



# FCC REPORT

**Applicant:** Xiamen Paperang Technology Co.,Ltd.

**Address of Applicant:** Room 3124,Xuanye Building, Pioneer Park, Xiamen Torch High-tech Zone, Fujian, China

**Equipment Under Test (EUT)**

Product Name: Thermal Printer

Model No.: P3,P3L,P3S,PAPERANG P3,PAPERANG-P3,P3B2,P3Y2,P3A2,P3Z2,P3N2,P3S2,P3C2,P3W2,P3X2

Trade mark: PAPERANG

**FCC ID:** 2APWO-PAPERANG-P3

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247

**Date of sample receipt:** 23 Feb., 2022

**Date of Test:** 24 Feb., 2022~ 14 Mar., 2022

**Date of report issued:** 15 Mar., 2022

**Test Result:** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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**1 Modified Information**

Version No.	Date	Description
00	15 Mar., 2022	Original

**Tested by:****Date:**

15 Mar., 2022

Raymon Zheng/ Project Engineer

**Reviewed by:****Date:**

15 Mar., 2022

Louis Ye/Manager

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### 3 Test Summary

Test Items	Section in CFR 47	Result
Antenna requirement	15.203&15.247 (b)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205&15.209	Pass
<b>Remark:</b> 1. Pass: The EUT complies with the essential requirements in the standard. 2. N/A: Not Applicable. 3. The cable insertion loss used by "RF Output Power" and other conduction measurement items is 1dB (provided by the customer).		
<b>Test Method:</b>	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02	

## 4 General Information

### 4.1 Client Information

Applicant:	Xiamen Paperang Technology Co.,Ltd.
Address:	Room 3124,Xuanye Building,Pioneer Park,Xiamen Torch High-tech Zone,Fujian,China
Manufacturer:	Xiamen Paperang Technology Co.,Ltd.
Address:	Room 3124,Xuanye Building,Pioneer Park,Xiamen Torch High-tech Zone,Fujian,China

### 4.2 General Description of E.U.T.

Product Name:	Thermal Printer
Model No.:	P3,P3L,P3S,PAPERANG P3,PAPERANG-P3,P3B2,P3Y2,P3A2,P3Z2,P3N2,P3S2,P3C2,P3W2,P3X2
Operation Frequency:	2402-2480 MHz
Channel numbers:	40
Channel separation:	2 MHz
Modulation technology:	GFSK
Data speed :	1Mbps
Antenna Type:	PCB Antenna
Antenna gain:	0dBi
Power supply:	Battery
AC adapter:	N/A
Differences of series model:	Only the model name and appearance color are different between each model, others are the same, the difference does not affect the safety and electromagnetic compatibility performance of the product., so full tests were performed on the model PAPERANG-P3.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz
<p>Note:</p> <p>In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test. Channel No. 0, 19&amp; 39 were selected as Lowest, Middle and Highest channel.</p>							

### 4.3 Test environment and test mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode	Keep the EUT in continuous transmitting with modulation
The sample was placed 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.	

### 4.4 Description of Support Units

The EUT has been tested as an independent unit.

### 4.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (150kHz ~ 30MHz)	±2.8 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±2.5 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.1 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.2 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±4.8 dB (k=2)

### 4.6 Additions to, deviations, or exclusions from the method

No

### 4.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC - Designation No.: CN1279**

Jianyan Testing Group Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 892155.

● **ISED – CAB identifier.: CN0102**

Jianyan Testing Group Co., Ltd. has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with ISED#:26114.

● **A2LA - Registration No.: 5568.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/5568-01.pdf>

### 4.8 Laboratory Location

JianYan Testing Group Co., Ltd.

Address: No.760, Fengling Road, Tong'an District, Xiamen, Fujian, China

Tel: +86-592-2273071, Fax: +86-592-2273700

Email: info-JYTee@lets.com, Website: <http://www.lets.com/>

## 4.9 Test Instruments list

Radiated Disturbances:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	BOST	CHC-966	966-1#	2019-12-27	2022-12-26
EMI Test Receiver	Rohde & Schwarz	ESR 3	102329	2021-07-29	2022-07-28
SpectrumAnalyzer	Rohde & Schwarz	FSV40-N	102175	2021-04-12	2022-04-11
BiConiLog Antenna	SCHWARZBECK	VULB 9163	1105	2021-12-05	2022-12-04
Horn Antenna	SCHWARZBECK	BBHA 9120 D	911	2021-03-17	2022-03-16
Pre-amplifier	SCHWARZBECK	BBV9743	00009	2021-07-29	2022-07-28
Pre-amplifier	SCHWARZBECK	BBV9718C	00014	2021-04-01	2022-03-31
EMI Test Software	Farad	EZ-EMC	Version: V.EMCE-3A1		

Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESR 3	102330	2021-07-29	2022-07-28
LISN	Rohde & Schwarz	ENV 216	102240	2021-07-29	2022-07-28
LISN	AFJ/Italy	LS16C\10	16012020470	2021-06-22	2022-06-21
EMI Test Software	Farad	EZ-EMC	Version: V.EMCE-3A1		

Conducted method:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Signal Generator	Agilent	N5181	MY49060122	2021-04-12	2022-04-11
Spectre Analyzer	R&S	FSV40-N	102175	2021-04-12	2022-04-11
Wideband Radio Communication Tester	R&S	CMW500	145852	2021-04-12	2022-04-11
Signal Generator	Agilent	N5182A	MY51004823	2021-04-12	2022-04-11
Power Sensor	Keysight	U2021XA	MY54320004	2021-04-01	2022-03-31
Test Software	MWRFTTEST	MTS 8310	Version: 2.0.0.0		

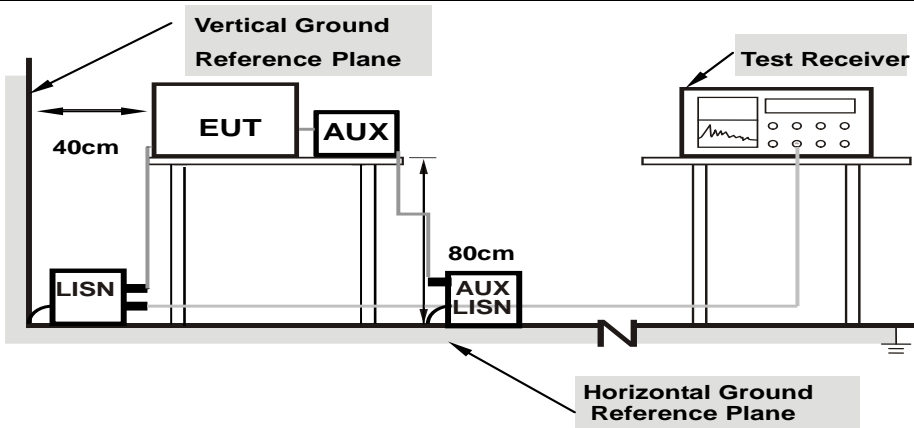
## 5 Test results and Measurement Data

### 5.1 Antenna requirement:

<b>Standard requirement:</b>	FCC Part15 C Section 15.203 /247(b)
<p>15.203 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, 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.</p> <p>15.247(b) (4) requirement:  (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
<b>E.U.T Antenna:</b>	
The Bluetooth antenna is an Internal antenna which permanently attached, and the best case gain of the antenna is 0 dBi.	

