



FCC TEST REPORT

FCC ID: 2AUXB-DSHT-040

On Behalf of

Hangzhou Roombanker Technology Co.,Ltd.

HEAT PUMP THERMOSTAT

Model No.: DSHT-040

Prepared for : Hangzhou Roombanker Technology Co.,Ltd.
Address : A#801 Wantong center, Hangzhou, Zhejiang, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

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TEST REPORT DECLARATION

Applicant : Hangzhou Roombanker Technology Co.,Ltd.
 Address : A#801 Wantong center, Hangzhou, Zhejiang, China
 Manufacturer : Hangzhou Roombanker Technology Co.,Ltd.
 Address : A#801 Wantong center, Hangzhou, Zhejiang, China
 EUT Description : HEAT PUMP THERMOSTAT
 (A) Model No. : DSHT-040
 (B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
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).....: Lucas Pang
 Project Engineer



Approved by (name + signature).....: Simple Guan
 Project Manager



Date of issue.....: March 3, 2021

Revision History

Revision	Issue Date	Revisions	Revised By
V0	March 3, 2021	Initial released Issue	Lucas Pang

1. Summary Of Standards And Results

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Conducted Emission	FCC Part 15: 15.207 ANSI C63.10	P
6dB Bandwidth	FCC PART 15:15.247(a)(2) ANSI C63.10	P
Output Power	FCC Part 15: 15.247(b)(3) ANSI C63.10	P
Radiated Spurious Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10	P
Conducted Spurious & Band Edge Emission	FCC Part 15: 15.247(d) ANSI C63.10	P
Power Spectral Density	FCC PART 15:15.247(e) ANSI C63.10	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d) ANSI C63.10	P
Antenna Requirement	FCC Part 15: 15.203	P
Note:	1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/ is an abbreviation for Not Applicable.	

2. General Information

2.1. Description of Device (EUT)

Description	: HEAT PUMP THERMOSTAT
Model Number	: DSHT-040
Diff	: N/A
Trademark	: N/A
Test Voltage	: AC 24V from adapter
Operation frequency	: 2405-2480MHz
Channel No.	: 16 Channels(Channel Spacing 5MHz)
Modulation type	: GFSK
Antenna Type	: Internal Antenna, Maximum Gain is 2dBi
Software version	: V1.0
Hardware version	: HEC_20191022

2.2. Accessories of Device (EUT)

Accessory 1 : N/A

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification
1	Adapter	N/A	XTC245A	N/A	N/A

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH1	2405
	Middle: CH9	2445
	High: CH16	2480

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-45°C	24°C
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7. Additional instructions

The operation (Used for test) from client

Mode	Special operated method is used. The operation provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.		
Power level setup in software			
Mode	Channel	Frequency (MHz)	Soft Set
GFSK	CH1	2405	TX level is set as defaults value.
	CH9	2445	
	CH16	2480	

Channel list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH1	2405	CH5	2425	CH9	2445	CH13	2465
CH2	2410	CH6	2430	CH10	2450	CH14	2470
CH3	2415	CH7	2435	CH11	2455	CH15	2475
CH4	2420	CH8	2440	CH12	2460	CH16	2480

2.8. Test Facility

Shenzhen Alpha Product Testing Co., Ltd
 Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
 Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

Designation Number: CN1236

July 15, 2019 Certificated by IC

Registration Number: CN0085

2.9. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.77dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.16 dB(Polarize: V)
	2.62dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.76dB(Polarize: V)
	3.82dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.22dB(Polarize: H)
	4.18dB(Polarize: V)
Uncertainty for radio frequency	5.6×10^{-8}
Uncertainty for conducted RF Power	0.39dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.10. Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2019.09.06	1Year
Spectrum analyzer	ROHDE&SCHWARZ	FSU	1166.1660.26	2019.09.06	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2019.09.05	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2019.09.06	1Year
Receiver	R&S	ESCI	101165	2019.09.05	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2020.04.12	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2Year
Cable	Resenberger	N/A	No.1	2019.09.05	1Year
Cable	Resenberger	N/A	No.2	2019.09.05	1Year
Cable	Resenberger	N/A	No.3	2019.09.05	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2019.09.05	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2019.09.05	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2019.09.05	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2019.09.05	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2019.09.20	1 Year
Horn Antenna	A-INFOMW	LB-180100-KF	J211020657	2019.09.20	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2019.09.05	1 Year
Power Meter	Agilent	E9300A	MY41496625	2019.09.06	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2019.09.10	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2019.09.10	1 Year

3. Maximum Peak Output Power

3.1.Limit

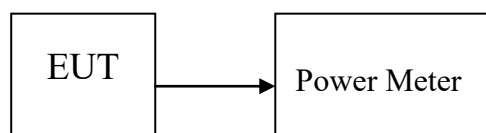
Please refer section 15.247.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

3.2.Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

3.3.Test Setup



3.4.Test Result

Mode	Freq (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)	Result
GFSK	2405	9.376	8.662	21.00	Pass
	2445	9.491	8.894	21.00	Pass
	2480	9.359	8.628	21.00	Pass
Conclusion: PASS					

4. Bandwidth

4.1.Limit

Please refer RSS-247 & FCC PART 15: 15.247

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

4.2.Test Procedure

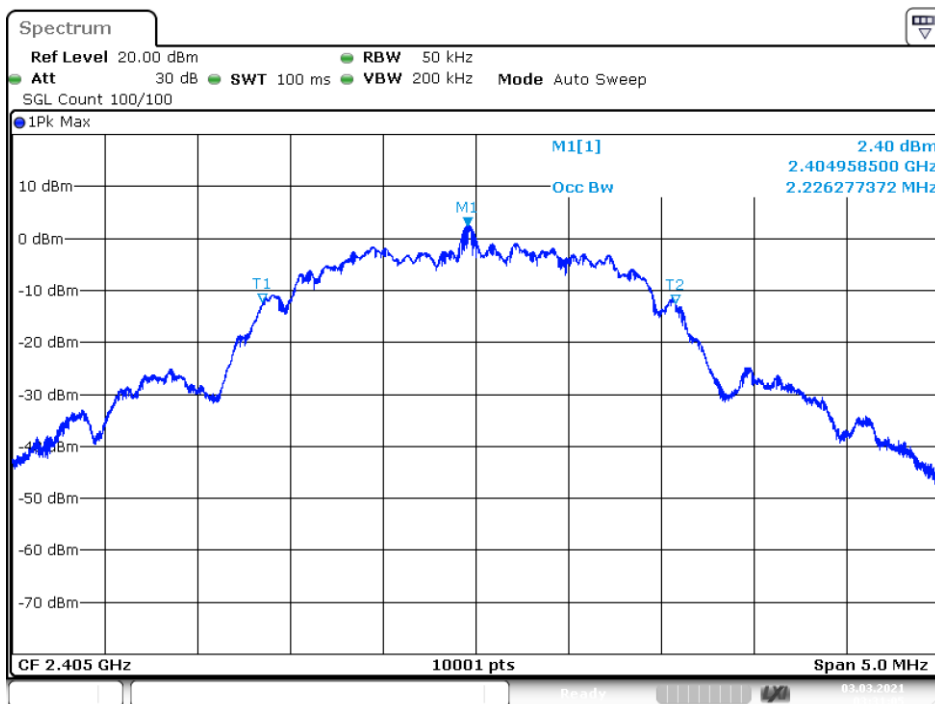
Details see the KDB558074 D01 Meas Guidance v05r02

- a) The bandwidth is measured at an amplitude level reduced 6dB 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 = 100kHz, VBW ≥ 3 *RBW =300kHz,, Peak Detector, Sweep time set auto, detail see the test plot.

4.3.Test Result

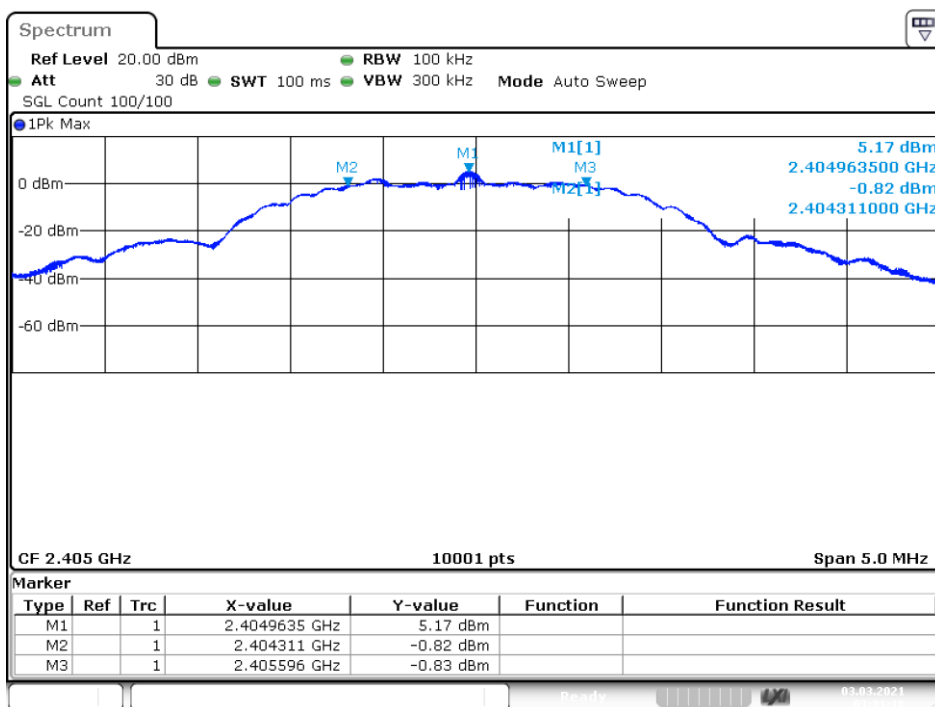
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	TX	2405	Ant 1	2.2263	1.285	0.5	Pass
NVNT	TX	2445	Ant 1	2.2283	1.2725	0.5	Pass
NVNT	TX	2480	Ant 1	2.2418	1.236	0.5	Pass

