANSI C63.4:2014 using a ANRITSU spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a micro volt at the output of the antenna. The resolution bandwidth was 100kHz and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3MHz above 1 GHz. The ambient temperature of the EUT was 25°C with a humidity of 58%.

FORMULA OF CONVERSION FACTORS:

The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer and cable loss. The antenna correction factors and cable loss are stated in terms of dB. The gain of the Pre-selector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF + CABLE = FS

33.20 dBuV + 10.36 dB + 0.9 dB= 44.46 dBuV/m @ 3m

ANSI STANDARD ANSI C63.4:2014 10.1.7 MEASUREMENT PROCEDURES:

The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSI Standard ANSI C63.4:2014 10.1.7 with the EUT 40 cm from the vertical ground wall.

2. Summary of Measurement

2.1. Summary of test result

Test procedures according to the technical standards:

KDB 558074 D01 DTS Meas Guidance v03r05

Description of Test Item	Standard	Results
Spurious Emission	Section 15.247&15.209	PASS
Conduction Emission	Section 15.207	PASS
Bandwidth Test	Section 15.247	PASS
Peak Power	Section 15.247	PASS
Power Density	Section 15.247	PASS
Band Edge	Section 15.247	PASS
Antenna Requirement	Section 15.203	PASS

Note:

1: "N/A" denotes test is not applicable in this Test Report

2: Test with the test procedure Blue tool.

3: All tests are according to ANSI C63.10-2013:

2.2. Assistant equipment used for test

Description	:	N/A
Manufacturer	:	N/A
Model No.	:	N/A

2.3. Block Diagram of Test setup

1, For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz, 1.5 meter high above ground for above 1GHz.

EUT was be set into BT test mode by software before test.



2, For Power Line Conducted Emissions Test.

EUT

2.4. Test mode

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode.

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH1	2402
	Middle: CH19	2440
	High: CH40	2480

2.5. Test Conditions

Temperature range	21-25°C
Humidity range	40-75%
Pressure range	86-106kPa

2.6. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.71dB	
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB	Polarize: V
	2.57dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.90dB	Polarize: V
	3.92dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.28dB	Polarize: H
	4.26dB	Polarize: V
Uncertainty for radio frequency	1×10^{-9}	
Uncertainty for conducted RF Power	0.16dB	
Uncertainty for temperature	0.2°C	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

2.7. Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	cal. Date	Cal. Interval
3m Semi-Anechoic	CHENYU	N/A	N/A	2017.07.21	2Year
Spectrum analyzer	Agilent	E4407B	MY46185649	2017.09.29	1Year
Receiver	R&S	ESPI	101873	2017.09.29	1Year
Receiver	R&S	ESCI	101165	2017.09.29	1Year
Bilog Antenna	SCHWARZBECK	VULB 9168	VULB9168-438	2017.09.30	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2017.09.30	2Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2017.09.29	1 Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2017.09.29	1 Year
Cable	Resenberger	N/A	No.1	2017.09.29	1Year
Cable	SCHWARZBECK	N/A	No.2	2017.09.29	1Year
Cable	SCHWARZBECK	N/A	No.3	2017.09.29	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2017.09.29	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2017.09.29	1Year
vector Signal Generator	Agilent	N5182A	MY49060042	2017.09.29	1 Year
vector Signal Generator	Agilent	E4438C	US44271917	2017.09.29	1 Year
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54080020	2017.09.29	1 Year
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54110001	2017.09.29	1 Year
Signal Analyzer	Agilent	N9020A	MY48030494	2017.09.29	1 Year

3. Radiated emissions

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	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

NOTE:

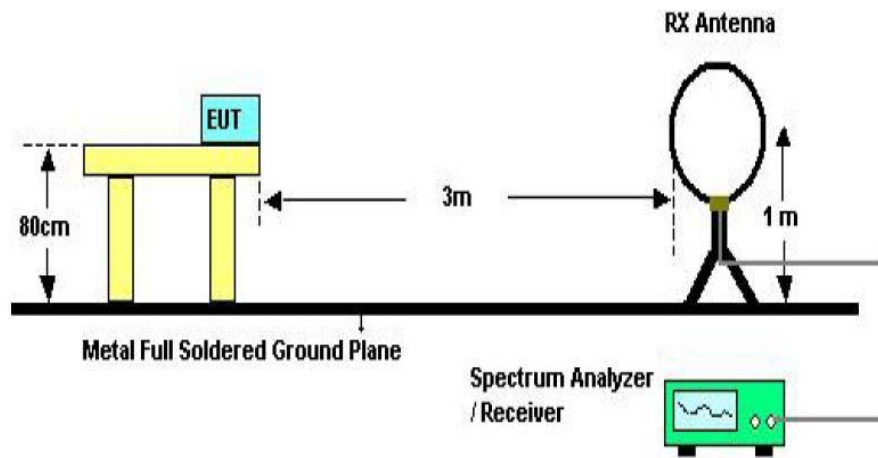
a) The tighter limit applies at the band edges.

b) Emission Level(dB uV/m)=20log Emission Level(uv/m)

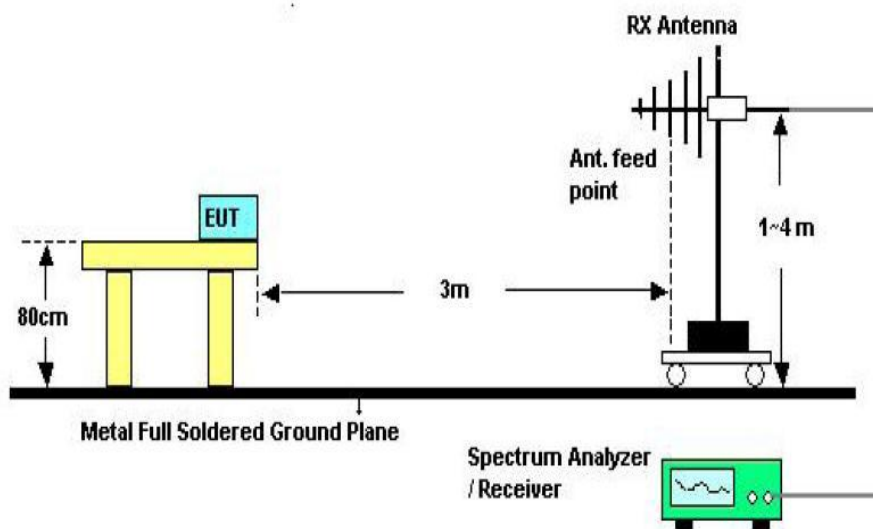
3.2. Test Procedure

- a) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground for below 1GHz and 1.5m high for above1GHz testing, The table was rotated 360 degrees to determine the position of the highest radiation. The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make measurement.
- b) Change work frequency or channel of device if practicable. Change modulation type of device if practicable. Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.
- c) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- d) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014on Radiated Emission test.
- e) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure, RBW is set at 1MHz, VBW is set at 10Hz PK detector for Average measure.