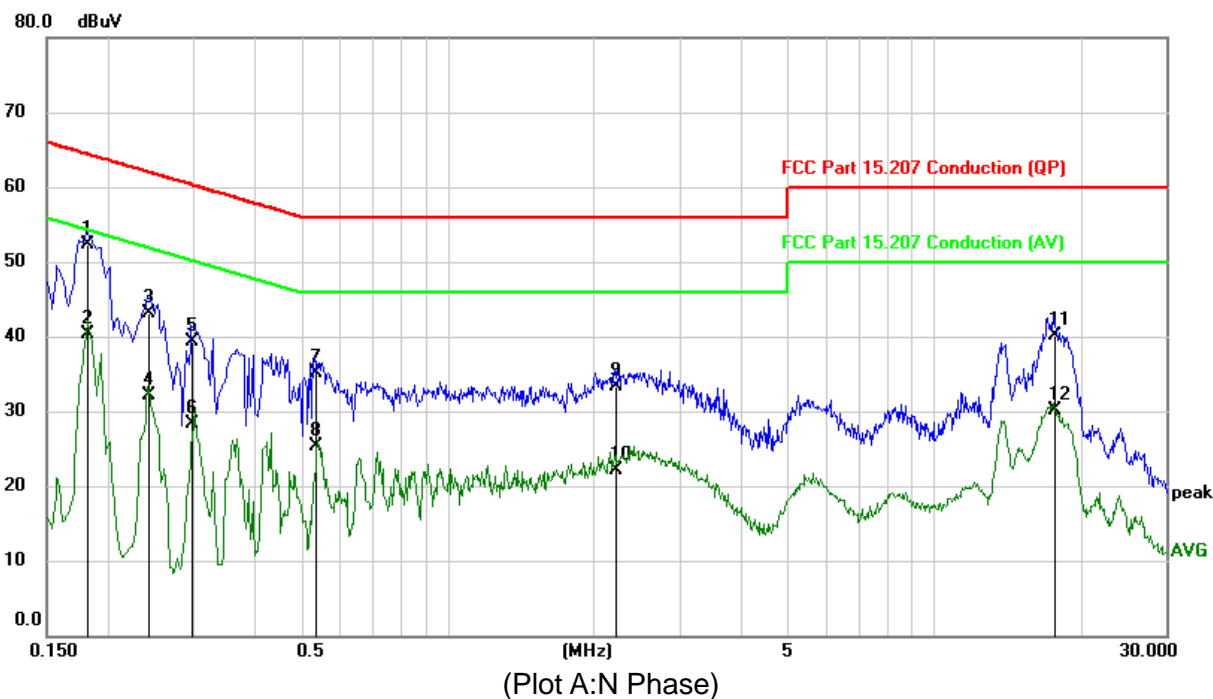


## 5.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207		
Test Frequency Range:	150 kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test procedure:	<ol style="list-style-type: none"> <li>The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10(latest version) on conducted measurement.</li> </ol>		
Test setup:	 <p><b>Note: 1.Support units were connected to second LISN.</b>  <b>2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes</b></p>		
Test Instruments:	Refer to section 4.9 for details		
Test mode:	Charging + BLE Link.		
Test results:	Pass		

## Measurement Data:

Product model:	PAPERANG-P3	Test result:	pass
Test by:	Raymon Zheng	Test mode:	Mode 1
Test voltage:	120Vac, 60 Hz	Phase:	Line (N)
Environment:	Temp.: 22.3℃ Humi.: 46%		

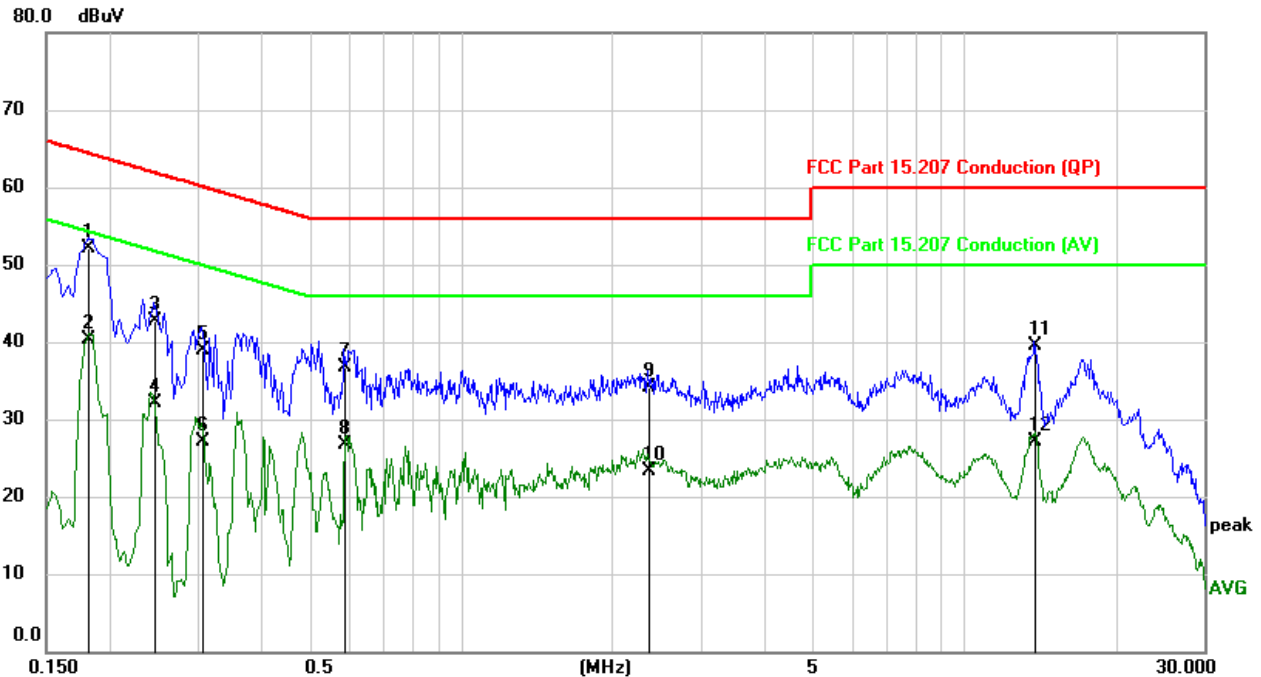


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1808	42.68	9.66	52.34	64.45	-12.11	QP
2		0.1808	30.67	9.66	40.33	54.45	-14.12	AVG
3		0.2420	33.41	9.71	43.12	62.03	-18.91	QP
4		0.2420	22.39	9.71	32.10	52.03	-19.93	AVG
5		0.2980	29.67	9.73	39.40	60.30	-20.90	QP
6		0.2980	18.67	9.73	28.40	50.30	-21.90	AVG
7		0.5340	25.35	9.77	35.12	56.00	-20.88	QP
8		0.5340	15.53	9.77	25.30	46.00	-20.70	AVG
9		2.2060	23.62	9.78	33.40	56.00	-22.60	QP
10		2.2060	12.42	9.78	22.20	46.00	-23.80	AVG
11		17.5739	30.29	9.91	40.20	60.00	-19.80	QP
12		17.5739	20.29	9.91	30.20	50.00	-19.80	AVG

## Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

Product model:	PAPERANG-P3	Test result:	pass
Test by:	Raymon Zheng	Test mode:	Mode 1
Test voltage:	120Vac, 60 Hz	Phase:	Line (L)
Environment:	Temp.: 22.3℃ Humi.: 46%		



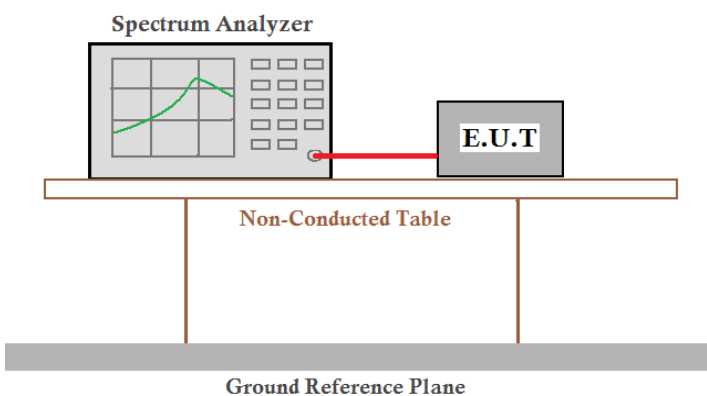
(Plot B:L Phase)

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1821	42.31	9.80	52.11	64.39	-12.28	QP
2		0.1821	30.59	9.80	40.39	54.39	-14.00	AVG
3		0.2460	33.09	9.71	42.80	61.89	-19.09	QP
4		0.2460	22.39	9.71	32.10	51.89	-19.79	AVG
5		0.3060	29.35	9.61	38.96	60.08	-21.12	QP
6		0.3060	17.59	9.61	27.20	50.08	-22.88	AVG
7		0.5860	26.91	9.89	36.80	56.00	-19.20	QP
8		0.5860	16.91	9.89	26.80	46.00	-19.20	AVG
9		2.3460	24.23	9.87	34.10	56.00	-21.90	QP
10		2.3460	13.53	9.87	23.40	46.00	-22.60	AVG
11		13.8139	29.40	10.05	39.45	60.00	-20.55	QP
12		13.8139	17.15	10.05	27.20	50.00	-22.80	AVG

## Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

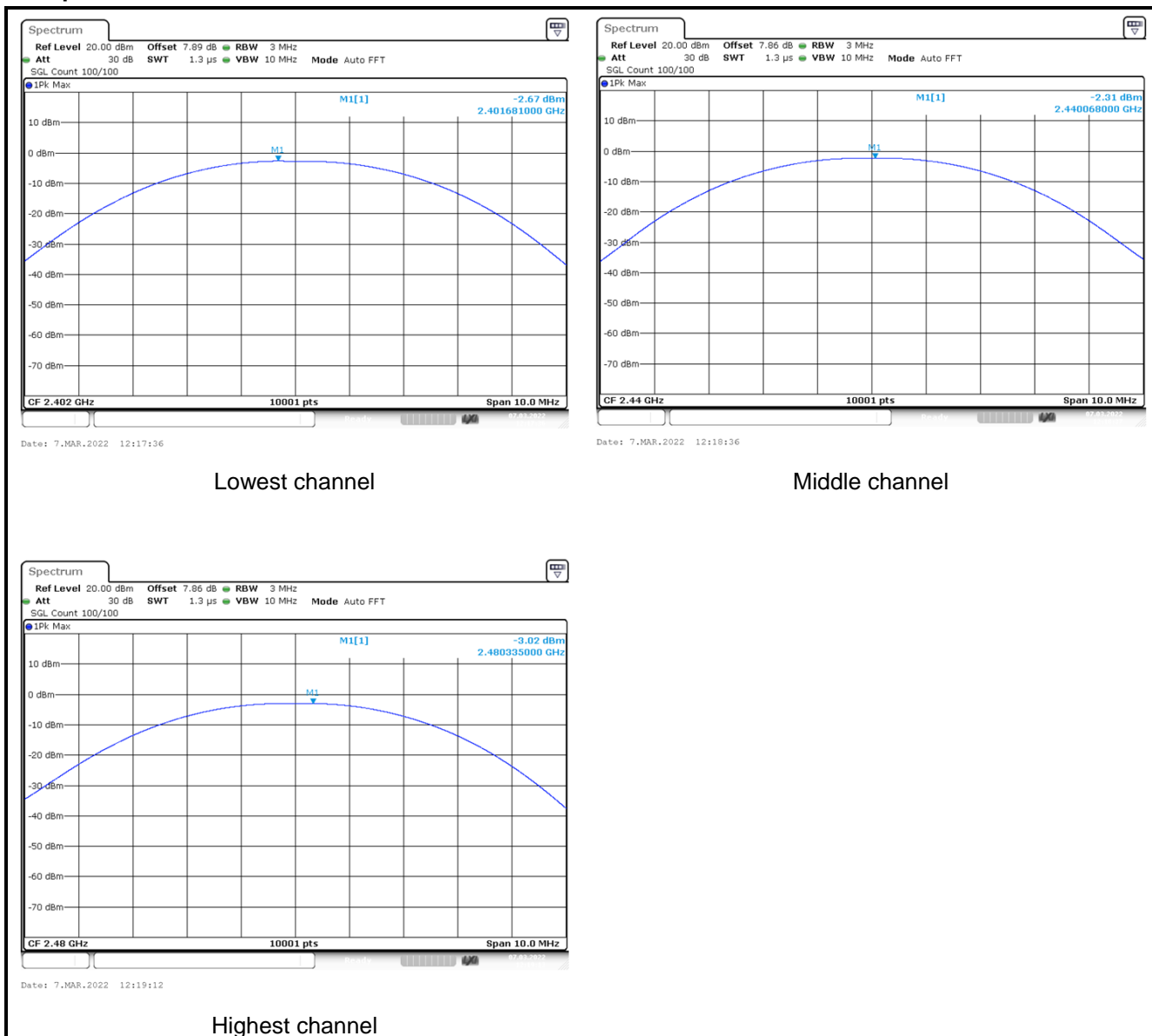
### 5.3 Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 4.9 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

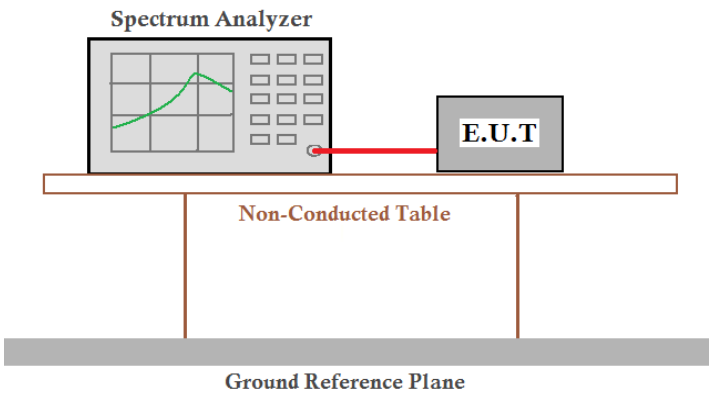
#### Measurement Data:

Test CH	Maximum Conducted Output Power (dBm)	Limit(dBm)	Result
Lowest	-2.668	30.00	Pass
Middle	-2.306		
Highest	-3.017		

Test plot as follows:



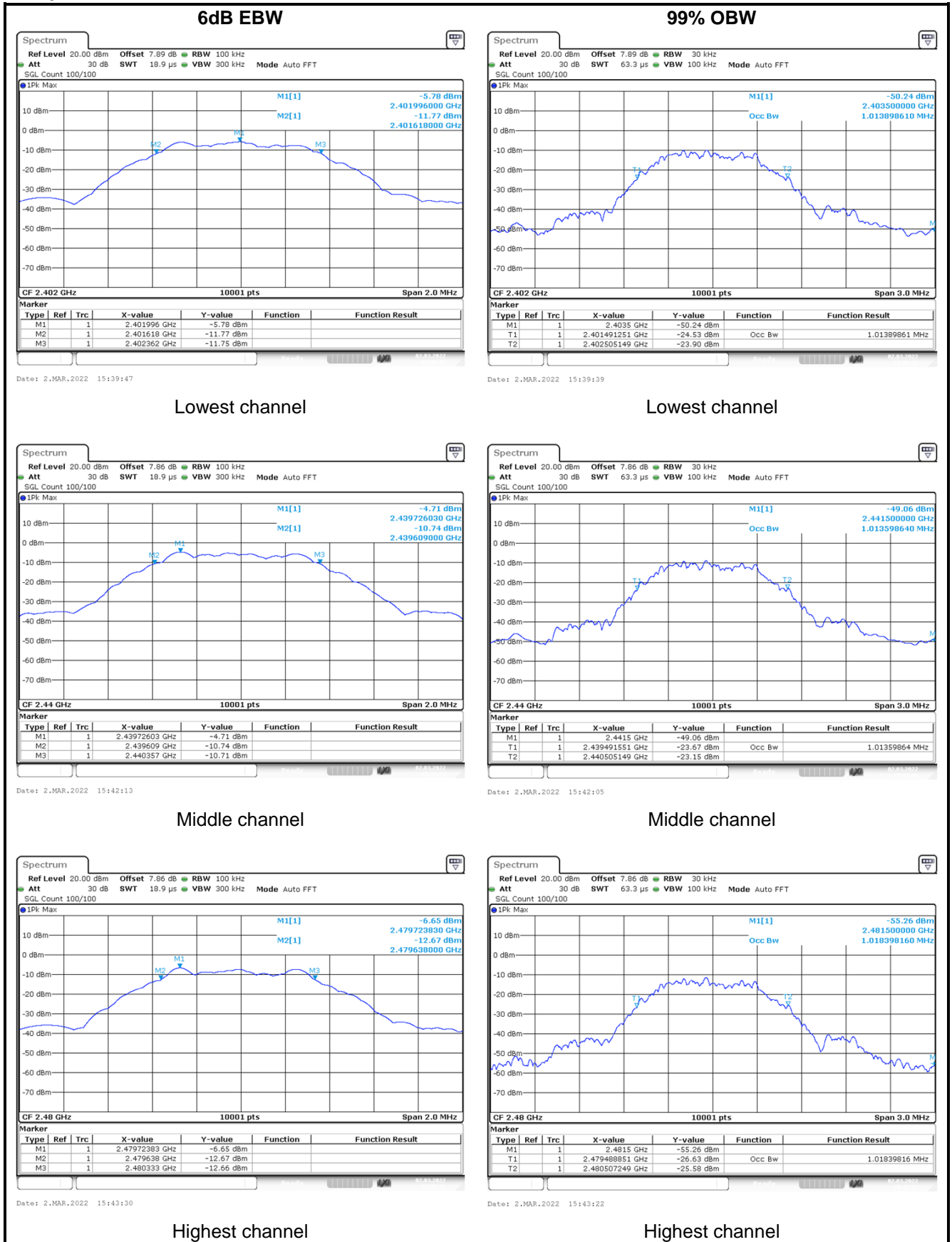
## 5.4 Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 4.9 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