OBW NVNT BLE 2405MHz Ant1



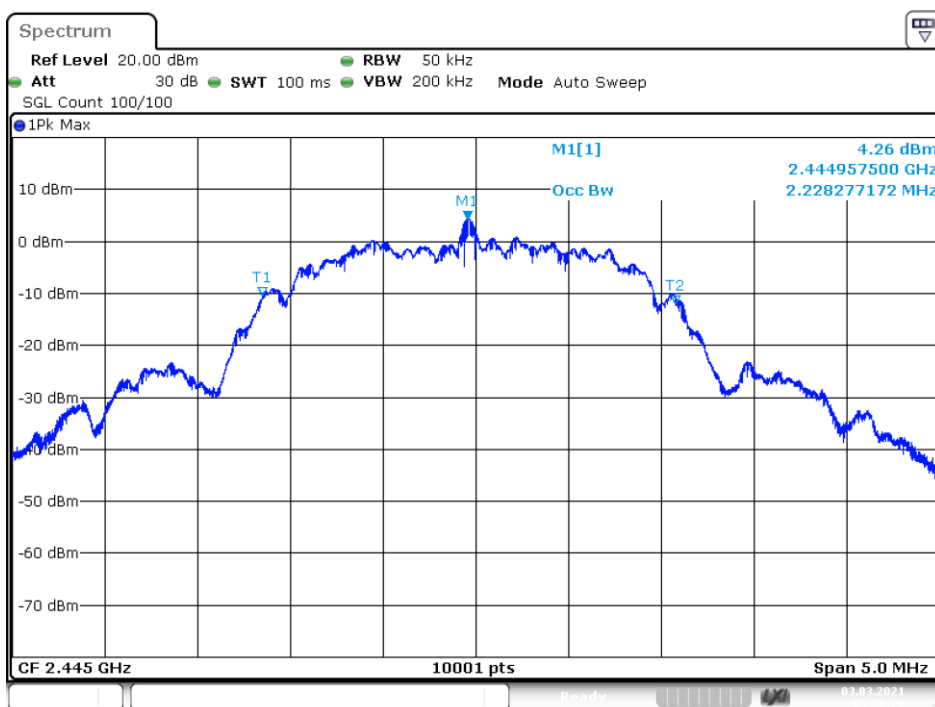
Date: 3.MAR.2021 03:31:05

-6 dB BW NVNT BLE 2405MHz Ant1



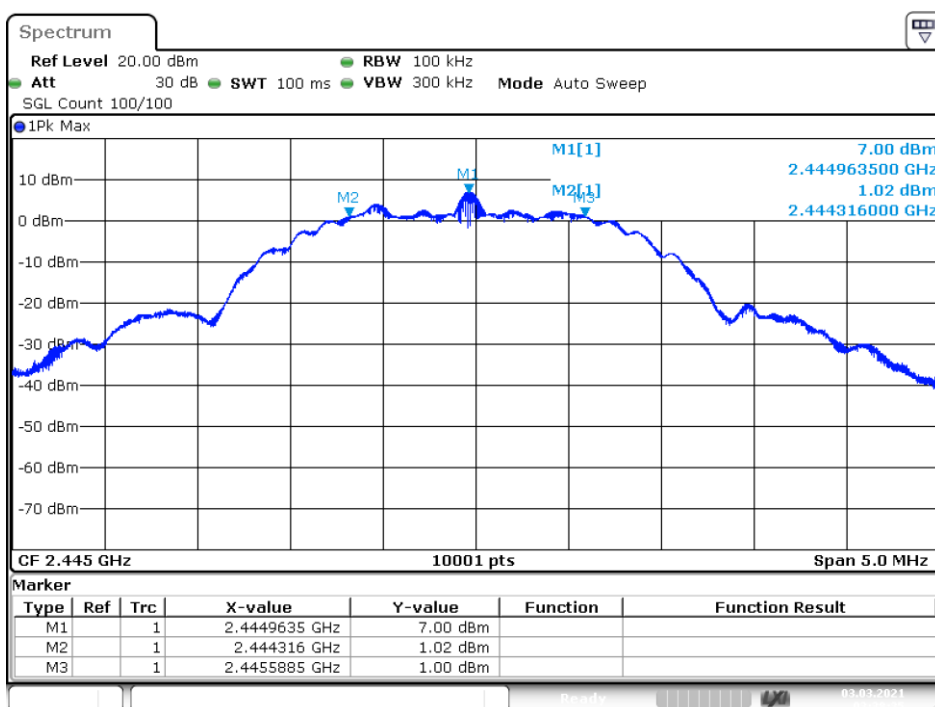
Date: 3.MAR.2021 03:31:18

OBW NVNT BLE 2445MHz Ant1



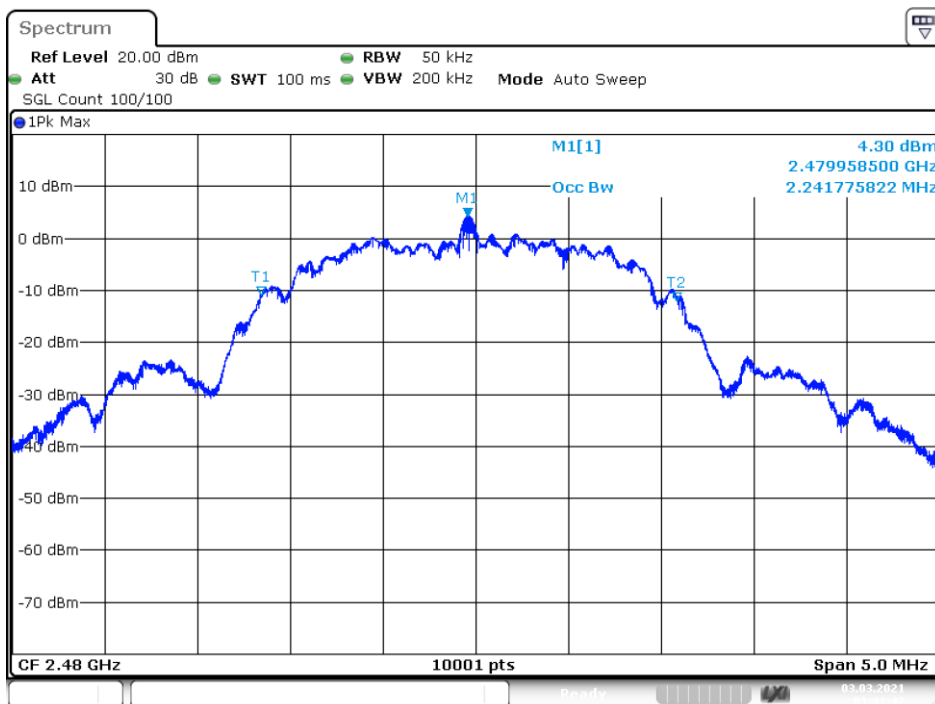
Date: 3.MAR.2021 03:38:19

-6 dB BW NVNT BLE 2445MHz Ant1



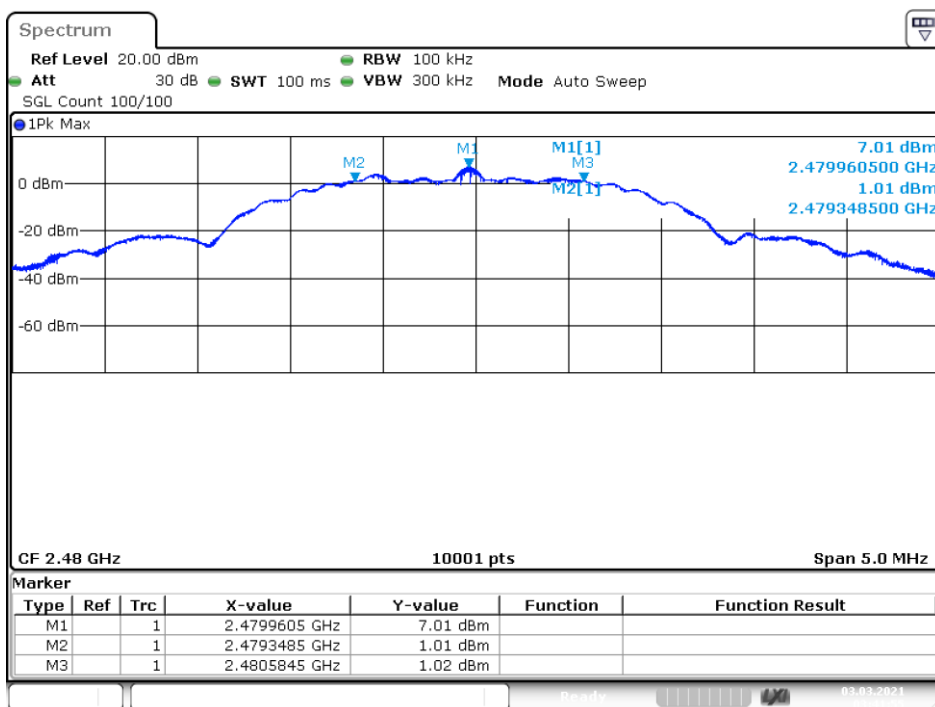
Date: 3.MAR.2021 03:38:34

OBW NVNT BLE 2480MHz Ant1



Date: 3.MAR.2021 03:41:42

-6 dB BW NVNT BLE 2480MHz Ant1



Date: 3.MAR.2021 03:41:55

5. Peak Power Spectral Density

5.1. Test limits

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.

5.2. Test Procedure

Details see the KDB 558074 D01 15.247 Meas Guidance v05r02

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

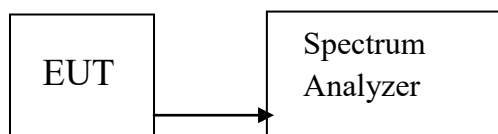
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Set the spectrum analyzer as $RBW = 3\text{kHz}$ (Set the RBW to: $3\text{ kHz} \leq RBW \leq 100\text{ kHz}$.), $VBW = 10\text{kHz}$ (Set the $VBW \geq 3 \times RBW$), $span = 1.5 \times \text{DTS bandwidth}$., 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.

5.3. Test Setup



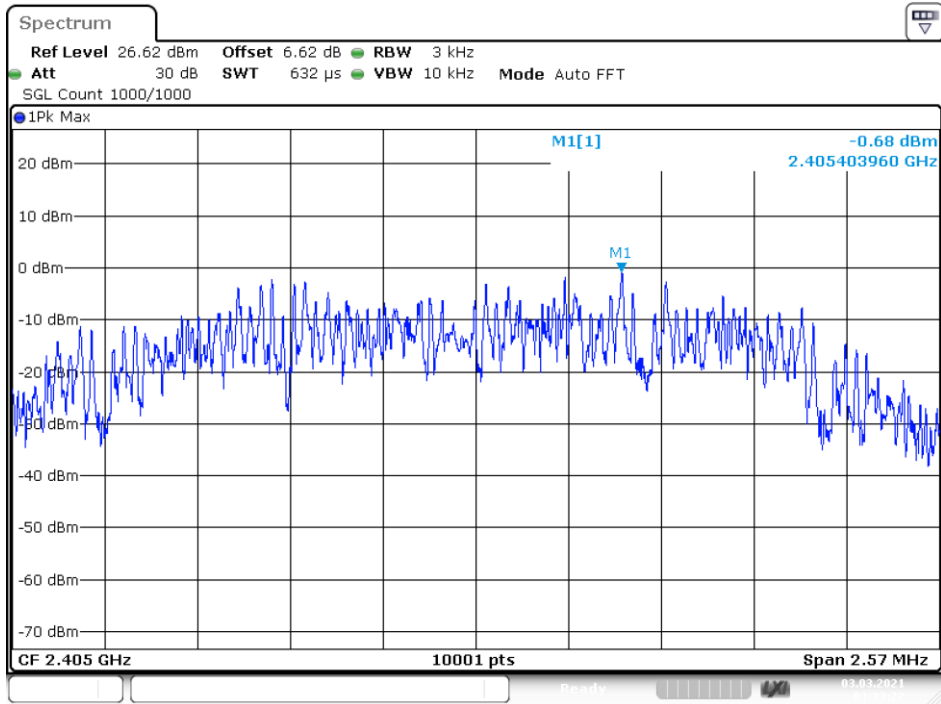
5.4. Test Results

Pass

The test results are listed in next pages.