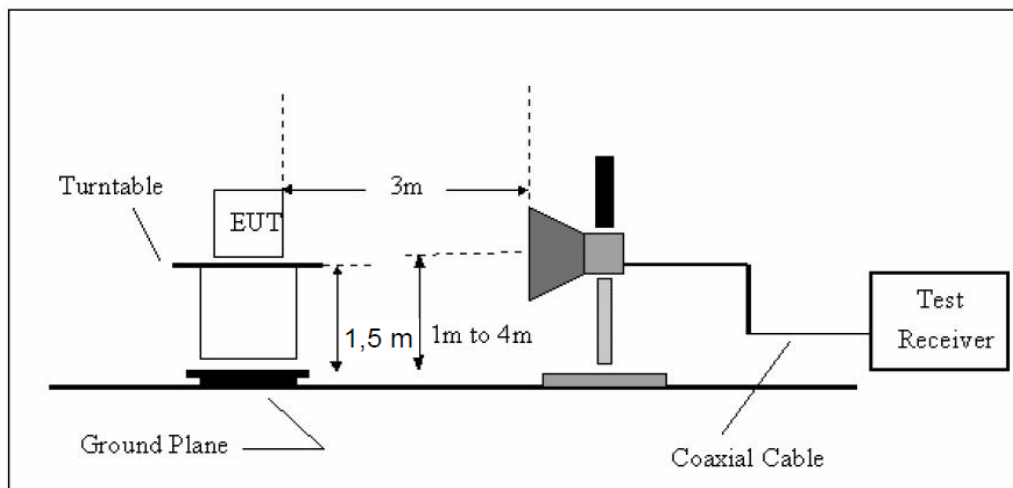
3.3. Block Diagram of Test setup



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

3.4. Test Results

We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency.

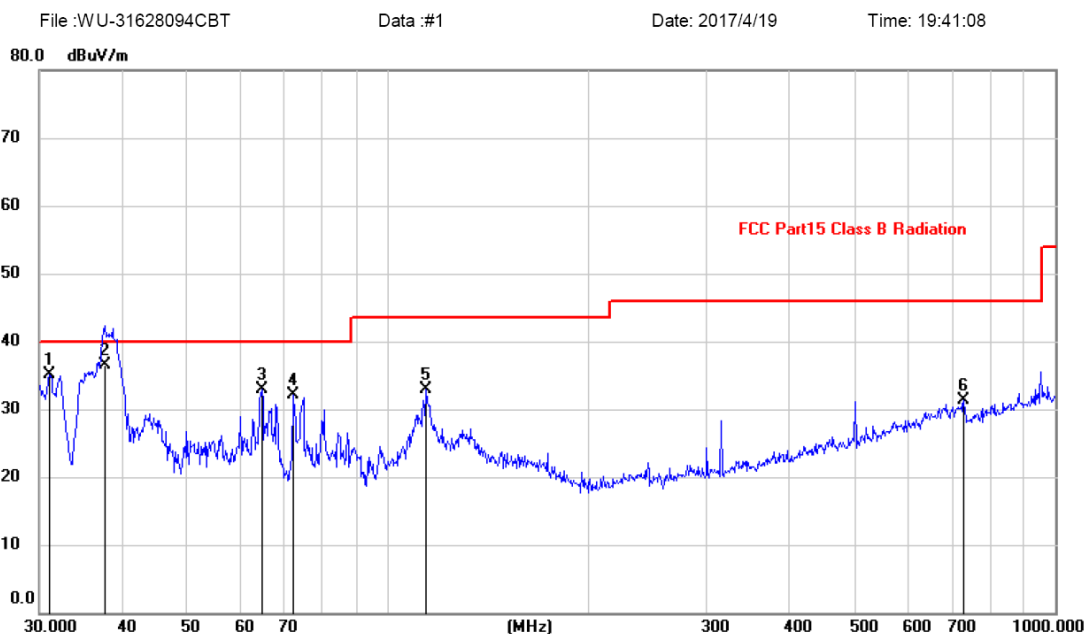
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Site LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part15 Class B Radiation	Power: AC 120V/60Hz	Humidity: 51 %
EUT:	Distance: 3m	
M/N: WU-31628094CBT		
Mode:Working		
Note:		

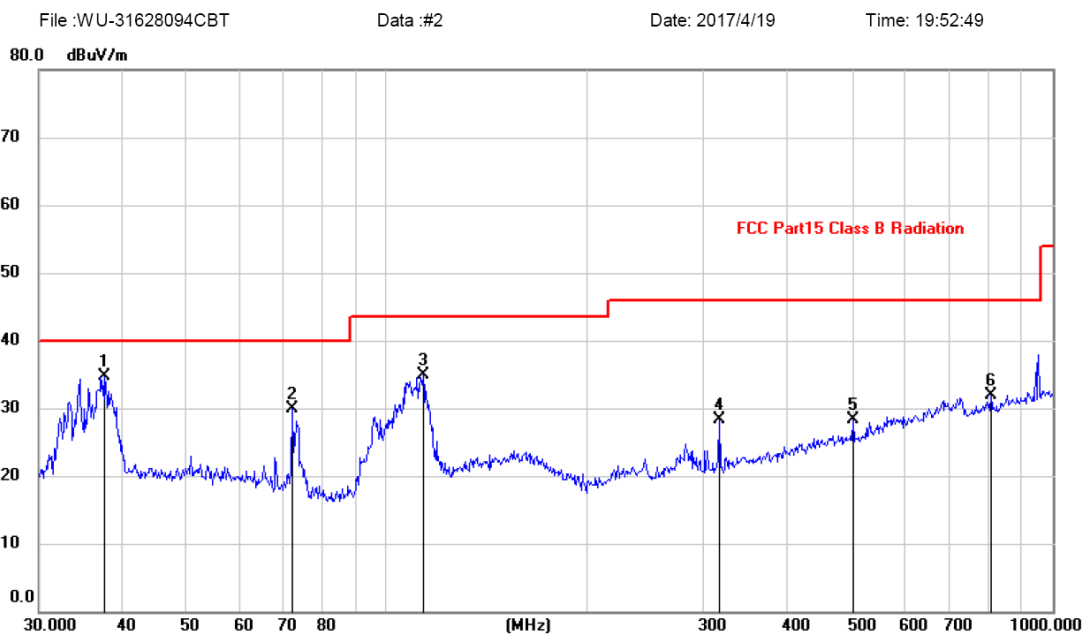
Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		31.0705	21.69	13.35	35.04	40.00	-4.96			peak
2	*	37.7397	22.78	13.82	36.60	40.00	-3.40	100	360	
3		64.6594	20.88	11.97	32.85	40.00	-7.15			peak
4		72.0841	21.48	10.67	32.15	40.00	-7.85			peak
5		114.1136	20.99	11.96	32.95	43.50	-10.55			peak
6		731.9202	9.95	21.37	31.32	46.00	-14.68			peak

Site LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part15 Class B Radiation	Power: AC 120V/60Hz	Humidity: 51 %
EUT: Electric Fireplace insert	Distance: 3m	
M/N: WU-31628094CBT		
Mode: Working		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	37.6798	20.91	13.82	34.73	40.00	-5.27			peak
2		72.0843	19.27	10.67	29.94	40.00	-10.06			peak
3		113.3163	22.99	11.87	34.86	43.50	-8.64			peak
4		316.5890	14.58	13.79	28.37	46.00	-17.63			peak
5		501.1790	11.16	17.22	28.38	46.00	-17.62			peak
6		810.2654	9.86	22.09	31.95	46.00	-14.05			peak

Notes: Above is below 1GHz test data. This report only shall the worst case mode for TX 2402MHz.