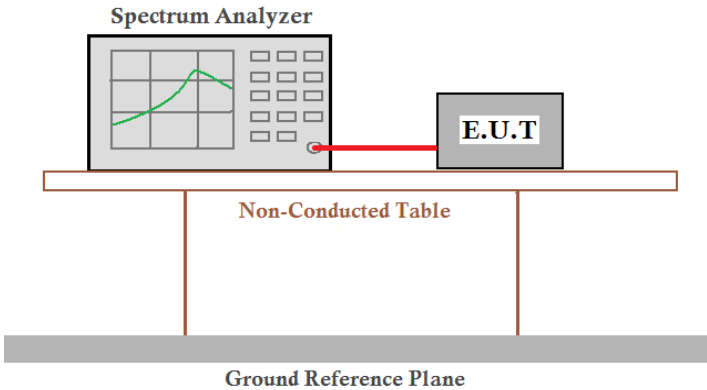
### Measurement Data:

Test CH	6dB Emission Bandwidth (MHz)	Limit(kHz)	Result
Lowest	0.745	>500	Pass
Middle	0.748		
Highest	0.694		
Test CH	99% Occupy Bandwidth (MHz)	Limit(kHz)	Result
Lowest	1.014	N/A	N/A
Middle	1.014		
Highest	1.018		

Test plot as follows:



## 5.5 Power Spectral Density

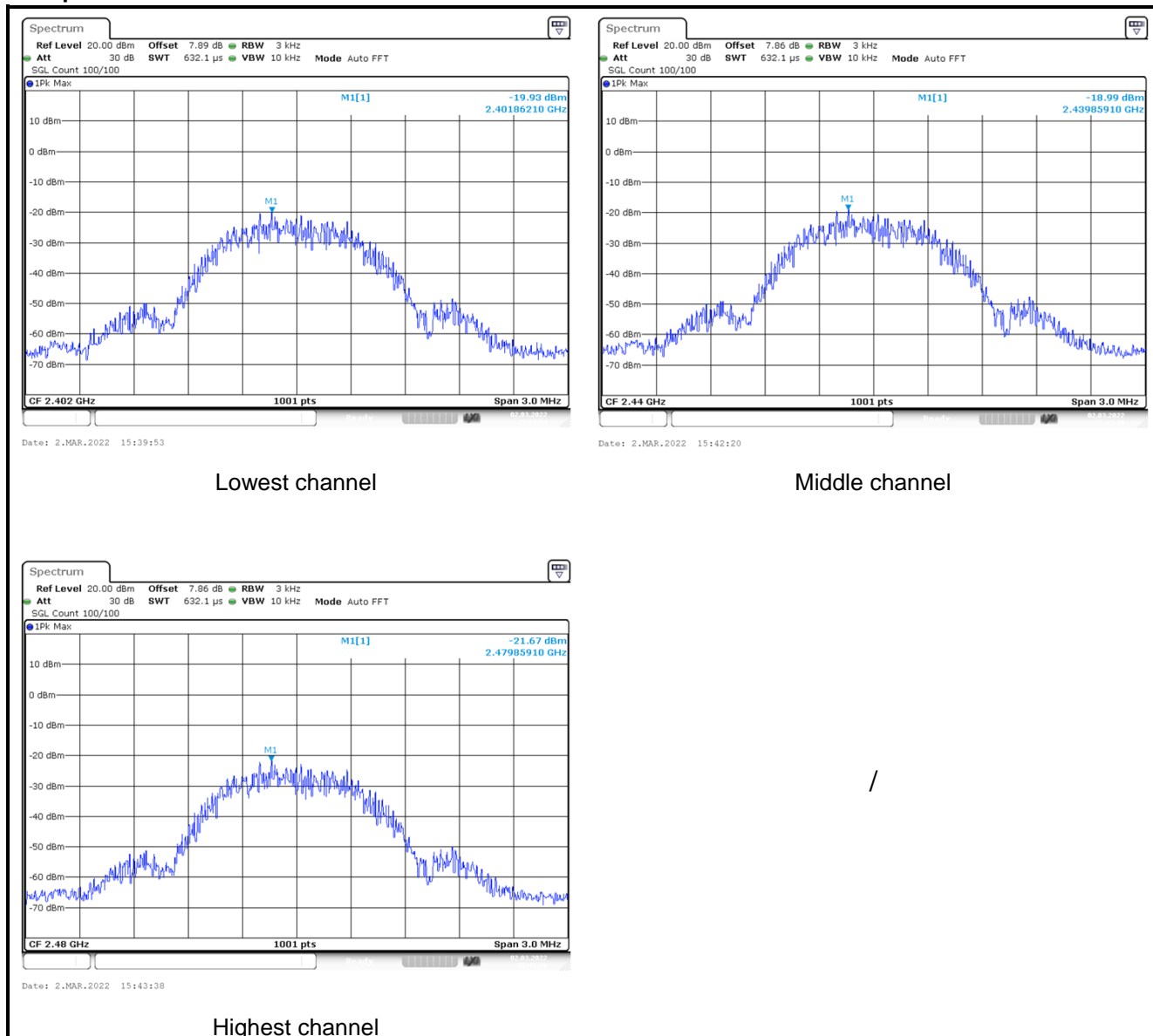
Test Requirement:	FCC Part15 C Section 15.247 (e)
Limit:	8dBm/3kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 4.9 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

### Measurement Data:

Test CH	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-19.928	8.00	Pass
Middle	-18.994		
Highest	-21.670		