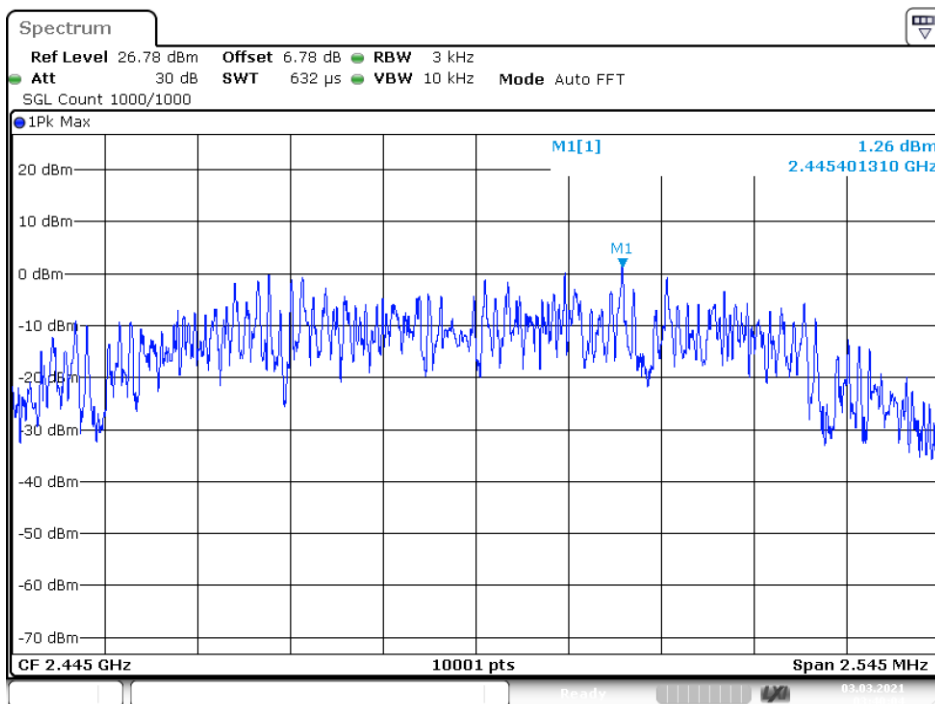
Condition	Frequency (MHz)	Antenna	Max PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	2405	Ant 1	-0.68	8	Pass
NVNT	2445	Ant 1	1.256	8	Pass
NVNT	2480	Ant 1	1.098	8	Pass

PSD NVNT 2405MHz Ant1



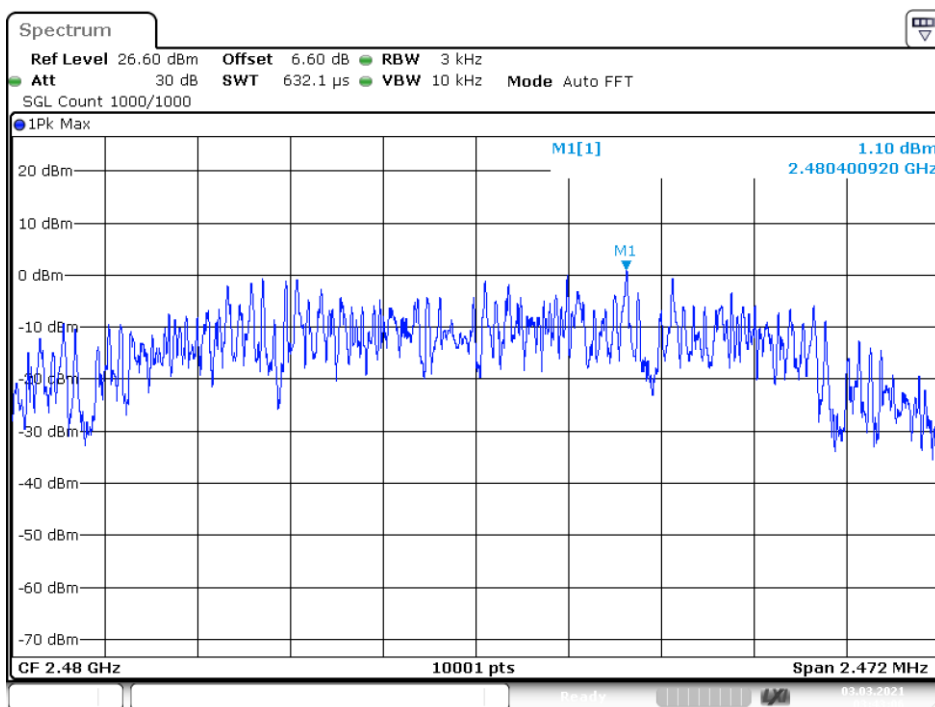
Date: 3.MAR.2021 03:33:22

PSD NVNT 2445MHz Ant1



Date: 3.MAR.2021 03:40:04

PSD NVNT 2480MHz Ant1



Date: 3.MAR.2021 03:43:07

6. Radiated Emissions

6.1.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

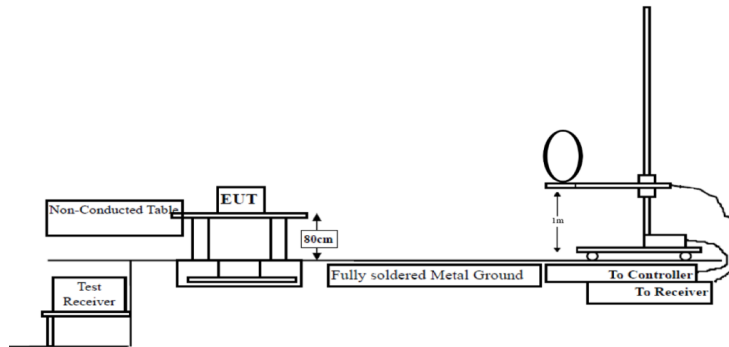
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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

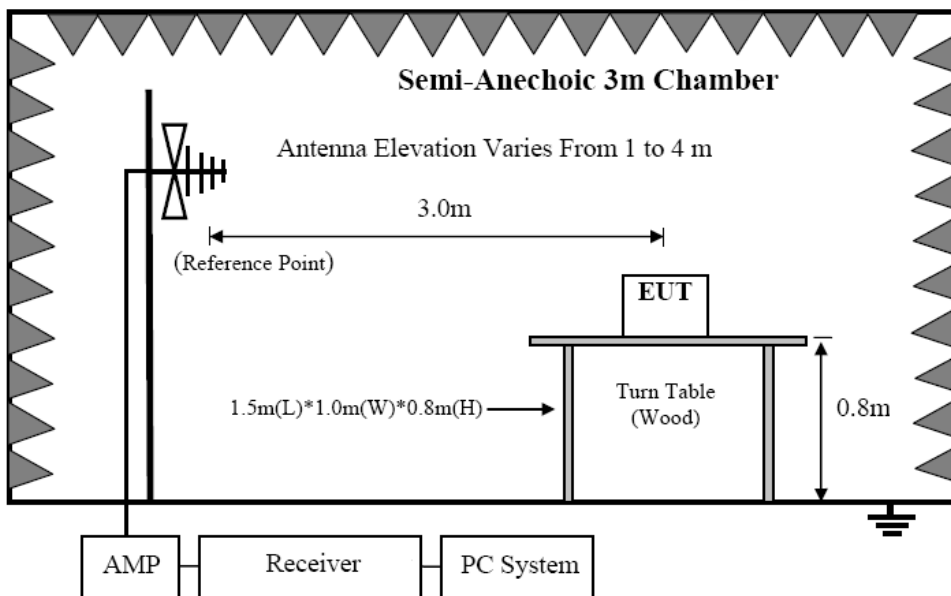
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

6.2. Block Diagram of Test setup

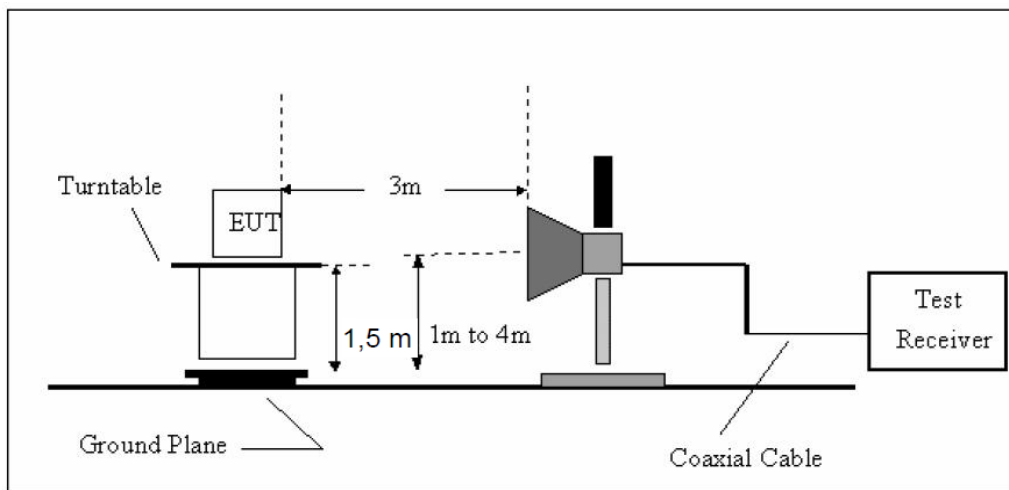
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for 9KHzHz to 30MHz



8.2.2 In 3m Anechoic Chamber Test Setup Diagram for 30MHz to 1GHz



8.2.3 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

6.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1GHz test, 150 cm above the ground plane inside a semi-anechoic chamber for above 1GHz test
- (2) Setup EUT and simulator as shown in section 1.4 and 6.1
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) 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 C63.10:2013on Radiated Emission test.
- (6) 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 for Average measure.

6.4. Test Result

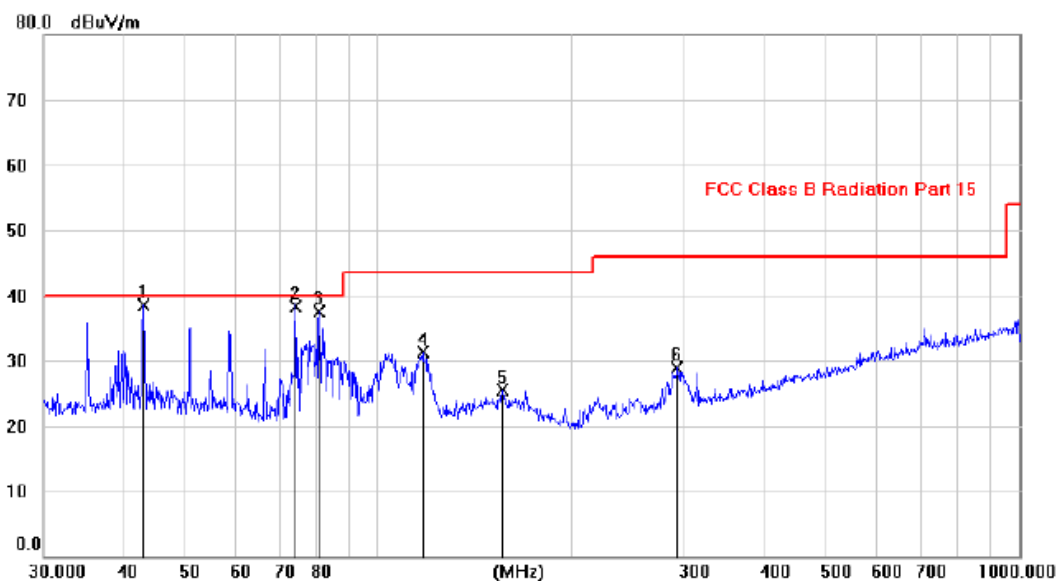
We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency..
Detailed information please see the following page.

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.