From 1G-25GHz

EUT	Electric Heater	Model Name	WU-31628094CBT
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	AC 120V/60Hz
Test Mode	TX Low		

Antenna Polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	43.36	33.95	10.18	34.26	53.23	74	20.77	PK
2	4804	33.87	33.95	10.18	34.26	43.74	54	10.26	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	42.25	33.95	10.18	34.26	52.12	74	21.88	PK
2	4804	32.94	33.95	10.18	34.26	42.81	54	11.19	AV
3	7206	/							
4	9608	/							
5	12010	/							
<p>Note:</p> <p>1, Measuring frequency from 1GHz to 25GHz</p> <p>2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK</p> <p>2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS</p> <p>3, Result = Read level + Antenna factor + cable loss - Amp factor</p> <p>4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.</p>									

EUT	Electric Heater	Model Name	WU-31628094CBT
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	AC 120V/60Hz
Test Mode	TX Mid		

Antenna Polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880	41.95	33.93	10.2	34.29	51.79	74	22.21	PK
2	4880	32.17	33.93	10.2	34.29	42.01	54	11.99	AV
3	7320	/							
4	9760	/							
5	12200	/							
Antenna Polarity: Horizontal									
1	4880	42.08	33.93	10.2	34.29	51.92	74	22.08	PK
2	4880	32.56	33.93	10.2	34.29	42.4	54	11.6	AV
3	7320	/							
4	9760	/							
5	12200	/							
Note:									
1, Measuring frequency from 1GHz to 25GHz									
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK									
2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS									
3, Result = Read level + Antenna factor + cable loss-Amp factor									
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

EUT	Electric Heater	Model Name	WU-31628094CBT
Temperature	26°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	AC 120V/60Hz
Test Mode	TX High		

Antenna Polarity: Vertical

No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss (dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	42.77	33.98	10.22	34.25	52.72	74	21.28	PK
2	4960	33.84	33.98	10.22	34.25	43.79	54	10.21	AV
3	7440	/							
4	9920	/							
5	12400	/							

Antenna Polarity: Horizontal

1	4960	43.12	33.98	10.22	34.25	53.07	74	20.93	PK
2	4960	33.83	33.98	10.22	34.25	43.78	54	10.22	AV
3	7440	/							
4	9920	/							
5	12400	/							

Note:

1, Measuring frequency from 1GHz to 25GHz

2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK

2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS

3, Result = Read level + Antenna factor + cable loss - Amp factor

4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

4. Power Line Conducted Emission

4.1. Limit

Frequency MHz	Limits dB(μ V)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

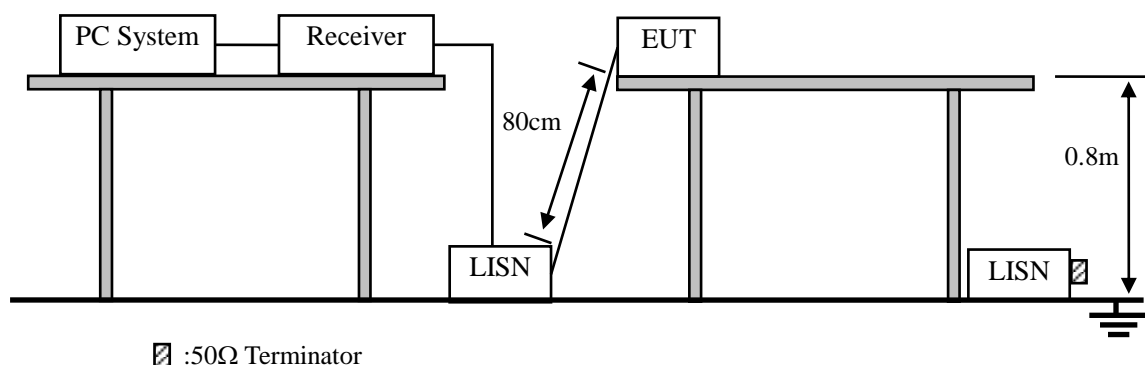
2. The lower limit shall apply at the transition frequencies.

3. The limit decreases in line with the logarithm of the frequency in rang of 0.15 to 0.50 MHz.

4.2. Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 :2014on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

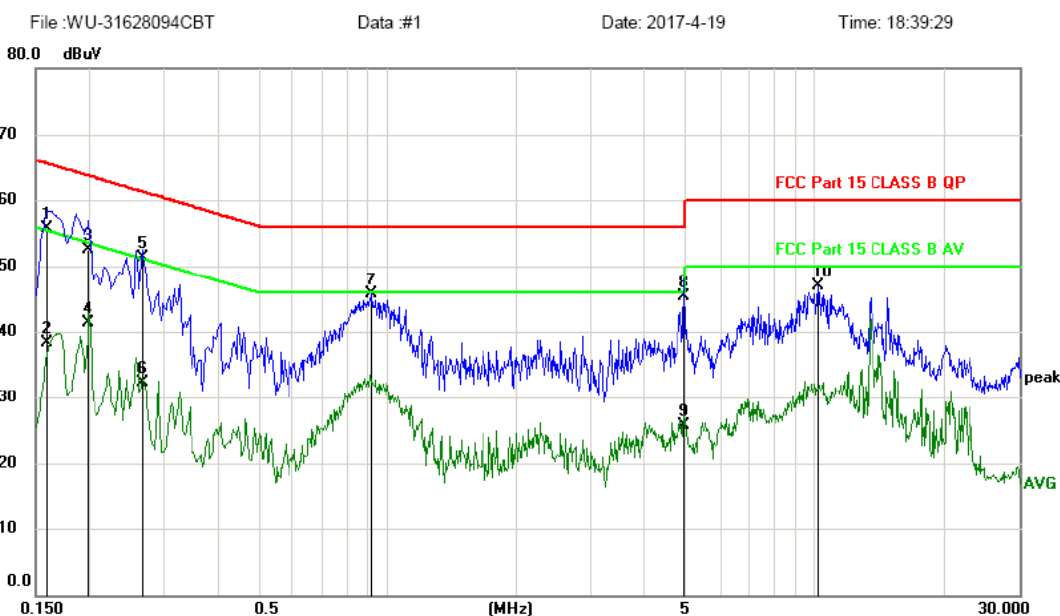
4.3. Block Diagram of Test setup



4.4. Test Results

Site LAB	Phase: N	Temperature: 23.6
Limit: FCC Part 15 CLASS B QP	Power: AC 120V/60Hz	Humidity: 54 %
EUT:		
M/N: WU-31628094CBT		
Mode: Working		
Note:		

Conducted Emission Measurement



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1590	45.89	9.73	55.62	65.52	-9.90	QP	
2		0.1590	28.66	9.73	38.39	55.52	-17.13	AVG	
3		0.1995	42.72	9.74	52.46	63.63	-11.17	QP	
4		0.1995	31.61	9.74	41.35	53.63	-12.28	AVG	
5		0.2670	41.53	9.76	51.29	61.21	-9.92	QP	
6		0.2670	22.60	9.76	32.36	51.21	-18.85	AVG	
7		0.9150	35.79	9.83	45.62	56.00	-10.38	peak	
8		4.9335	35.13	10.19	45.32	56.00	-10.68	QP	
9		4.9335	15.46	10.19	25.65	46.00	-20.35	AVG	
10		10.1445	36.48	10.35	46.83	60.00	-13.17	peak	