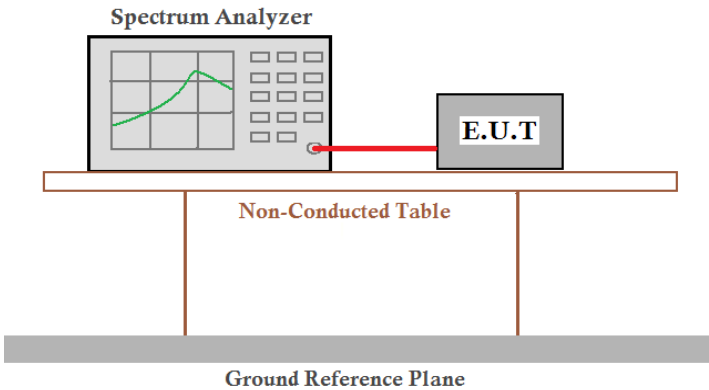


## Test plots as follow:

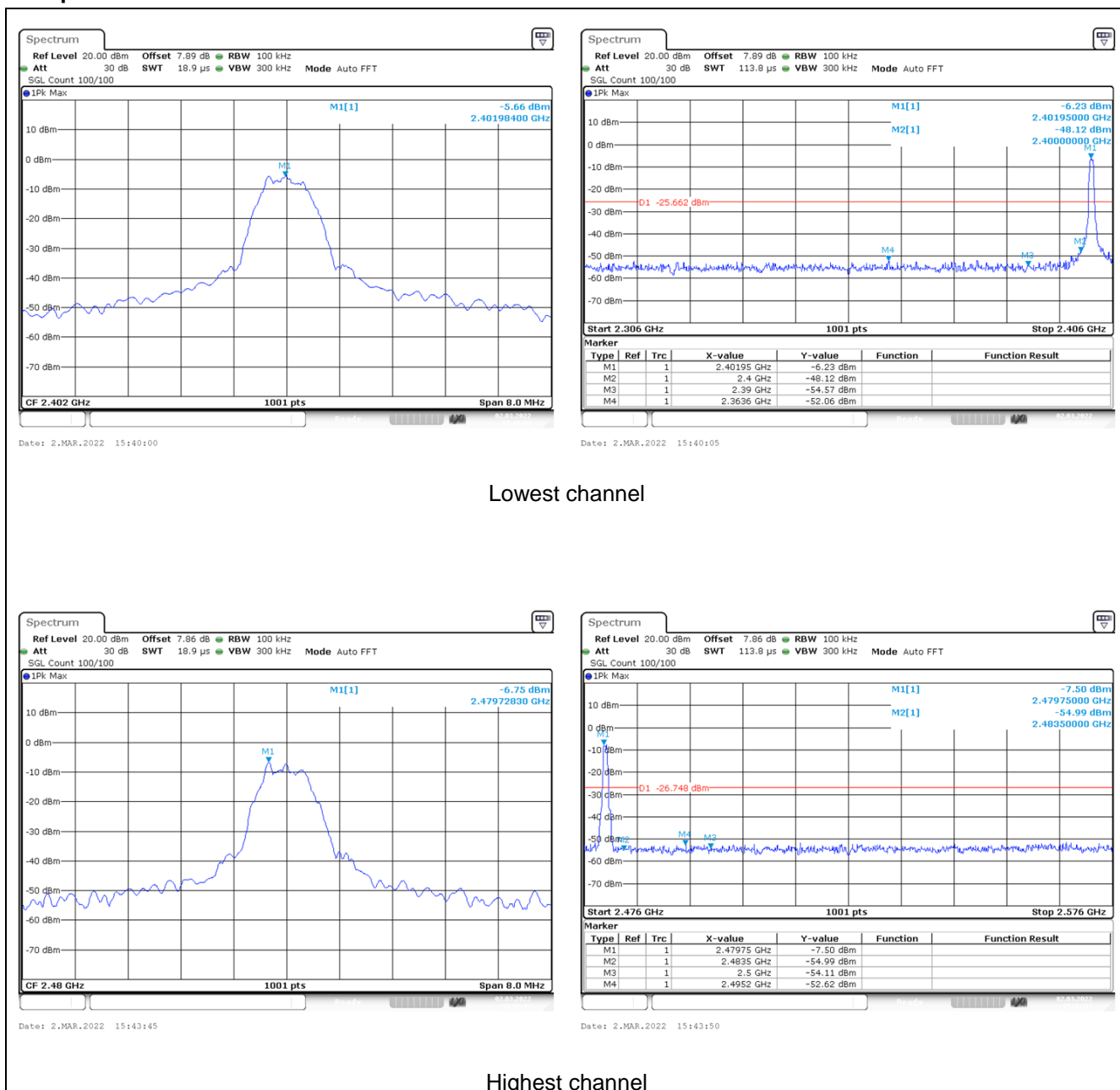


## 5.6 Band Edge

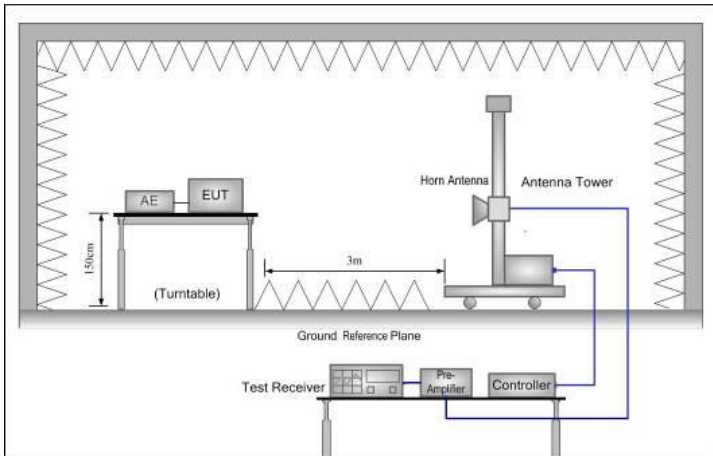
### 5.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emission measurements. A Spectrum Analyzer, shown with a green trace on its screen, is connected to an Equipment Under Test (E.U.T.) by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a Non-Conducted Table. This table is supported by a Ground Reference Plane, which is represented by a thick grey bar at the bottom of the setup.</p>
Test Instruments:	Refer to section 4.9 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

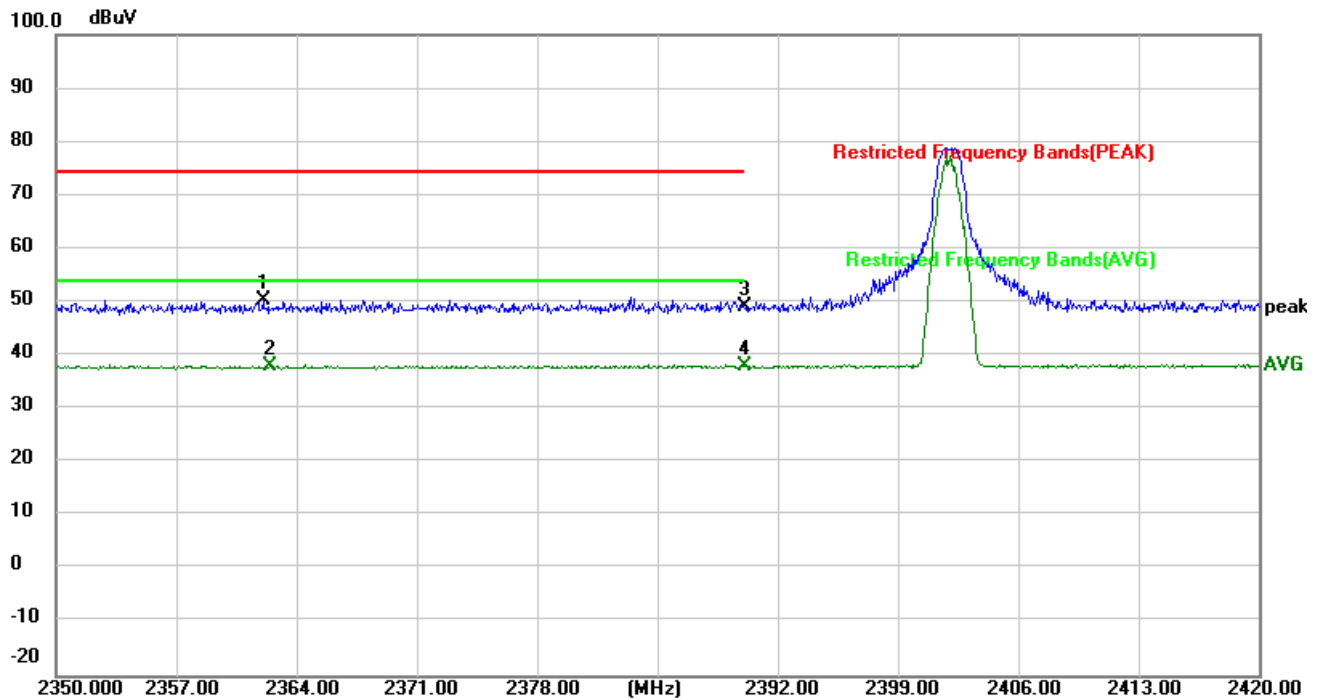
# Test plots as follow:



### 5.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.205 and 15.209				
Test Frequency Range:	2380 MHz to 2410 MHz and 2465MHz to 2520 MHz				
TestDistance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test Procedure:	<div>1. The EUT was placed on the top of a rotating table 1.5 meters above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation.</div> <div>2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.</div> <div>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</div> <div>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.</div> <div>5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.</div> <div>6. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</div>				
Test setup:	<div></div>				
Test Instruments:	Refer to section 4.9 for details				
Test mode:	Refer to section 4.3 for details				
Test results:	Passed				

Product Name:	Thermal Printer	Product Model:	PAPERANG-P3
Test By:	Raymon Zheng	Test mode:	BLE Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	DC5V	Environment:	Temp.:23.6℃ Humi.: 48%