From 30MHz to 1000MHz: Conclusion: PASS

Polarization: *Vertical*

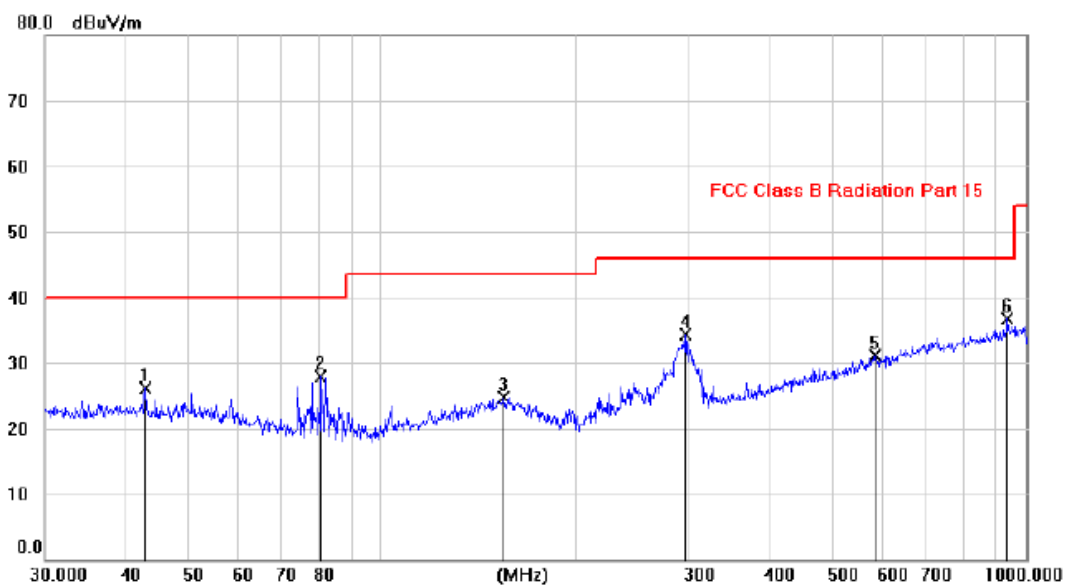


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	42.9950	24.23	14.22	38.45	40.00	-1.55			peak
2		74.1535	27.49	10.76	38.25	40.00	-1.75			QP
3		80.7102	27.53	9.91	37.44	40.00	-2.56			peak
4		117.2232	18.63	12.70	31.33	43.50	-12.17			peak
5		156.1472	10.44	15.05	25.49	43.50	-18.01			peak
6		292.2290	14.89	13.93	28.82	46.00	-17.18			peak

Note: 1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Polarization: *Horizontal*



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		42.9098	11.85	14.23	26.08	40.00	-13.92			peak
2		80.5594	18.05	9.91	27.96	40.00	-12.04			peak
3		154.6758	9.68	15.05	24.73	43.50	-18.77			peak
4		296.3914	20.31	14.02	34.33	46.00	-11.67			peak
5		583.8333	11.13	19.90	31.03	46.00	-14.97			peak
6	*	937.2976	12.11	24.52	36.63	46.00	-9.37			peak

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

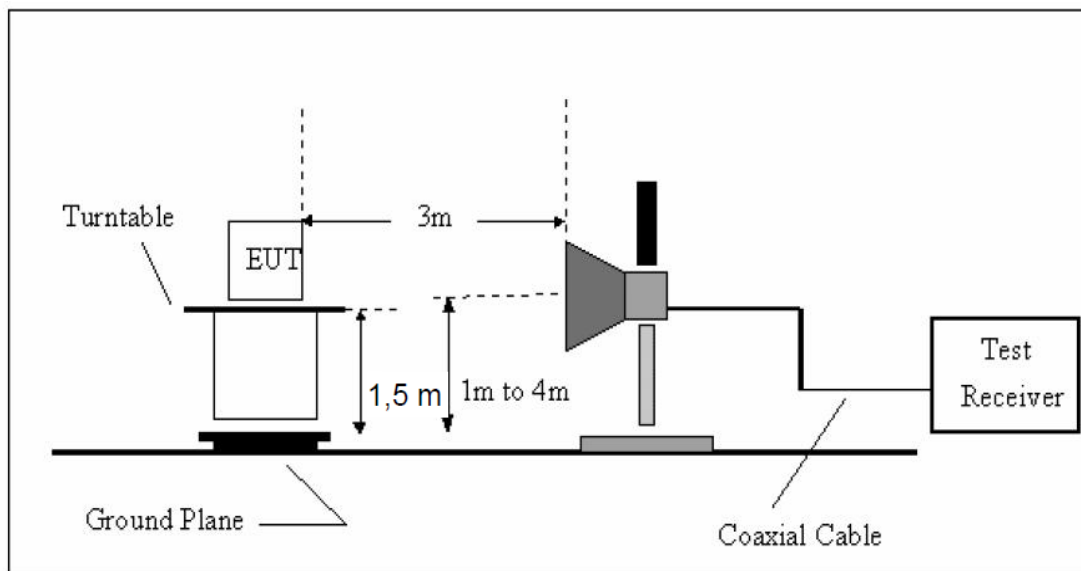
Remark: All modes have been tested, and only worst data of GFSK Channel High mode was listed in this report.

From 1G-25GHz

Test Mode: GFSK TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4810	47.35	V	33.95	10.18	34.26	57.22	74	16.78	PK
4810	37.00	V	33.95	10.18	34.26	46.87	54	7.13	AV
7215	/	/	/	/	/	/	/	/	/
9620	/	/	/	/	/	/	/	/	/
4810	43.28	H	33.95	10.18	34.26	53.15	74	20.85	PK
4810	37.91	H	33.95	10.18	34.26	47.78	54	6.22	AV
7215	/	/	/	/	/	/	/	/	/
9620	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX Mid									
4882	42.83	V	33.93	10.2	34.29	52.67	74	21.33	PK
4882	33.87	V	33.93	10.2	34.29	43.71	54	10.29	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	42.96	H	33.93	10.2	34.29	52.80	74	21.20	PK
4882	34.05	H	33.93	10.2	34.29	43.89	54	10.11	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX High									
4956	46.75	V	33.98	10.22	34.25	56.70	74	17.30	PK
4956	36.38	V	33.98	10.22	34.25	46.33	54	7.67	AV
7434	/	/	/	/	/	/	/	/	/
9912	/	/	/	/	/	/	/	/	/
4956	45.14	H	33.98	10.22	34.25	55.09	74	18.91	PK
4956	34.73	H	33.98	10.22	34.25	44.68	54	9.32	AV
7434	/	/	/	/	/	/	/	/	/
9912	/	/	/	/	/	/	/	/	/
Note:									
1, Result = Read level + Antenna factor + cable loss-Amp factor									
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

7. Band Edge Compliance

7.1. Block Diagram of Test Setup



7.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

7.3. Test Procedure

All restriction band and non- restriction band have been tested , only worse case is reported.

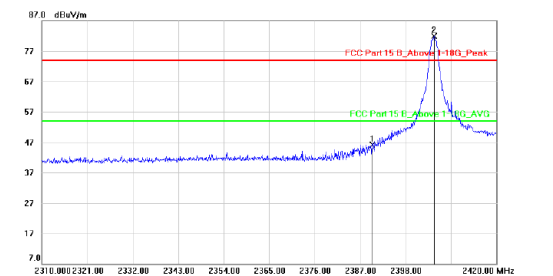
7.4. Test Result

PASS. (See below detailed test data)

Radiated Method:

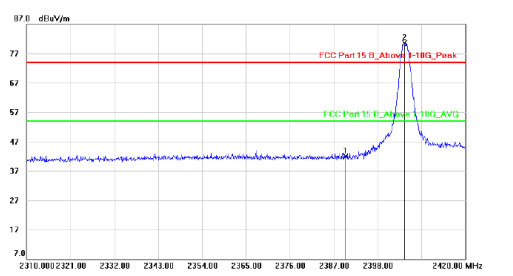
CH-L

Horizontally



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1	2390.000	50.58	-4.54	46.04	74.00	-27.96	peak	
2 *	2404.930	86.33	-4.45	81.88	74.00	7.88	peak	

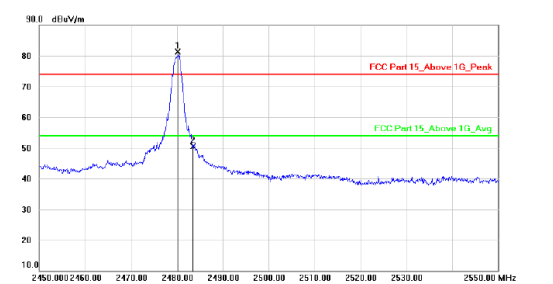
Vertically



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1	2390.000	46.43	-4.54	41.89	74.00	-32.11	peak	
2 *	2404.798	84.94	-4.45	80.49	74.00	6.49	peak	

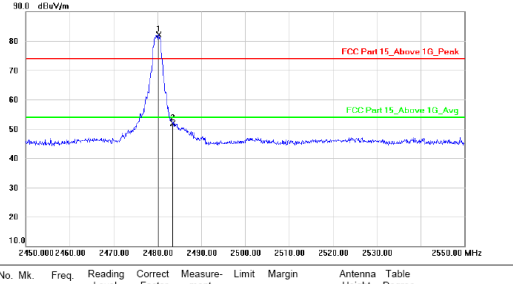
CH-H

Horizontally



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1 *	2480.200	84.75	-3.38	81.37	74.00	7.37	peak	
2	2483.500	53.82	-3.38	50.44	74.00	-23.56	peak	

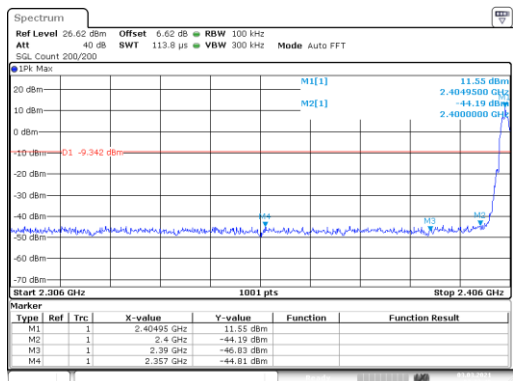
Vertically



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1 *	2480.300	85.49	-3.38	82.11	74.00	8.11	peak	
2	2483.500	55.36	-3.38	51.98	74.00	-22.02	peak	

Conducted Method:

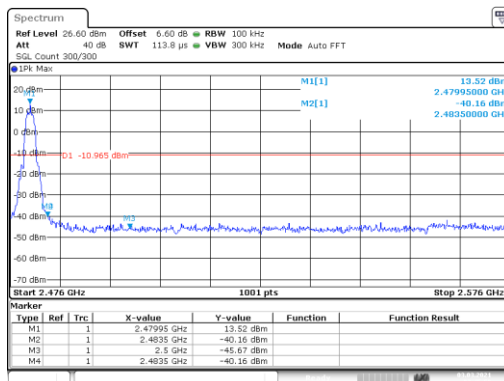
CH-L



Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1	1	1	2.40495 GHz	11.55 dBm		
M2	1	1	1	2.4 GHz	-44.19 dBm		
M3	1	1	1	2.39 GHz	-46.83 dBm		
M4	1	1	1	2.357 GHz	-44.81 dBm		