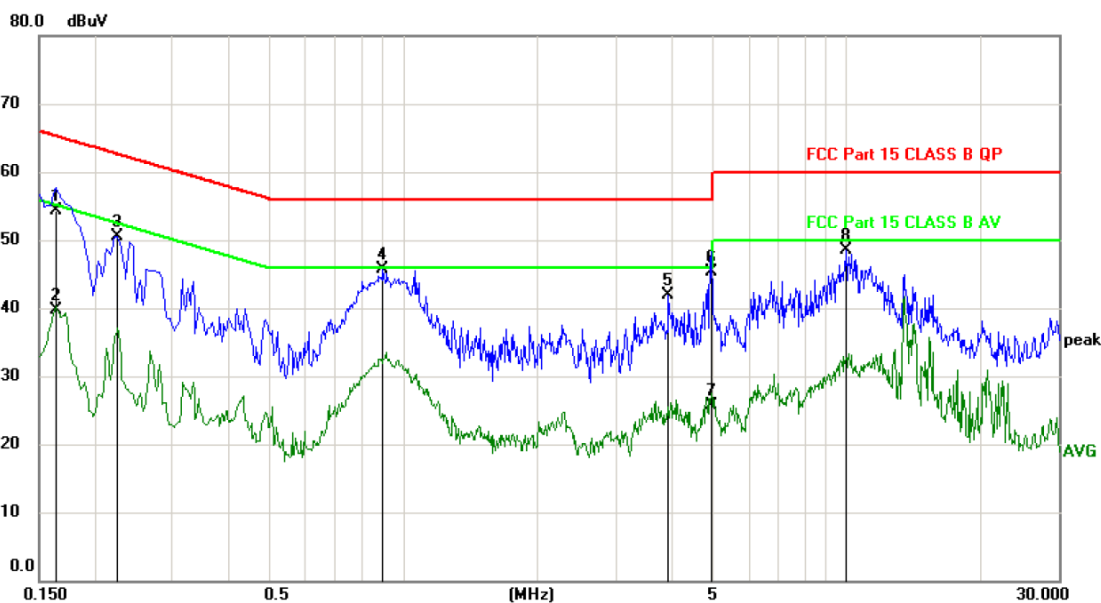
Site LAB
 Limit: FCC Part 15 CLASS B QP
 EUT:
 M/N: WU-31628094CBT
 Mode: Working
 Note:

Phase: **L1**
 Power: AC 120V/60Hz

Temperature: 23.6
 Humidity: 54 %

Conducted Emission Measurement

File :WU-31628094CBT Data :#2 Date: 2017-4-19 Time: 18:42:21



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1635	54.06	0.20	54.26	65.28	-11.02	QP	
2		0.1635	39.55	0.20	39.75	55.28	-15.53	AVG	
3		0.2265	50.34	0.20	50.54	62.58	-12.04	peak	
4	*	0.8970	45.54	0.20	45.74	56.00	-10.26	peak	
5		3.9435	41.61	0.24	41.85	56.00	-14.15	peak	
6		4.9424	44.95	0.26	45.21	56.00	-10.79	QP	
7		4.9425	25.42	0.26	25.68	46.00	-20.32	AVG	
8		9.9510	48.06	0.42	48.48	60.00	-11.52	peak	

5. Conducted Maximum Output Power

5.1. Test limit

Please refer section RSS-247 & 15.247.

5.2. Test Procedure

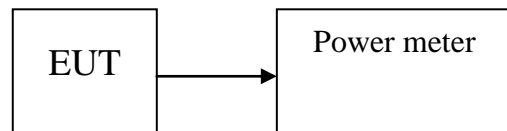
Details see the KDB558074 Meas Guidance V03

5.2.1 Place the EUT on the table and set it in transmitting mode.

5.2.2 Measure out each mode and each bands peak output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset. Details see the KDB558074 DTS Meas Guidance V03.

5.3. Block Diagram of Test setup



5.4. Test Results

Channel	Frequency (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)
CH1	2402	-2.13	0.612	21
CH20	2440	-2.25	0.596	21
CH40	2480	-2.44	0.570	21

6. Peak Power Spectral Density

6.1. Test limit

6.1.1 Please refer section RSS-247 & 15.247.

6.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

6.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

6.2. Test Procedure

Details see the KDB558074 DTS Meas Guidance V03

6.2.1 Place the EUT on the table and set it in transmitting mode.

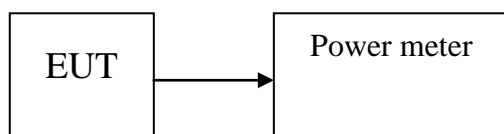
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, span=5-30%EBW, detail see the test plot.

6.2.4 Record the max reading.

6.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

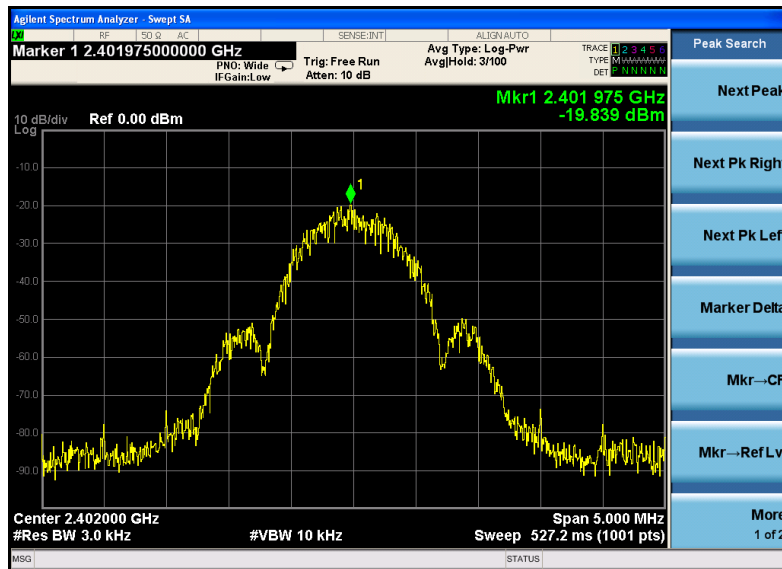
6.3. Block Diagram of Test setup



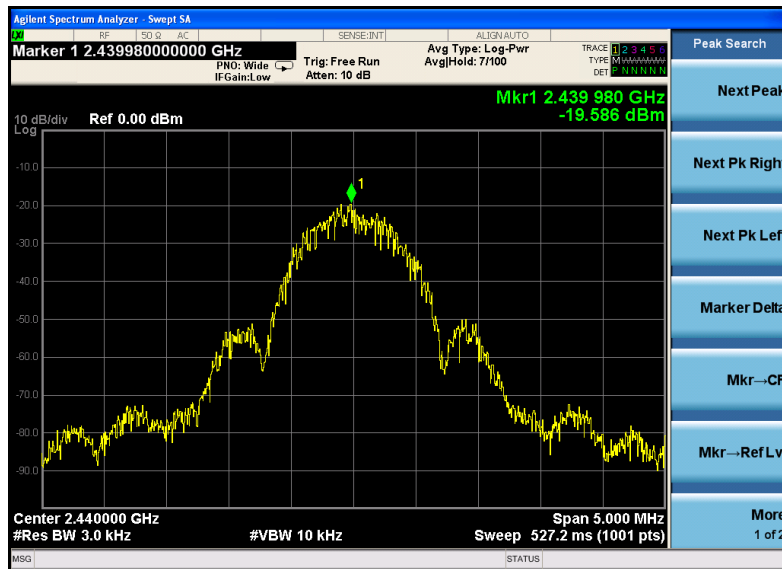
6.4. Test Results

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
CH1	2402	-19.839	8	PASS
CH20	2440	-19.586	8	PASS
CH40	2480	-19.712	8	PASS