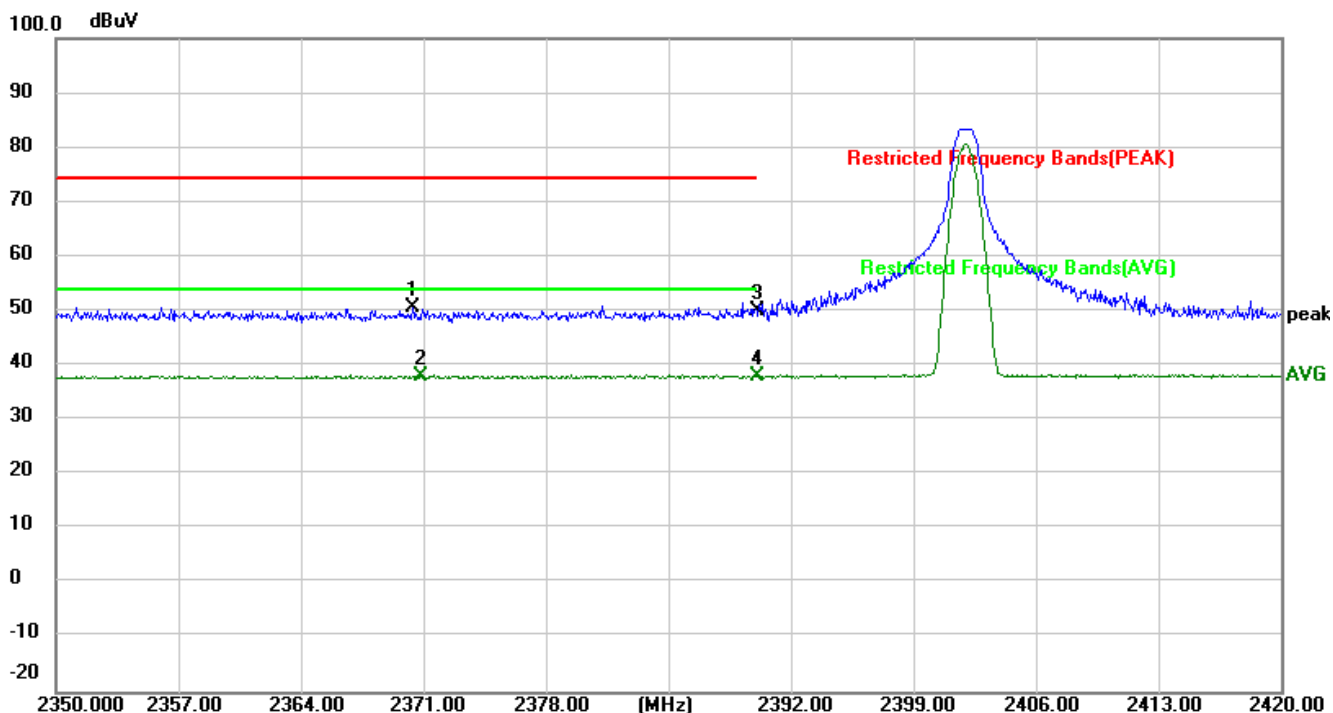


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		2362.040	57.01	-6.68	50.33	74.00	23.67	peak
2		2362.460	44.67	-6.68	37.99	54.00	16.01	AVG
3		2390.000	55.92	-6.67	49.25	74.00	24.75	peak
4	*	2390.000	44.86	-6.67	38.19	54.00	15.81	AVG

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Name:	Thermal Printer	Product Model:	PAPERANG-P3
Test By:	Raymon Zheng	Test mode:	BLE Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	DC5V	Environment:	Temp.: 23.6℃ Humi.: 48%

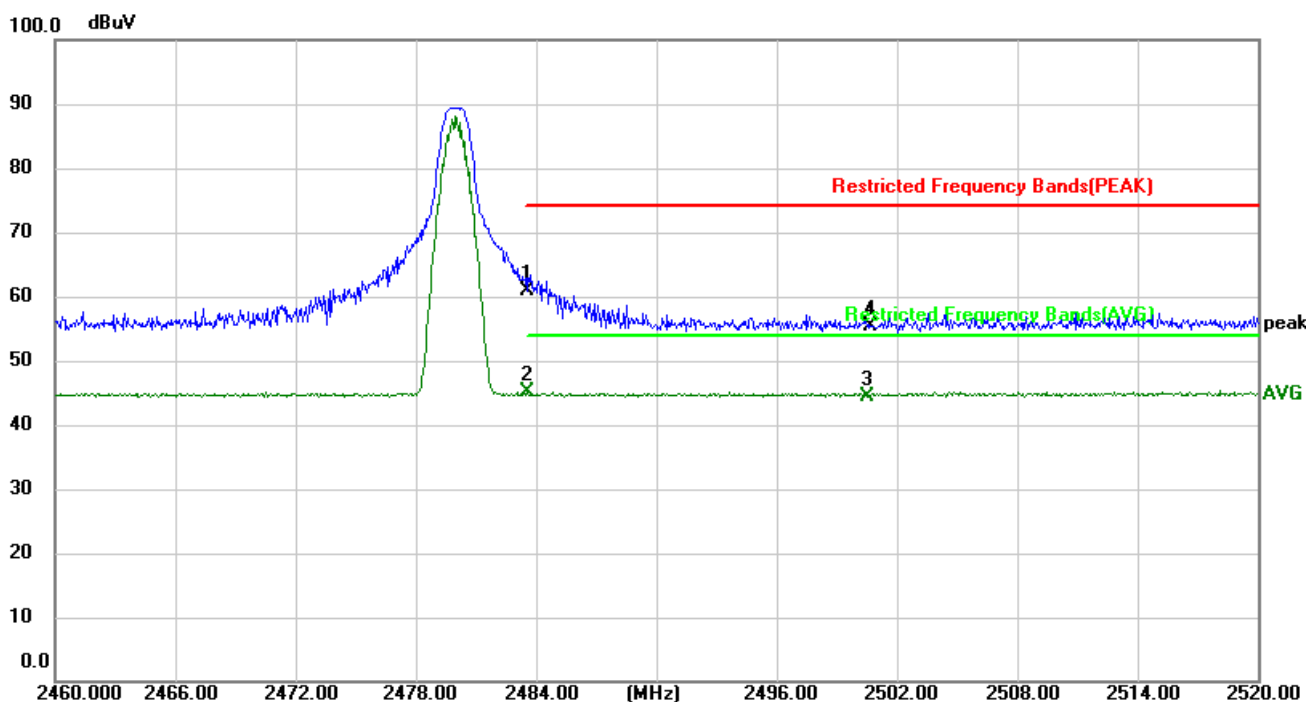


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		2370.370	57.22	-6.67	50.55	74.00	23.45	peak
2		2370.860	44.71	-6.67	38.04	54.00	15.96	AVG
3		2390.000	56.74	-6.67	50.07	74.00	23.93	peak
4	*	2390.000	44.75	-6.67	38.08	54.00	15.92	AVG

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Name:	Thermal Printer	Product Model:	PAPERANG-P3
Test By:	Raymon Zheng	Test mode:	BLE Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC5V	Environment:	Temp.: 22.6℃ Humi.: 49%

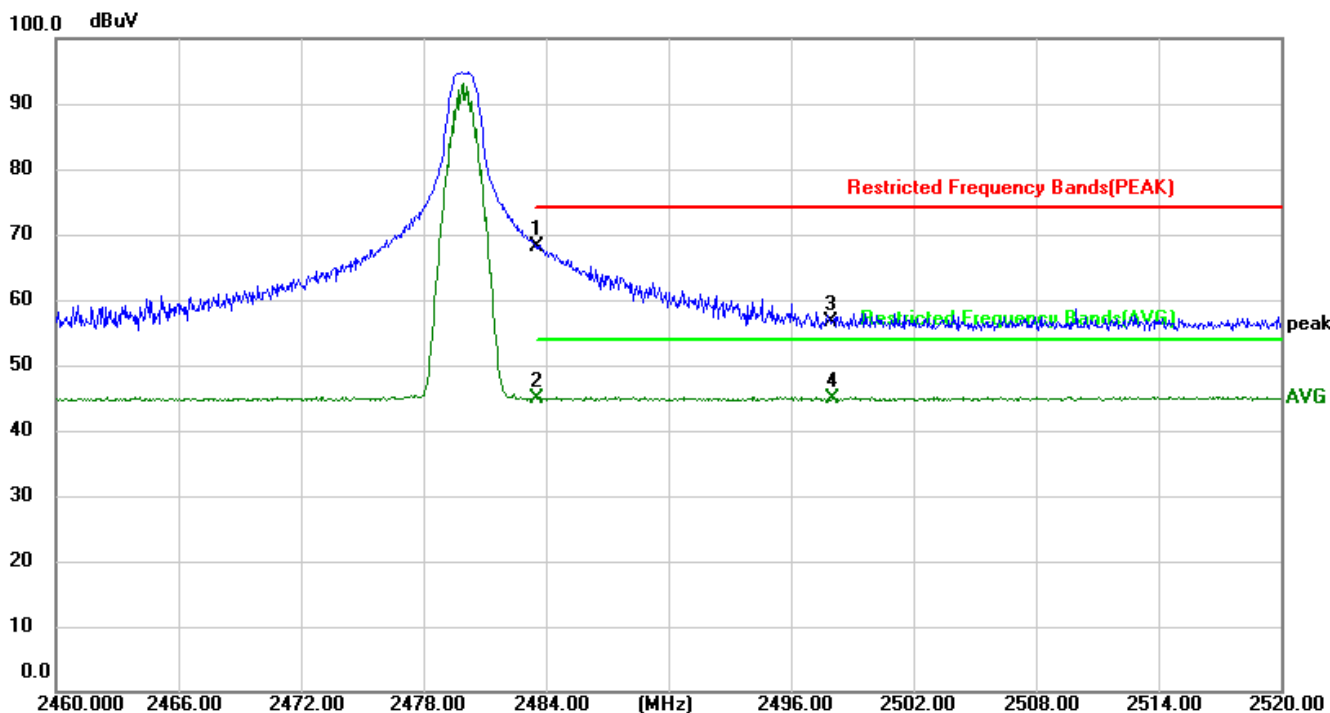


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		2483.500	61.15	-0.36	60.79	74.00	13.21	peak
2	*	2483.500	45.38	-0.36	45.02	54.00	8.98	AVG
3		2500.500	44.86	-0.37	44.49	54.00	9.51	AVG
4		2500.680	55.65	-0.37	55.28	74.00	18.72	peak