Date: 3-MAR-2021 03:33:40

CH-H

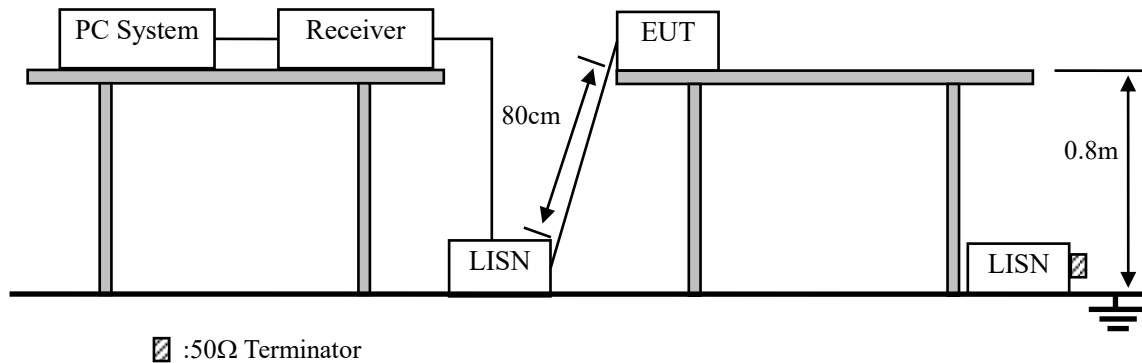


Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1	1	1	2.47995 GHz	13.52 dBm		
M2	1	1	1	2.4835 GHz	-40.16 dBm		
M3	1	1	1	2.5 GHz	-45.87 dBm		
M4	1	1	1	2.4835 GHz	-40.16 dBm		

Date: 3-MAR-2021 03:45:50

8. Power Line Conducted Emissions

8.1. Block Diagram of Test Setup



8.2. Limit

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

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

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

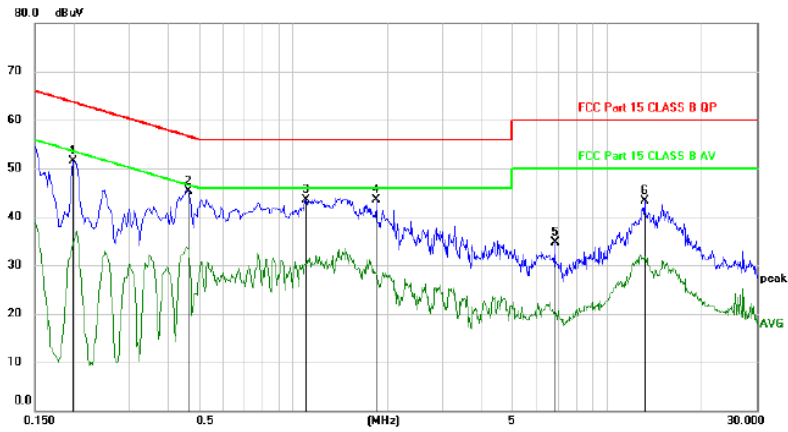
8.3. Test Procedure

- (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 C63.10 :2013on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

8.4. Test Result

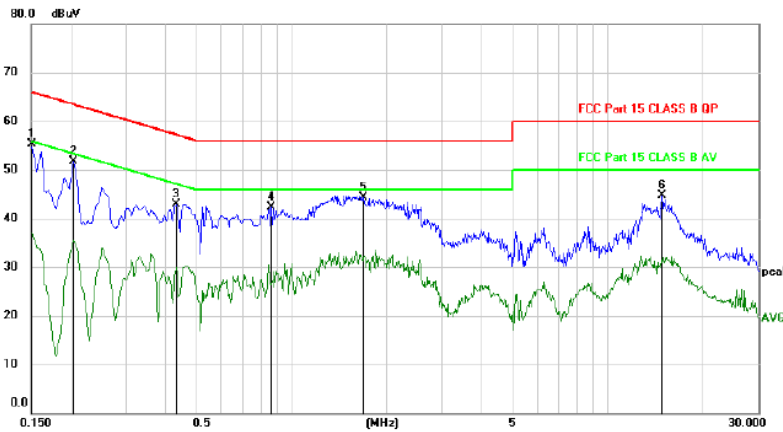
PASS. (See below detailed test data)

Polarity: L



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1980	41.49	9.92	51.41	63.69	-12.28	peak	
2 *	0.4620	35.33	9.95	45.28	56.66	-11.38	peak	
3	1.0980	33.67	9.91	43.58	56.00	-12.42	peak	
4	1.8420	33.63	9.89	43.52	56.00	-12.48	peak	
5	6.8400	24.65	10.11	34.76	60.00	-25.24	peak	
6	13.1639	33.09	10.29	43.38	60.00	-16.62	peak	

Polarity: N



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Margin dB	Detector	Comment
1 *	0.1500	45.35	9.94	55.29	66.00	-10.71	peak	
2	0.2038	41.72	9.92	51.64	63.45	-11.81	peak	
3	0.4319	33.00	9.95	42.95	57.22	-14.27	peak	
4	0.8639	32.26	9.96	42.22	56.00	-13.78	peak	
5	1.6978	34.35	9.89	44.24	56.00	-11.76	peak	
6	14.9039	34.32	10.33	44.65	60.00	-15.35	peak	

Note: All modes and channels have been tested and only the TX Hight mode with the worst data is listed.

9. Antenna Requirements

9.1.Limit

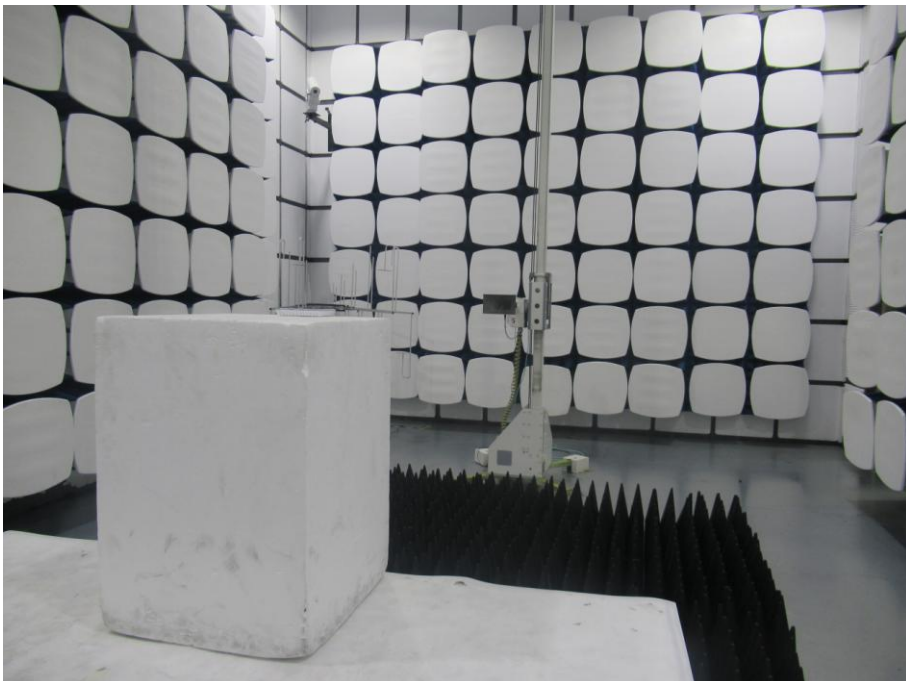
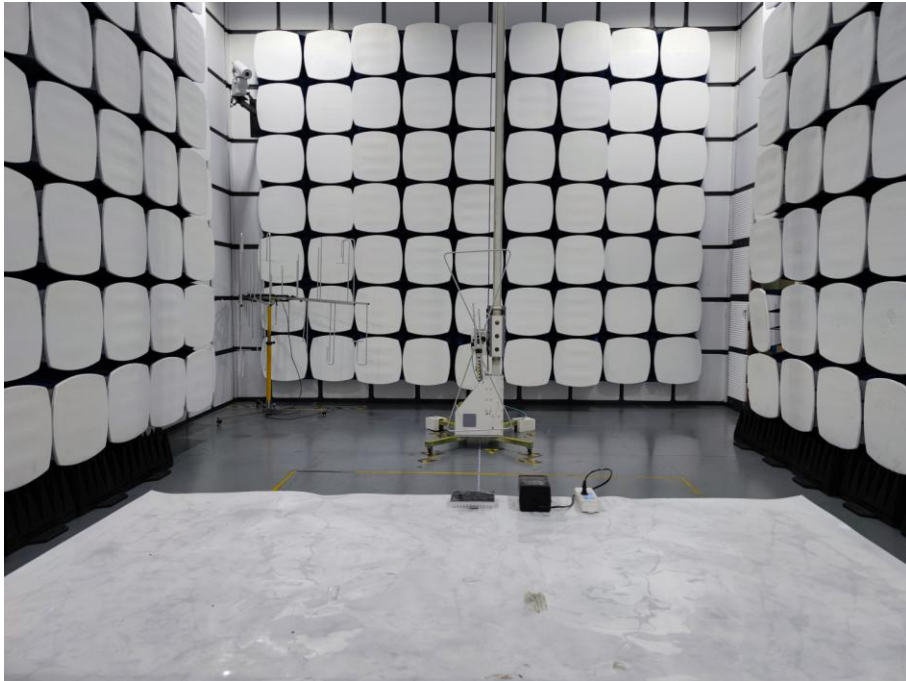
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional 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.Result

The EUT antenna is integrated Antenna. It complies with the standard requirement.