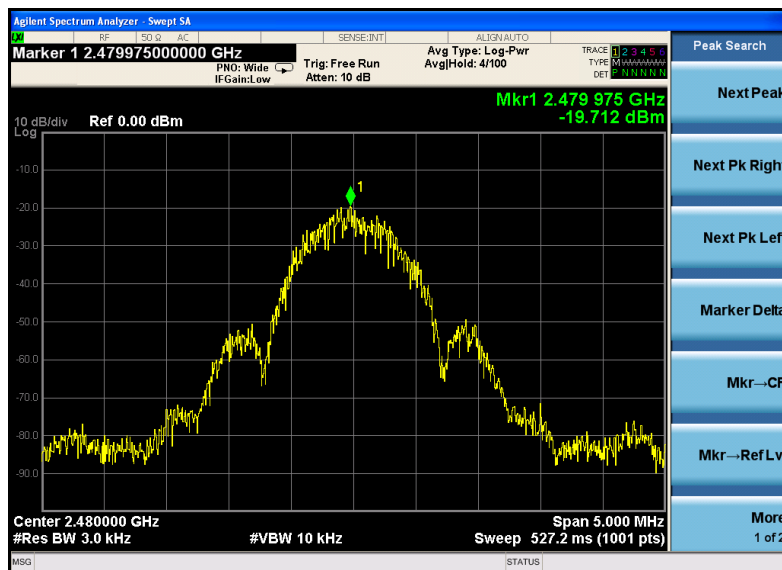
CH Low :



CH Mid:



CH Hig:



7. Bandwidth

7.1. Test limit

Please refer section RSS-247 & 15.247

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

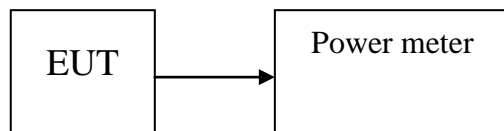
7.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance

a) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

b) The test receiver set $RBW = 100\text{kHz}$, $VBW \geq 3RBW$, Sweep time set auto, detail see the test plot.

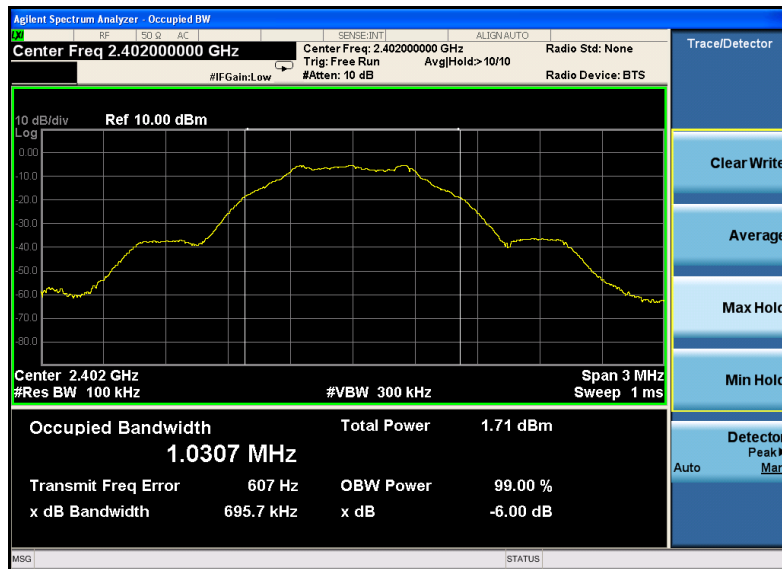
7.3. Block Diagram of Test setup



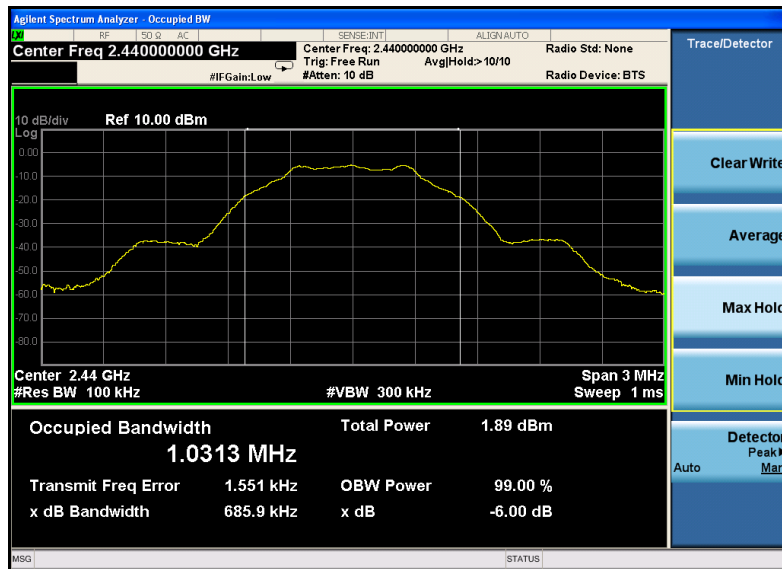
7.4. Test Results

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
CH1	2402	0.696	0.5	PASS
CH20	2440	0.686	0.5	PASS
CH40	2480	0.696	0.5	PASS

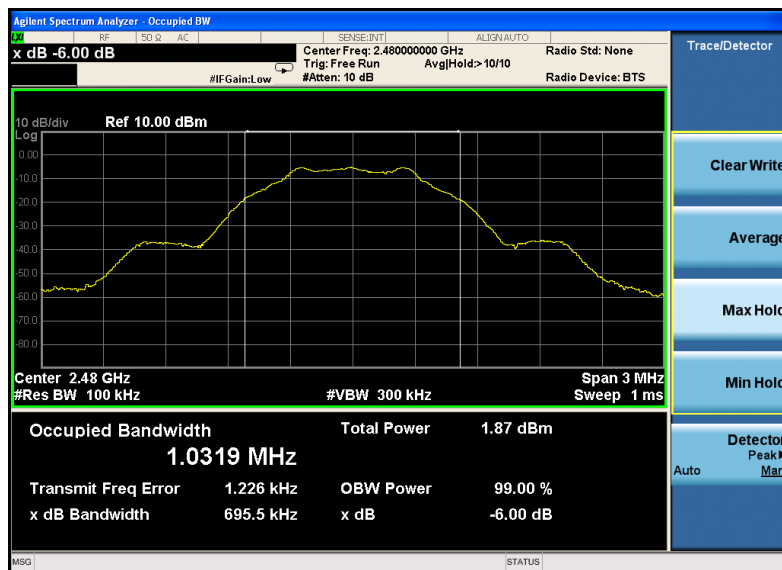
CH Low :



CH Mid :



CH High :



8. Band Edge Check

8.1. Test limit

Please refer section RSS-GEN&15.247.

8.2. Test Procedure

8.2.1 Put the EUT on a 0.8m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission

8.2.2 Check the spurious emissions out of band.

8.2.3 RBW 1MHz ,VBW 3MHz ,peak detector for peak value, RBW 1MHz ,VBW 3MHz, RMS detector for AV value.

8.3. Block Diagram of Test setup

Same as 3.3.

8.4. Test Results

PASS.

Detailed information please see the following page.

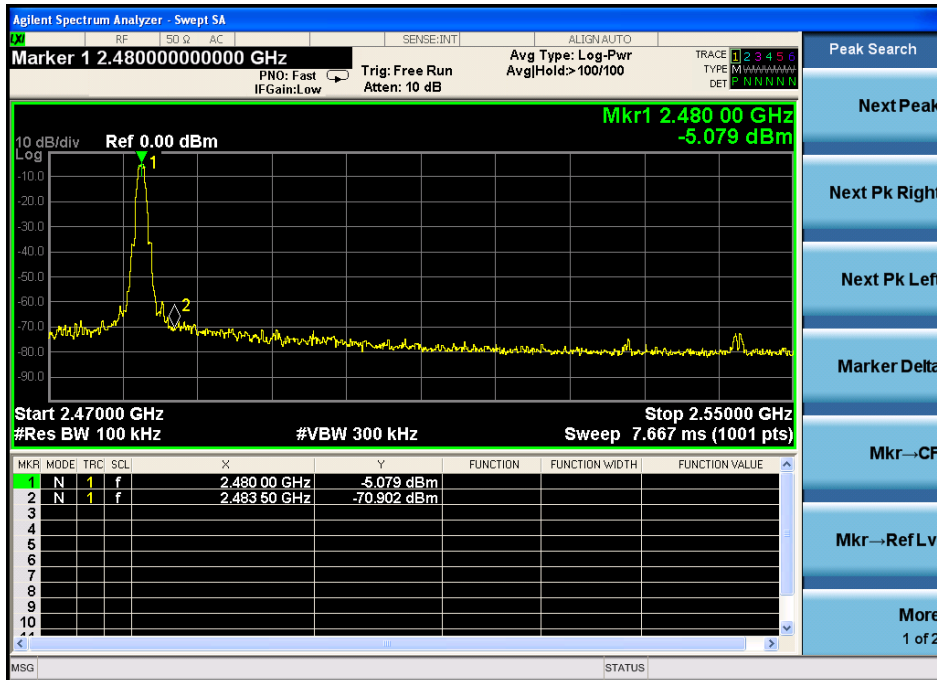
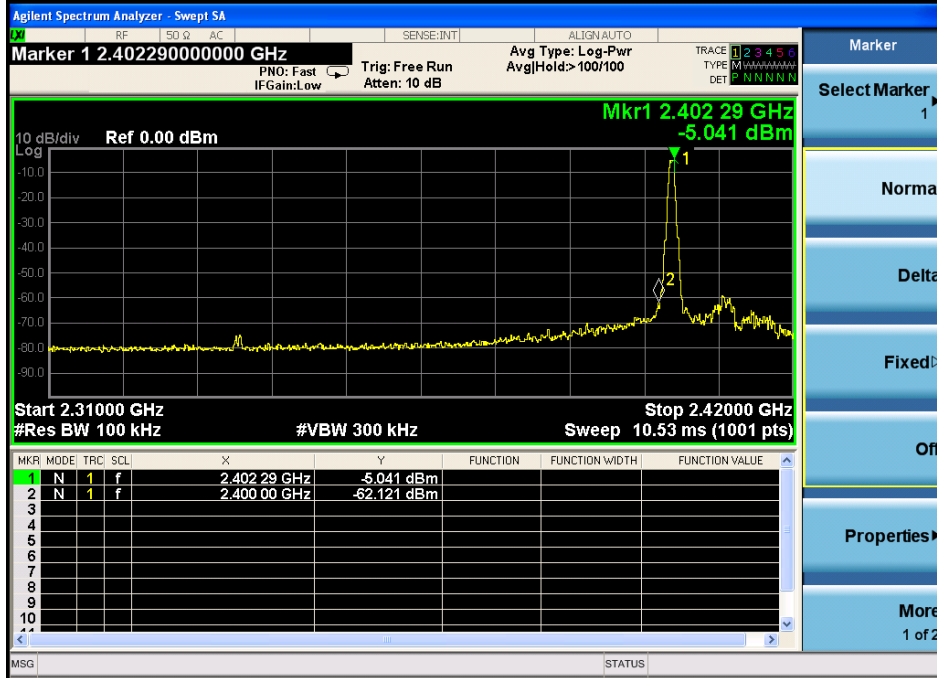
Radiated Method:

GFSK

Band Edge Test result								
EUT: Electric Heater			M/N: WU-31628094CBT					
Power: AC 120V/60Hz								
Test date: 2017-04-18			Test site: 3m Chamber			Tested by: Reak		
Test mode: Tx Low								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	41.96	27.62	3.92	34.97	38.53	74	35.47	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	44.59	27.62	3.92	34.97	41.16	74	32.84	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

Band Edge Test result								
EUT: Electric Heater			M/N: WU-31628094CBT					
Power: AC 120V/60Hz								
Test date: 2017-04-18 Test site: 3m Chamber Tested by: Reak								
Test mode: Tx High								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	43.52	27.89	4	34.97	40.44	74	33.56	PK
2483.5		--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	46.17	27.89	4	34.97	43.09	74	30.91	PK
2483.5		--	--	--	--	54	--	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

Conducted Method:
GFSK



9. Antenna Requirement

9.1. Standard Requirement

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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2. Antenna Connected Construction

The antenna is PCB antenna and no consideration of replacement. Please see EUT photo for details.

9.3. Results

The EUT antenna is PCB Antenna. It comply with the standard requirement.