10. Test Setup Photo

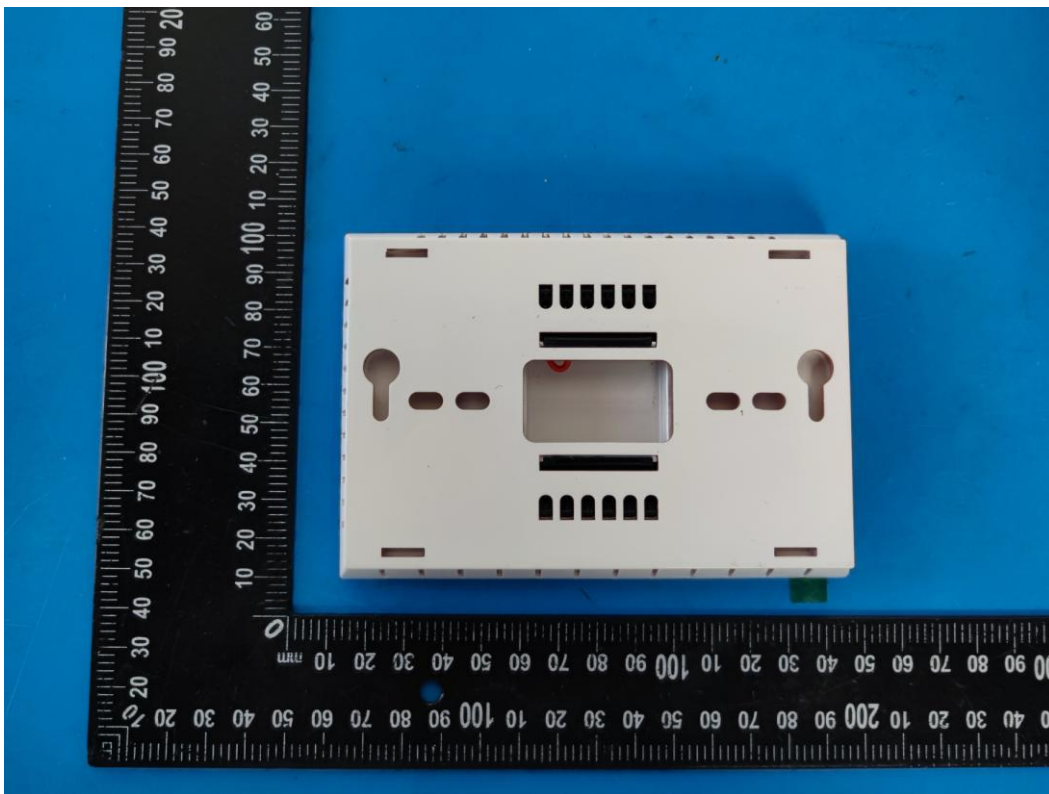
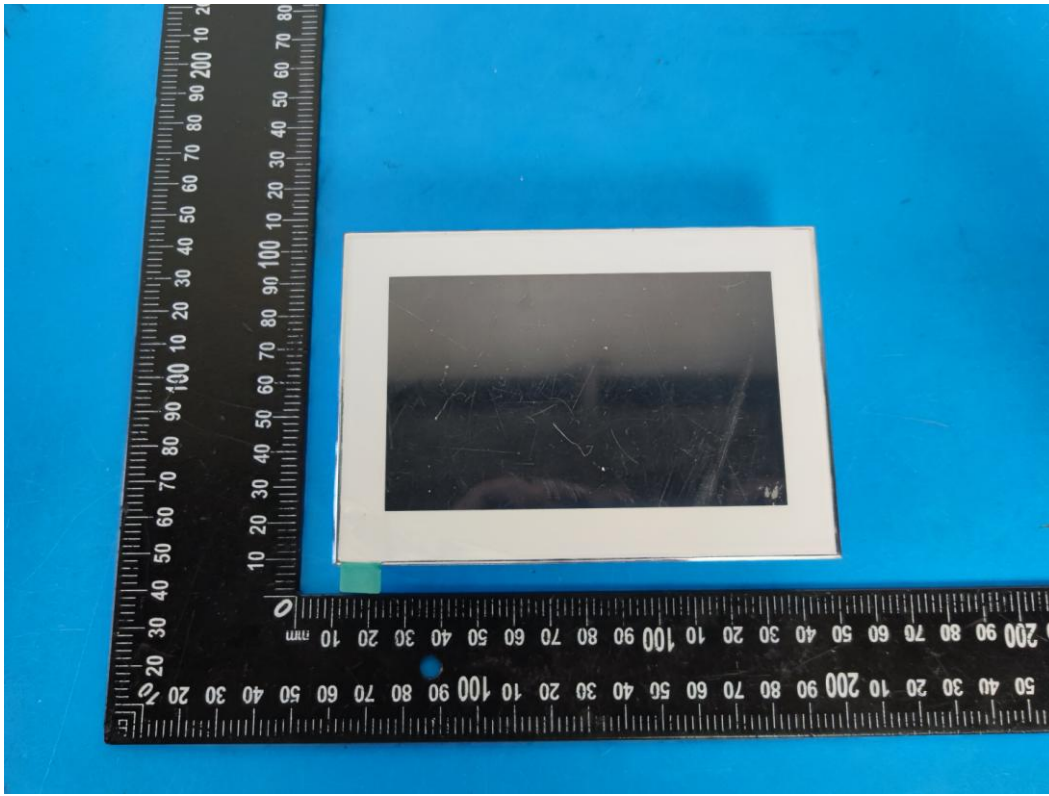
10.1. Photos of Radiated emission

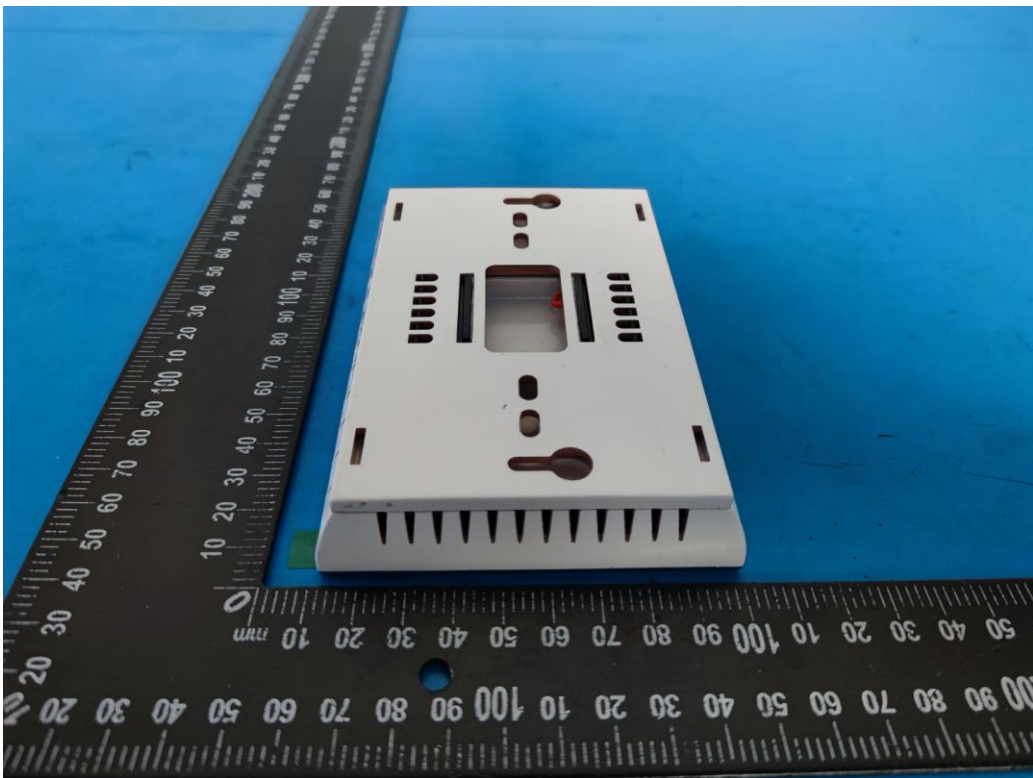
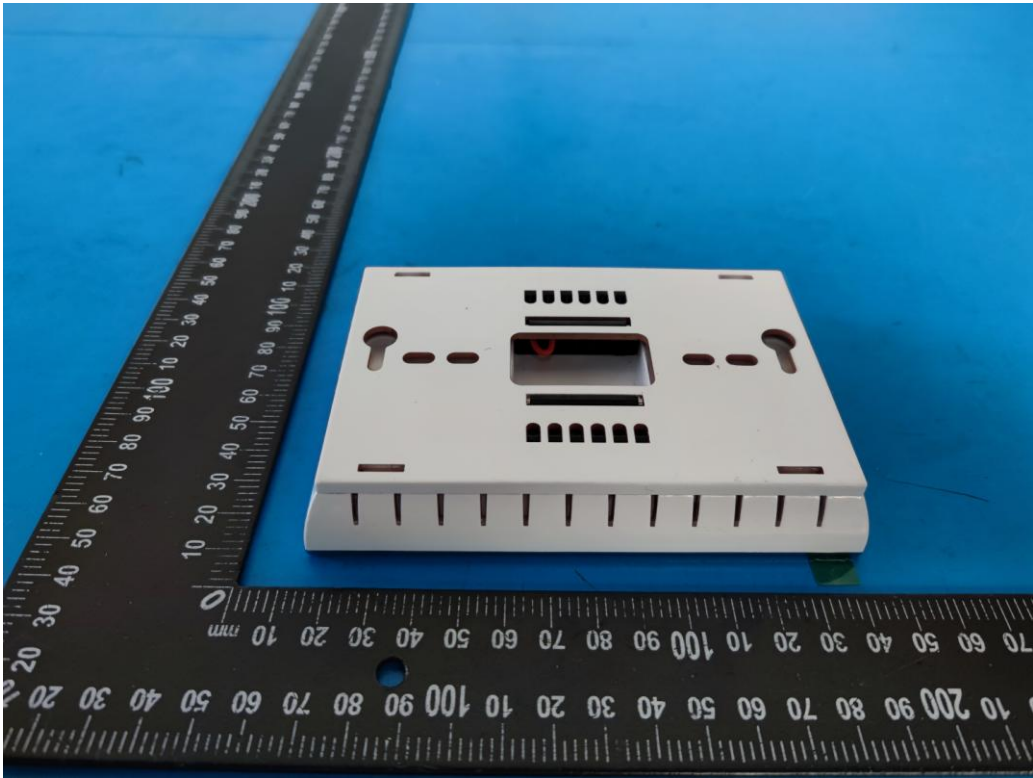


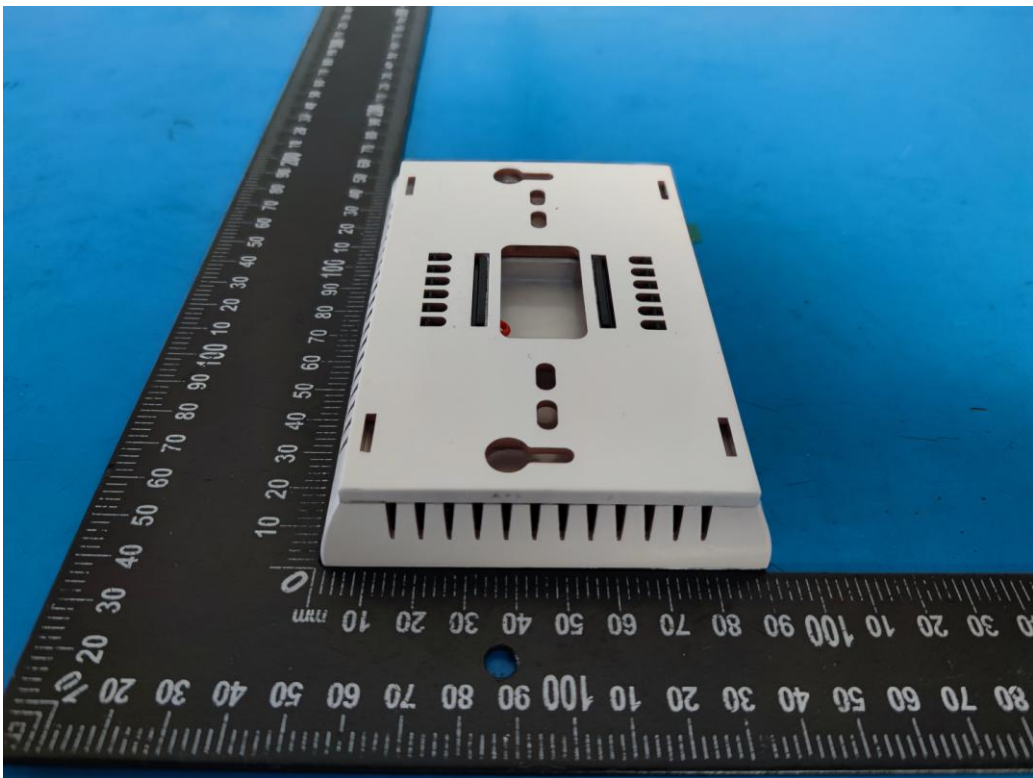
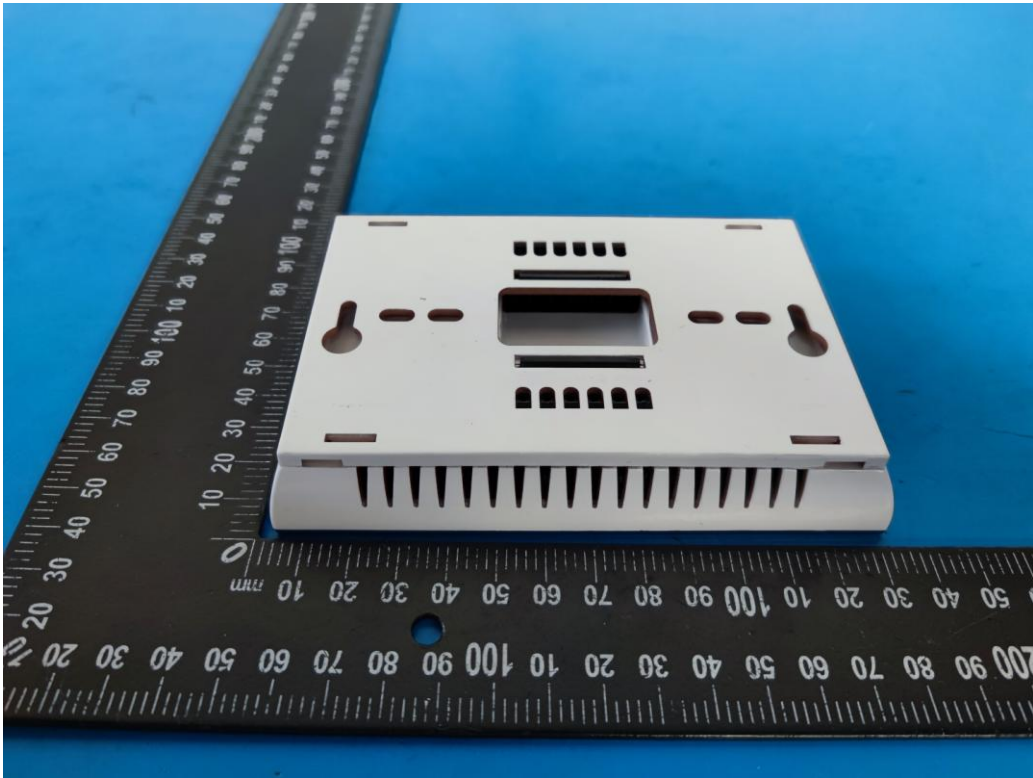
10.2.Photos of Power Line Conducted Emission Test