10. Photographs of Setup

10.1.Photos of Conducted Emission test



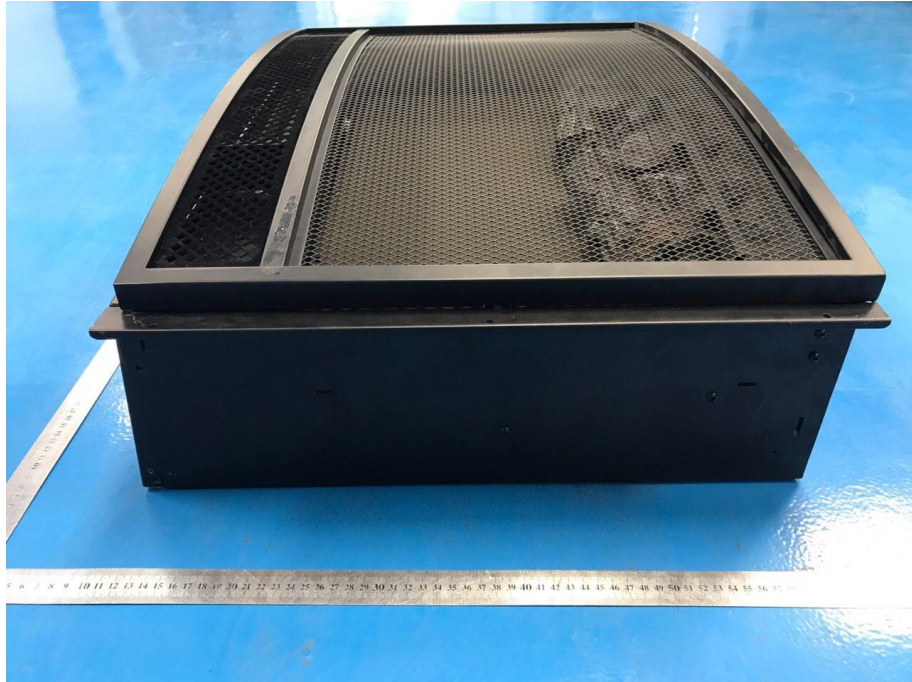
10.2.Photos of Radiated emission

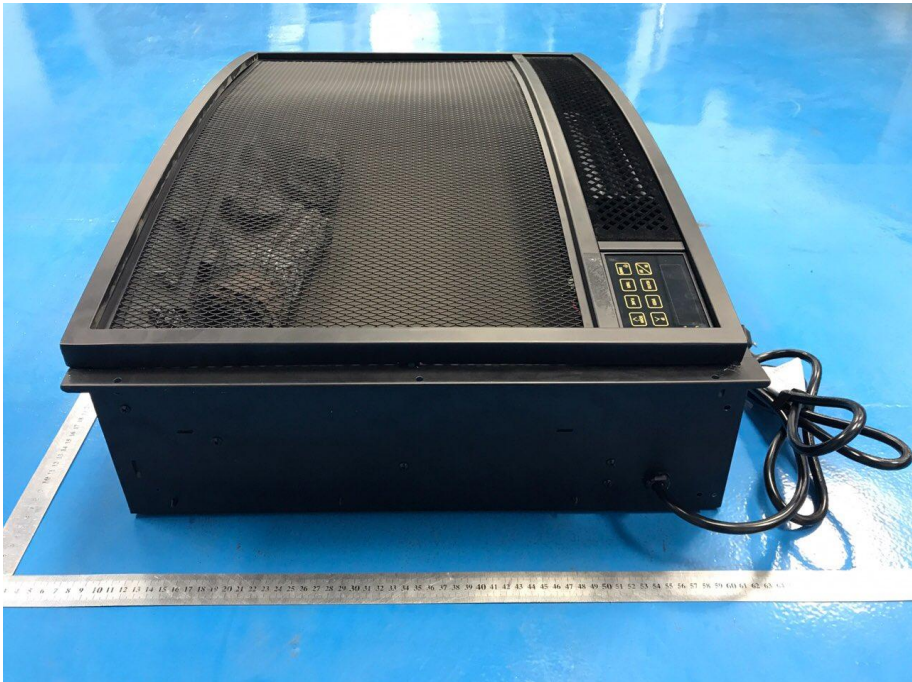


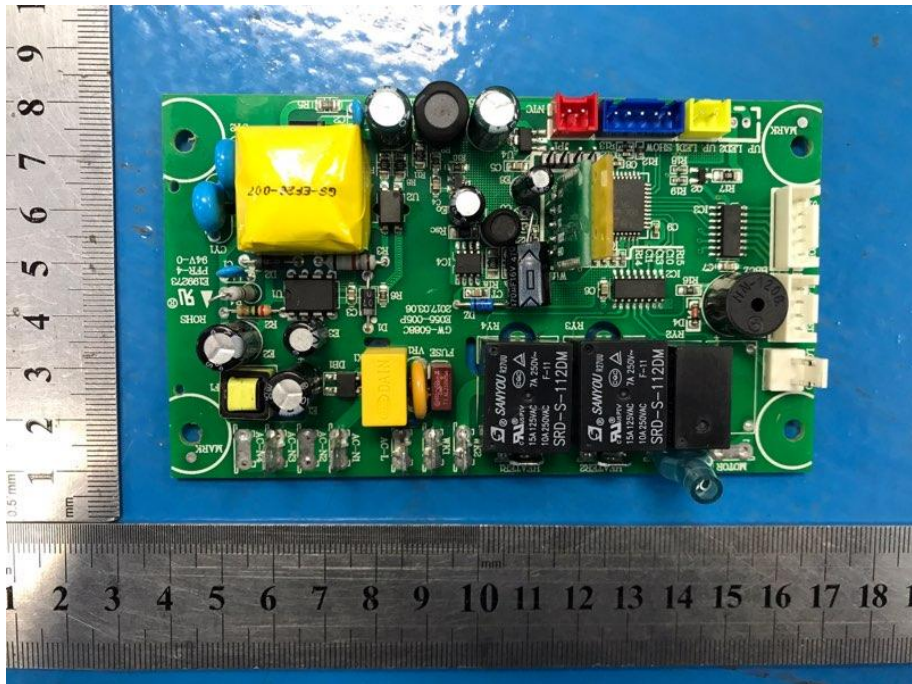
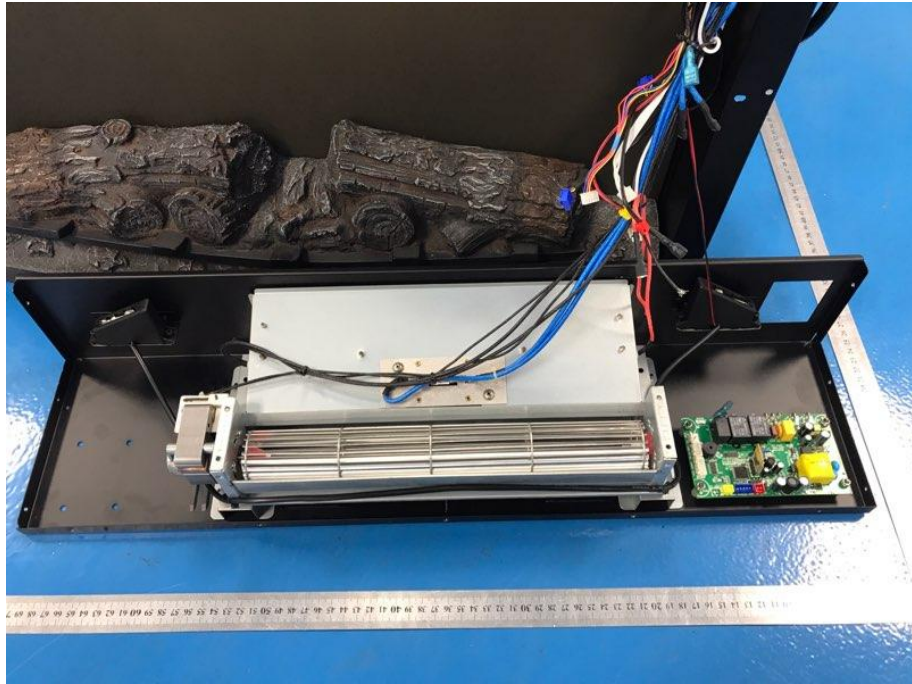


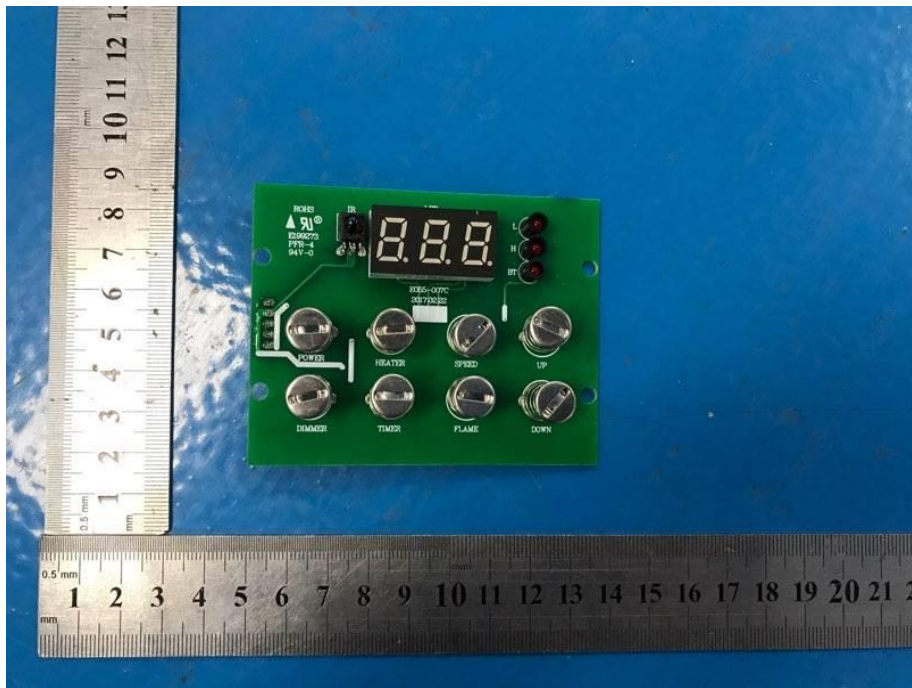
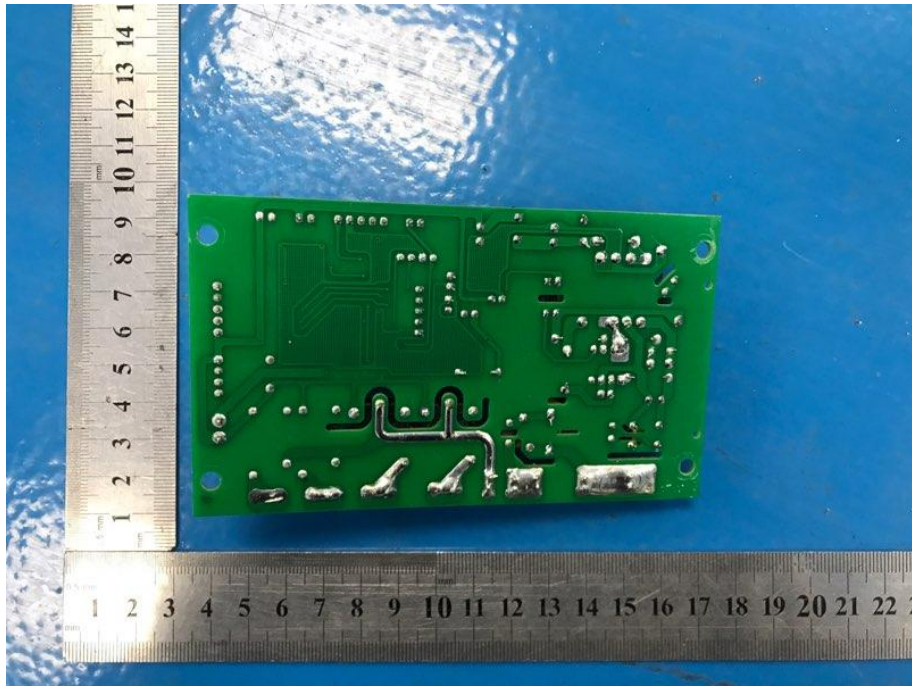
11.Photos of EUT

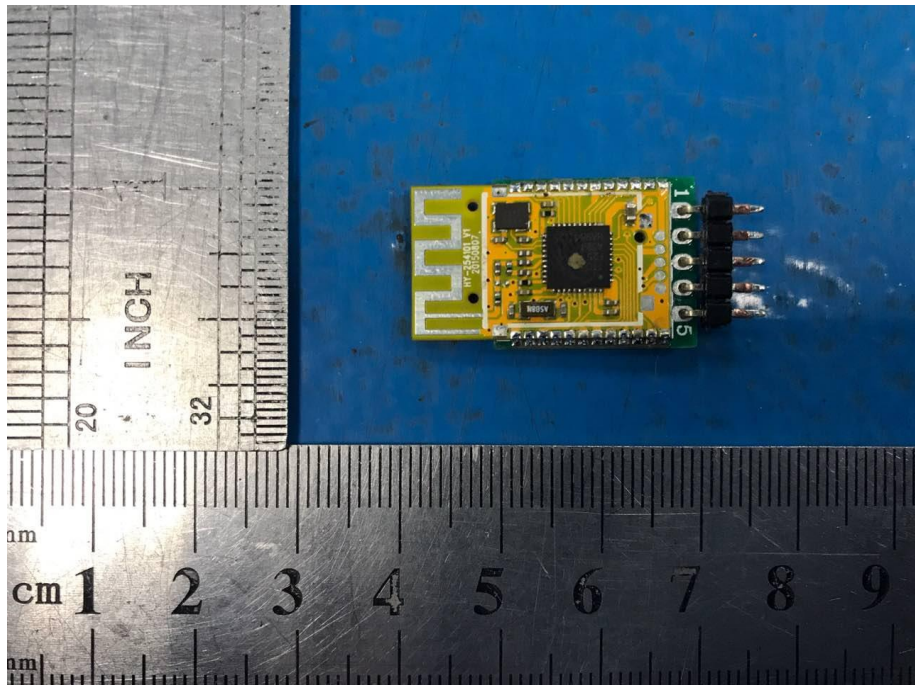
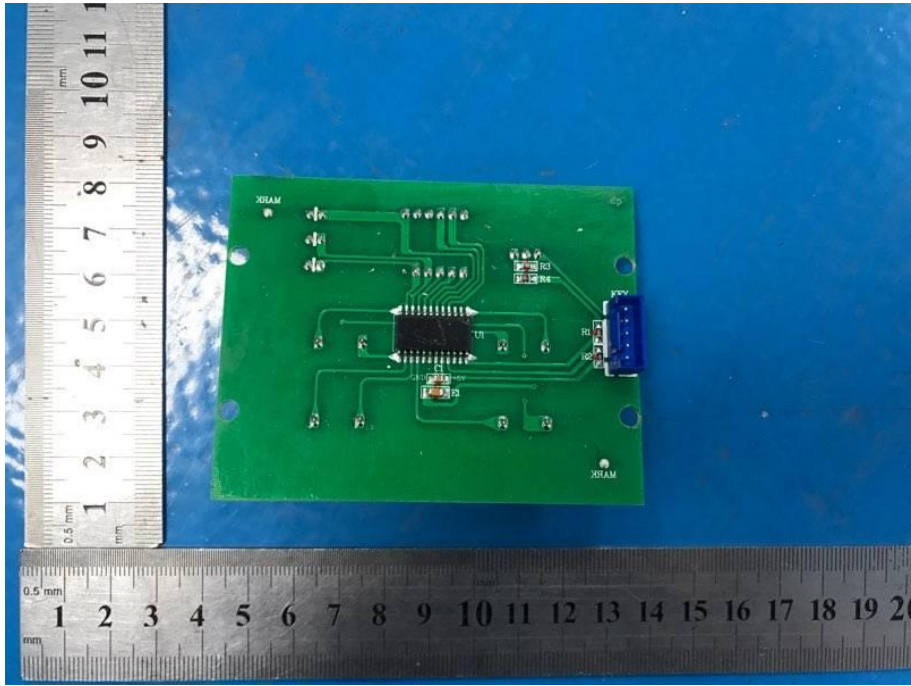


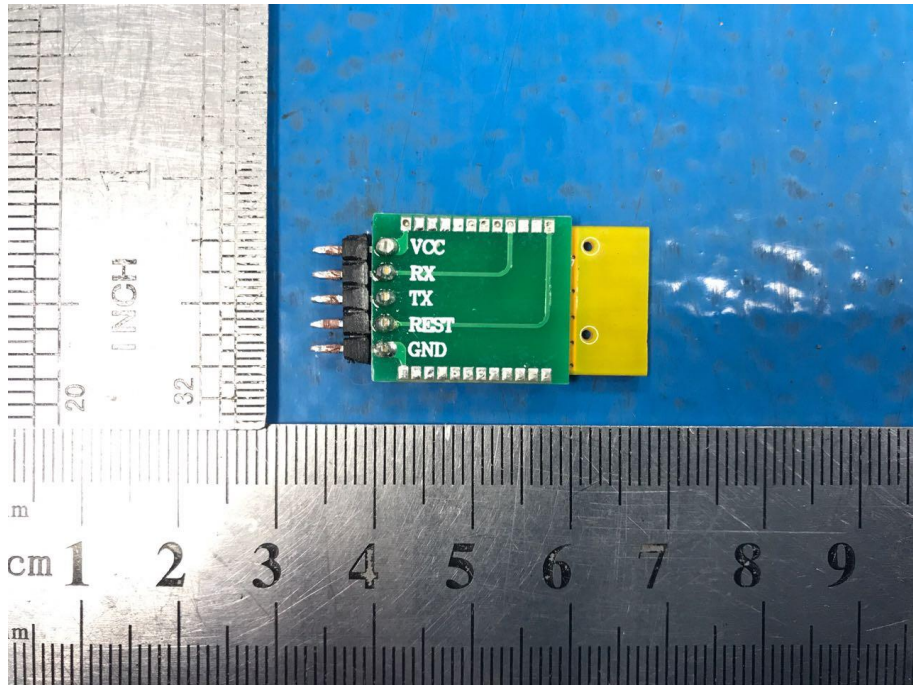












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