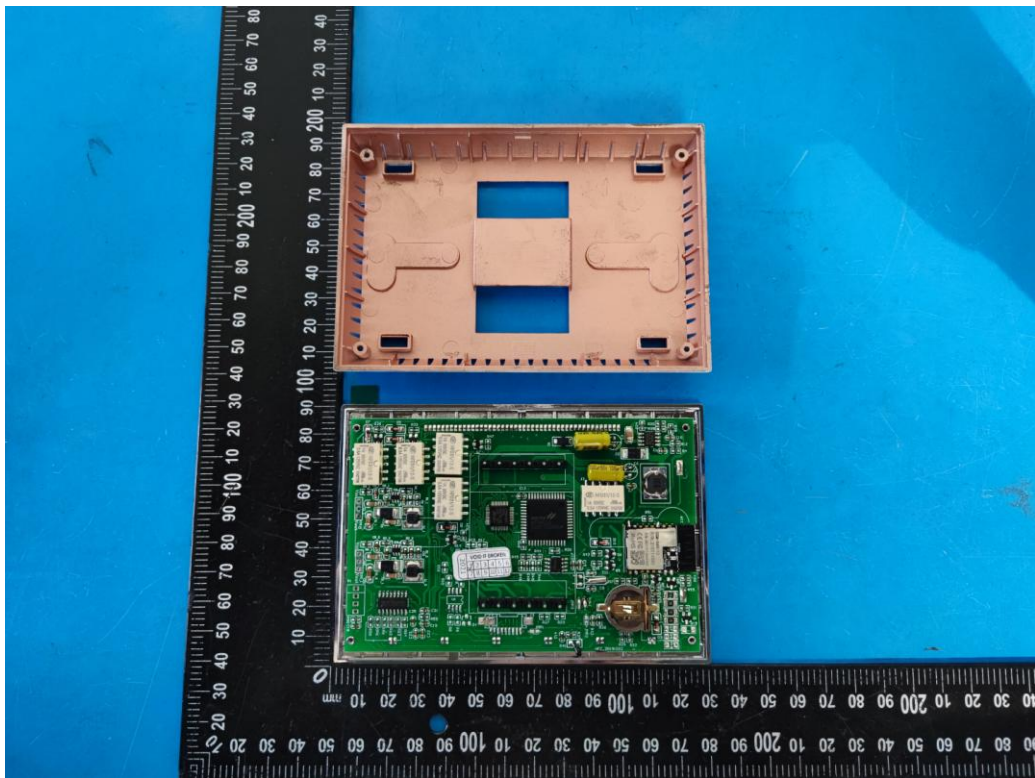
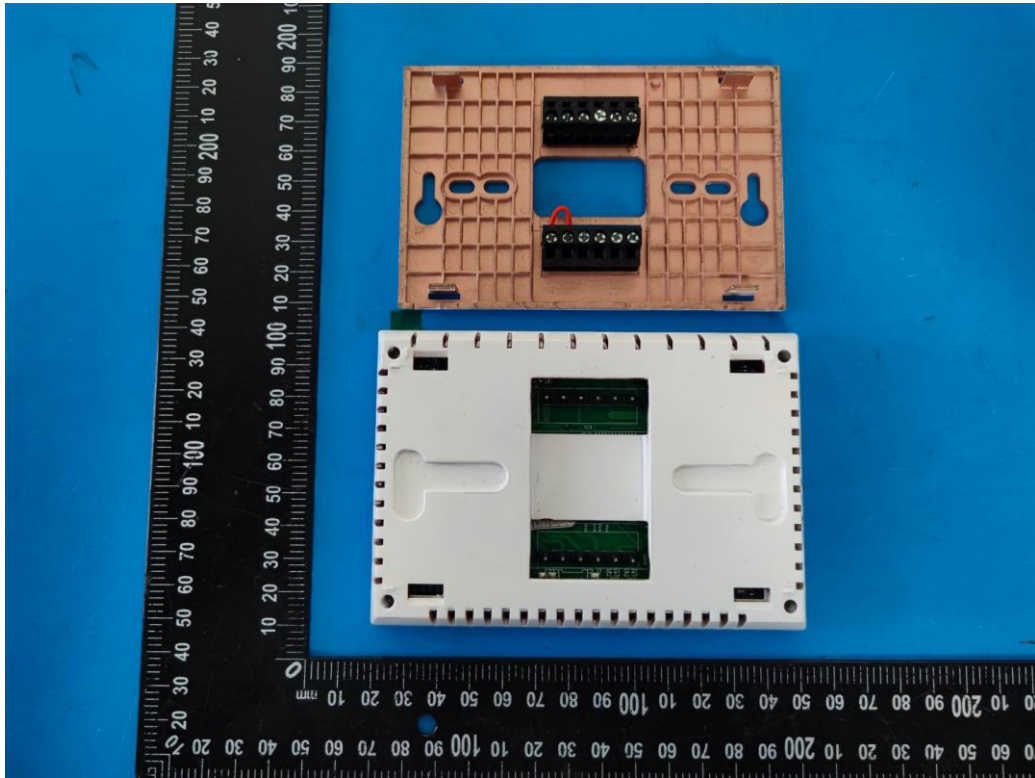


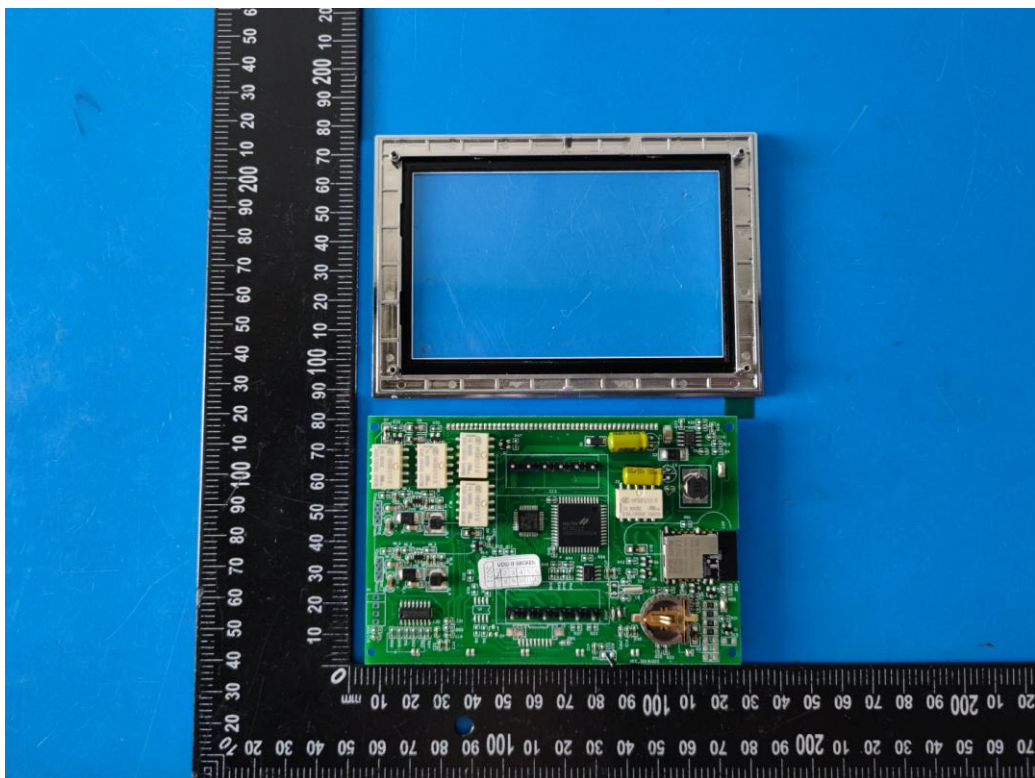
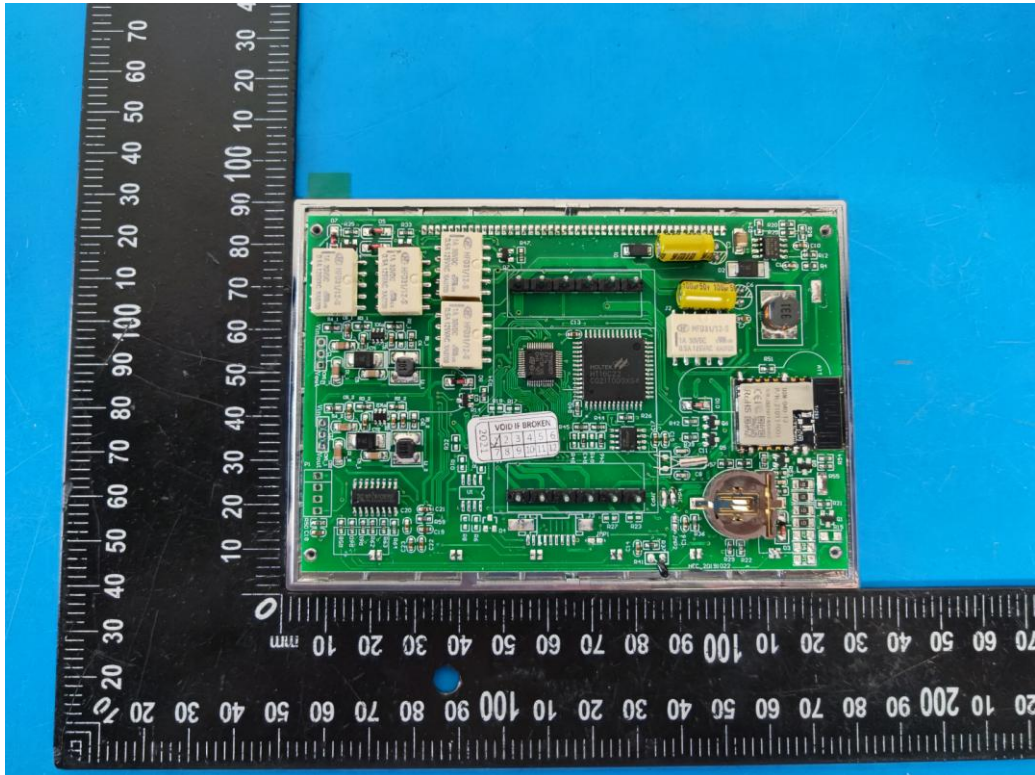
11.Photos Of EUT

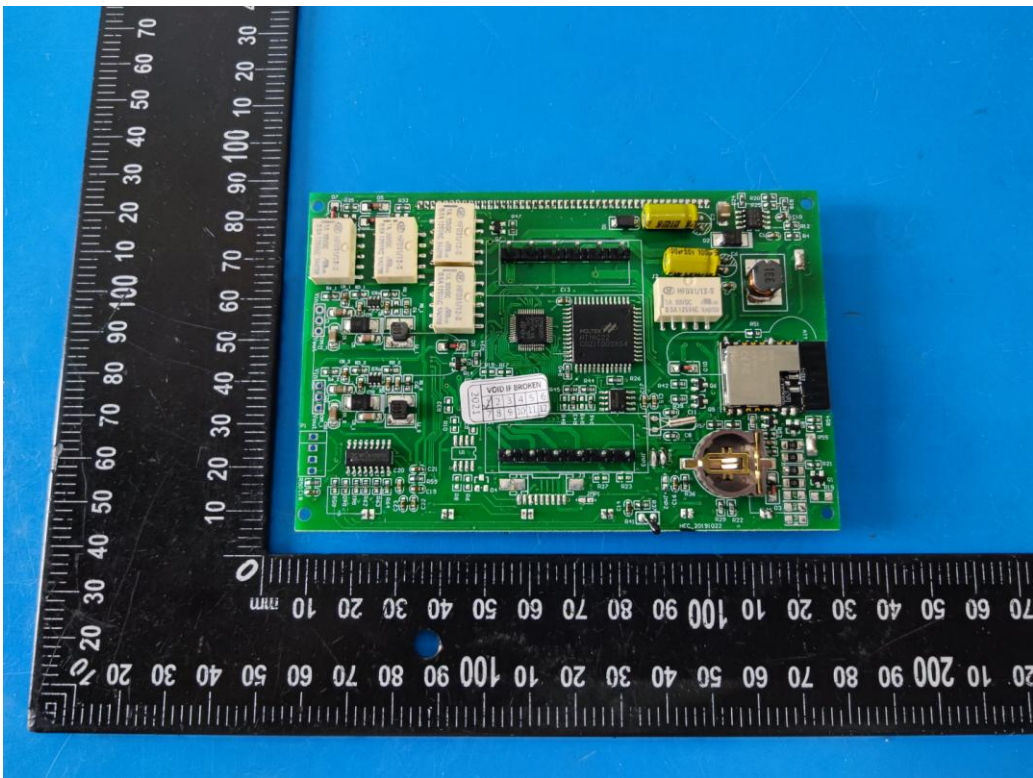
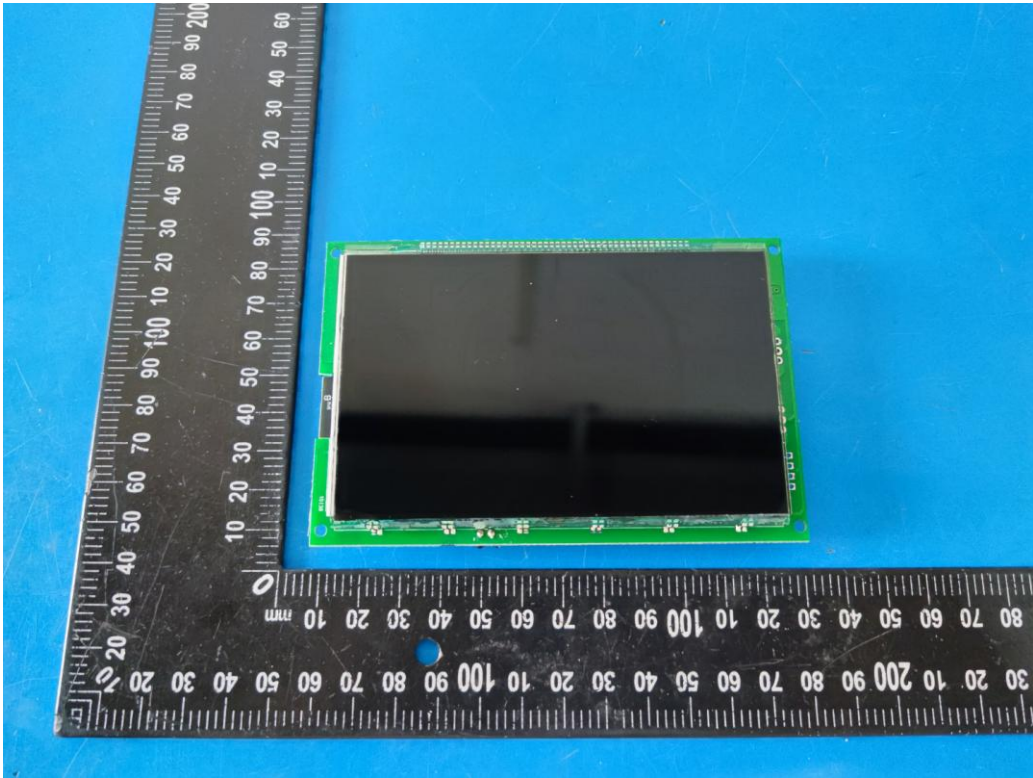


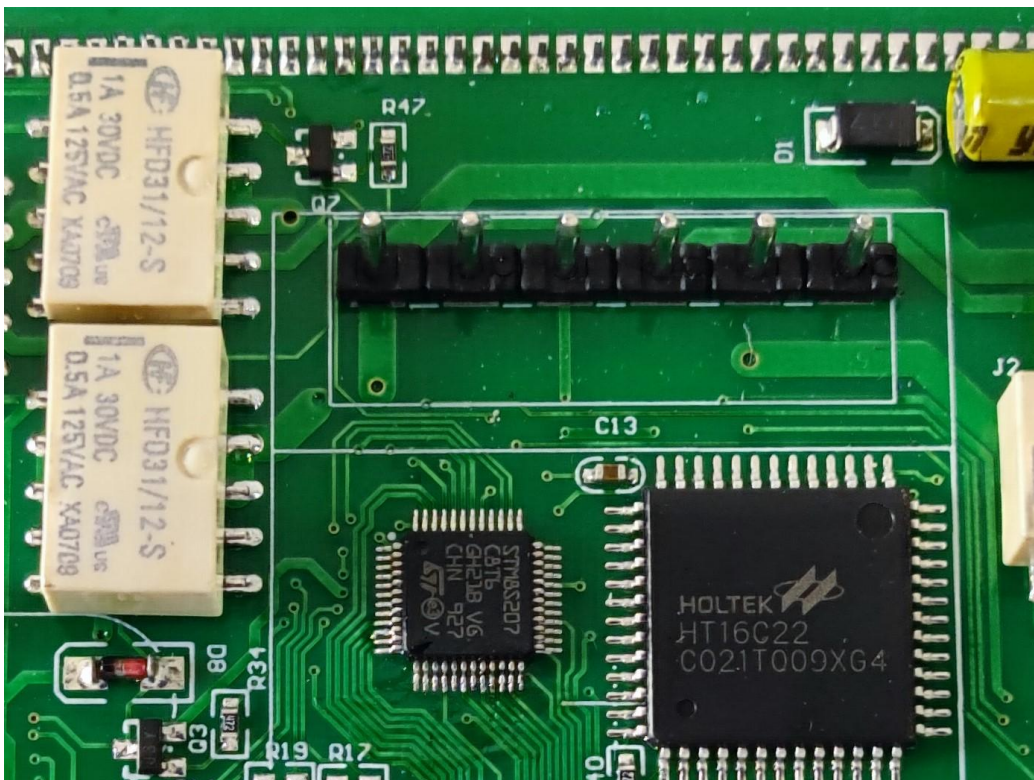
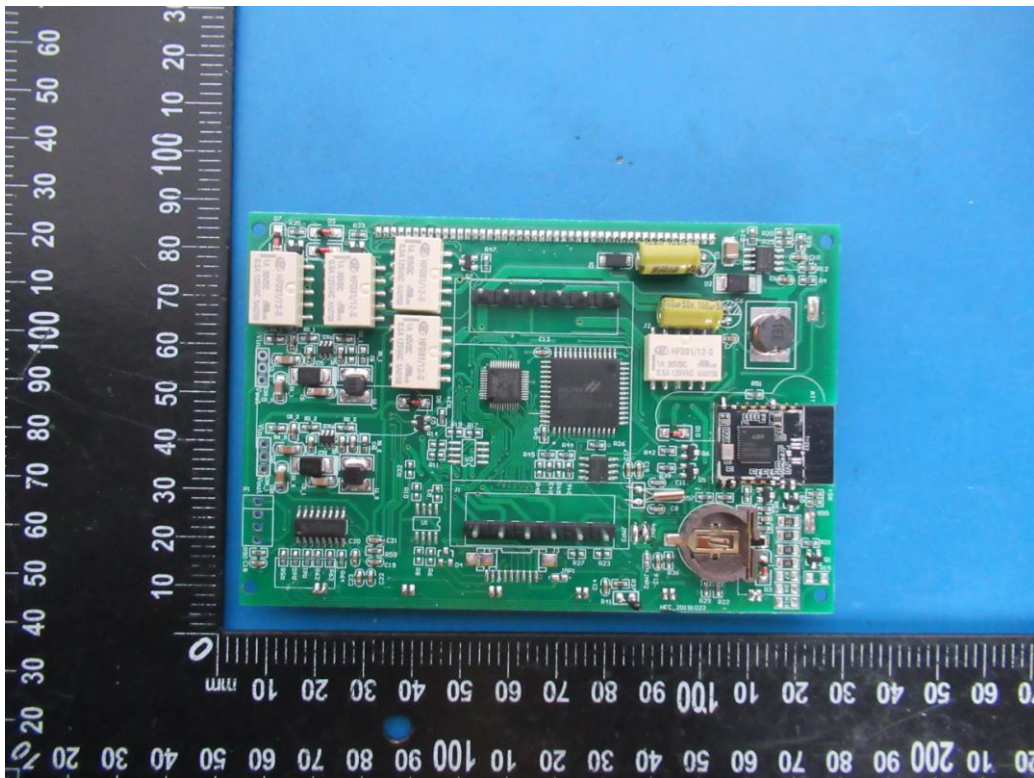












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