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Name:	Thermal Printer	Product Model:	PAPERANG-P3
Test By:	Raymon Zheng	Test mode:	BLE Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC5V	Environment:	Temp.: 22.6℃ Humi.: 49%



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	2483.500	68.41	-0.36	68.05	74.00	5.95	peak
2		2483.500	45.23	-0.36	44.87	54.00	9.13	AVG
3		2497.920	56.97	-0.37	56.60	74.00	17.40	peak
4		2498.040	45.27	-0.37	44.90	54.00	9.10	AVG

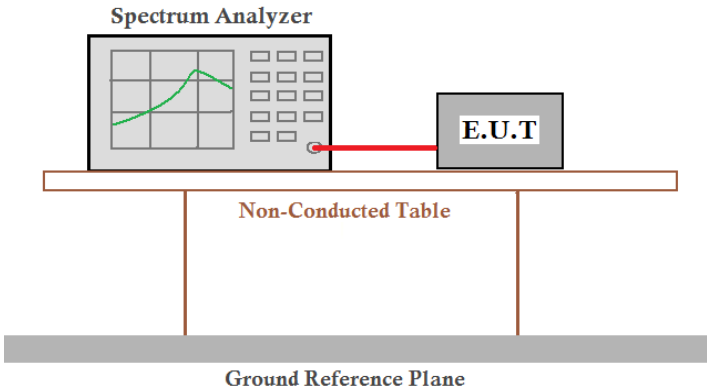
## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

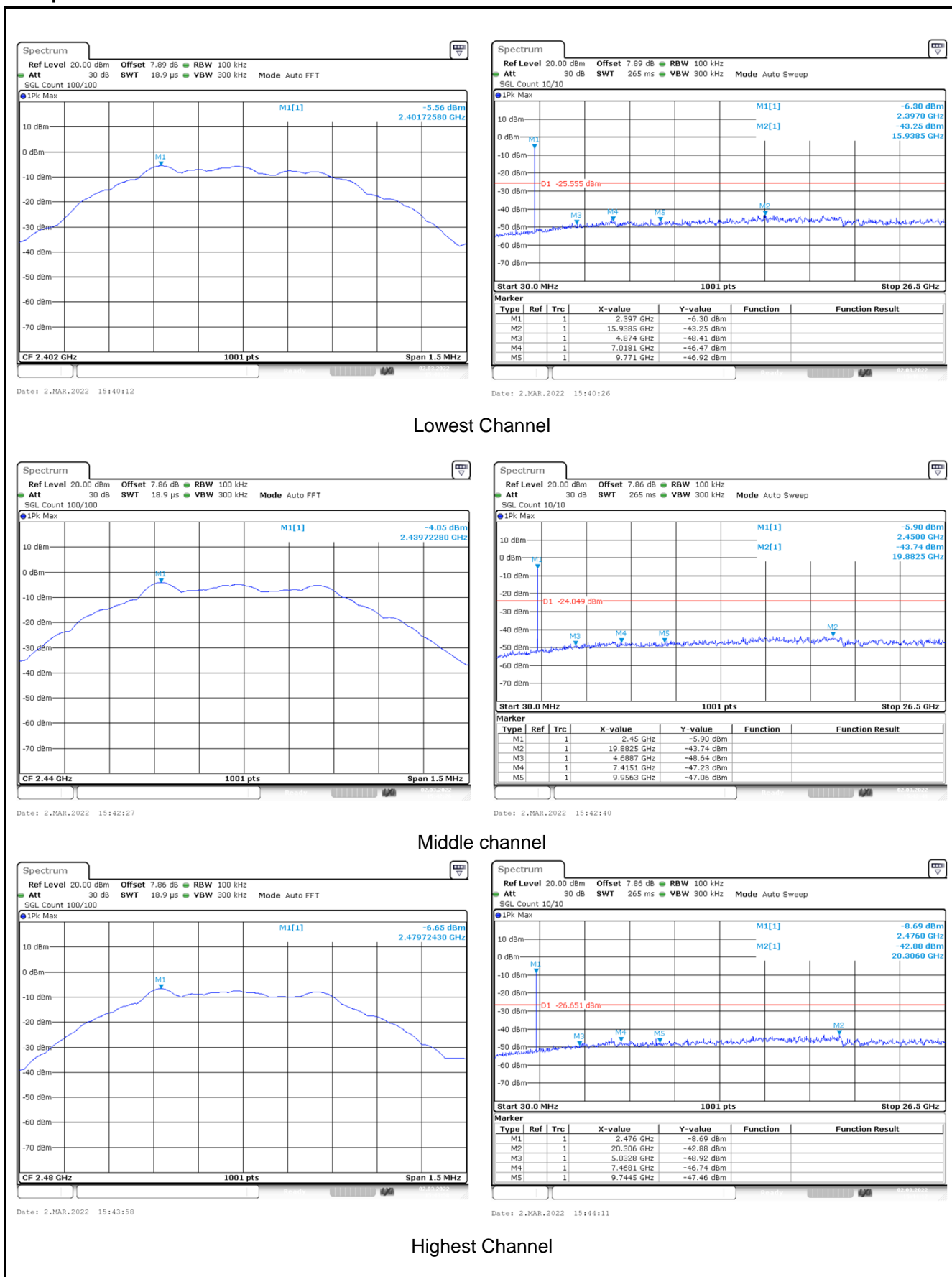


## 5.7 Spurious Emission

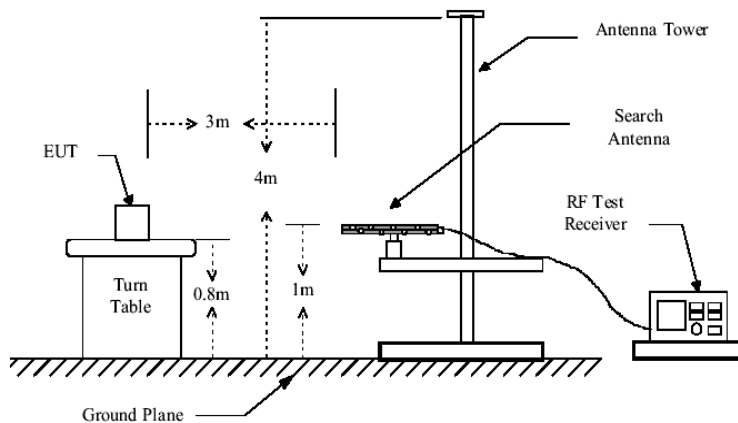
### 5.7.1 Conducted Emission Method

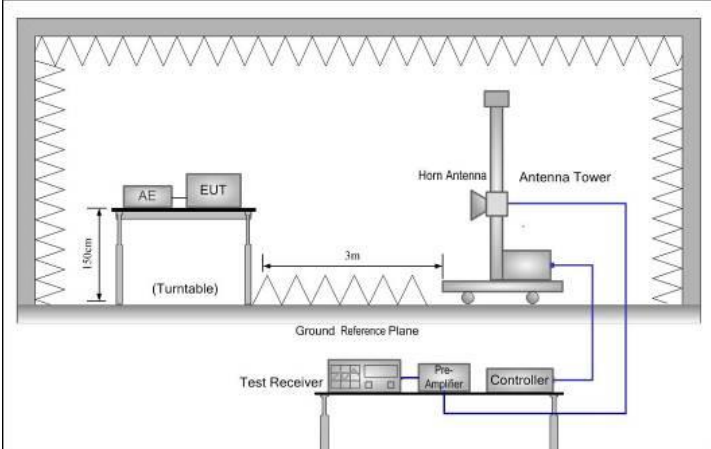
Test Requirement:	FCC Part15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emission measurements. A Spectrum Analyzer is connected to the Equipment Under Test (E.U.T) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 4.9 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

Test plot as follows:



### 5.7.2 Radiated Emission Method

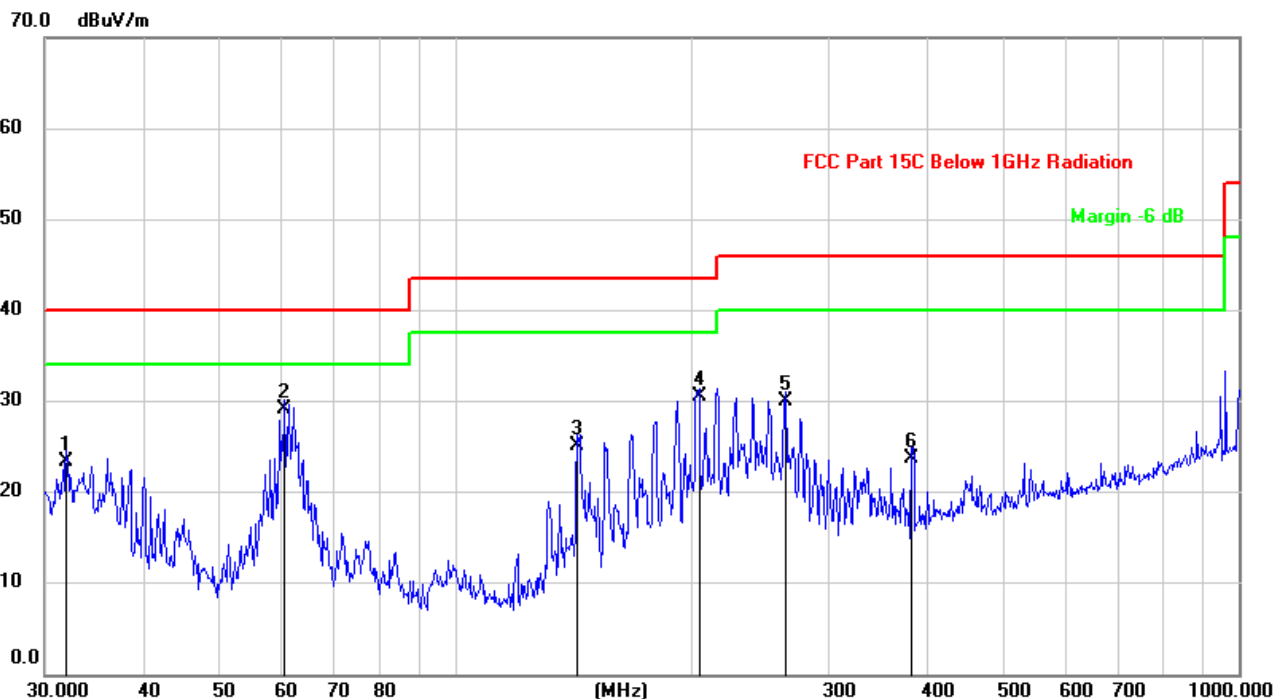
Test Requirement:	FCC Part15 C Section 15.205 and15.209				
Test Frequency Range:	9kHz to 25GHz				
TestDistance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak RMS	1MHz 1MHz	3MHz 3MHz	Peak Value Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		54.0 74.0		Average Value Peak Value
Test Procedure:	<div>1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation.</div> <div>2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.</div> <div>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</div> <div>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading.</div> <div>5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.</div> <div>6. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet.</div>				
Test setup:	<div>Below 1GHz</div> <div></div> <div>Above 1GHz</div>				

	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed
Remark:	<ol style="list-style-type: none"> <li>1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case.</li> <li>2. 9 kHz to 30MHz is too low, so only shows the data of above 30MHz in this report.</li> </ol>

## Measurement Data(worst case):

Below 1GHz:

Product Name:	Thermal Printer	Product Model:	PAPERANG-P3
Test By:	Raymon Zheng	Test mode:	BLE Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC5V	Environment:	Temp.: 23.6°C Humi.: 48%

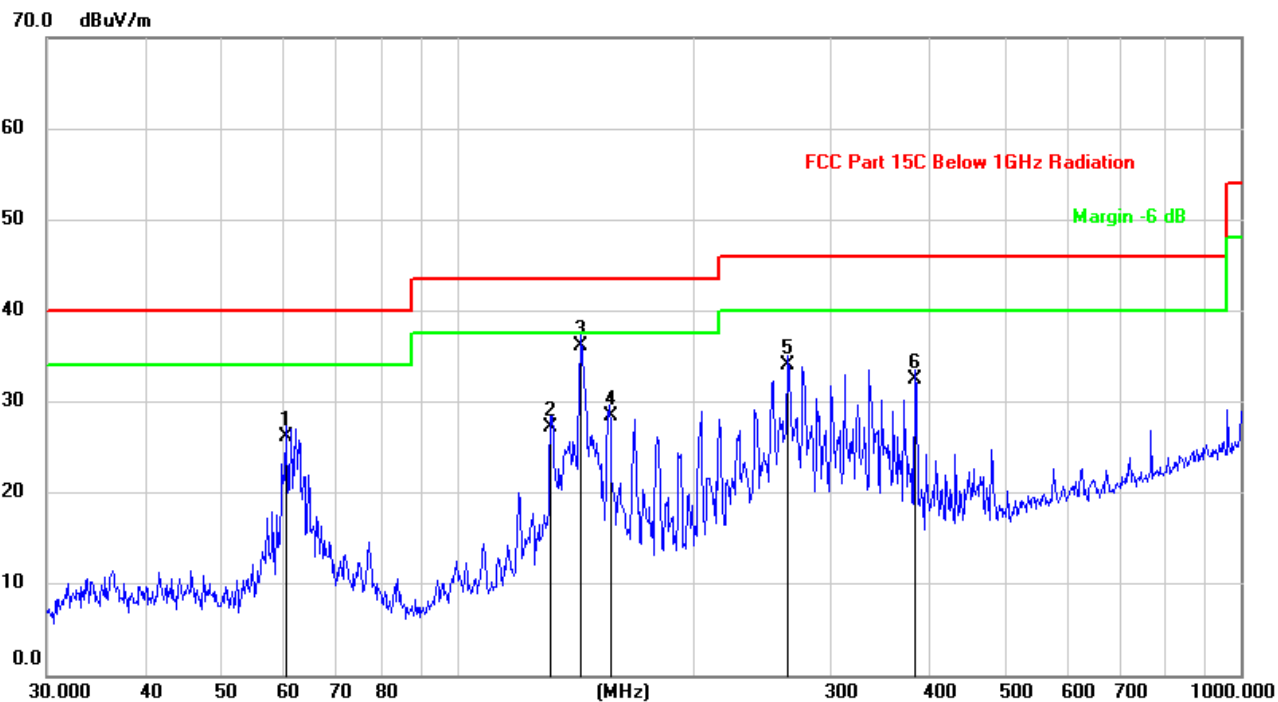


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		31.9545	39.69	-16.29	23.40	40.00	-16.60	QP
2	*	60.7043	45.34	-16.24	29.10	40.00	-10.90	QP
3		143.3260	43.05	-17.85	25.20	43.50	-18.30	QP
4		204.9550	44.76	-14.16	30.60	43.50	-12.90	QP
5		264.7456	42.32	-12.22	30.10	46.00	-15.90	QP
6		382.5878	32.77	-8.97	23.80	46.00	-22.20	QP

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product Name:	Thermal Printer	Product Model:	PAPERANG-P3
Test By:	Raymon Zheng	Test mode:	BLETx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC5V	Environment:	Temp.: 23.6℃ Humi.: 48%



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		60.4919	42.31	-16.21	26.10	40.00	-13.90	QP
2		131.7577	44.94	-17.74	27.20	43.50	-16.30	QP
3	*	143.8295	53.94	-17.84	36.10	43.50	-7.40	QP
4		156.4578	45.79	-17.39	28.40	43.50	-15.10	QP
5		263.8190	46.28	-12.25	34.03	46.00	-11.97	QP
6		383.9318	41.34	-8.94	32.40	46.00	-13.60	QP

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

**Above 1GHz:**

Test channel: Lowest channel						
Detector: PeakValue						
Frequency (MHz)	Read Level (dBuV)	Correct Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	46.00	7.54	53.54	74.00	-20.46	Vertical
4804.00	44.86	7.54	52.40	74.00	-21.60	Horizontal
Detector: AverageValue						
Frequency (MHz)	Read Level (dBuV)	Correct Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	28.74	7.54	36.28	54.00	-17.72	Vertical
4804.00	28.44	7.54	35.98	54.00	-18.02	Horizontal
Test channel: Middle channel						
Detector: PeakValue						
Frequency (MHz)	Read Level (dBuV)	Correct Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4882.00	39.76	7.79	47.55	74.00	-26.45	Vertical
4882.00	42.88	7.79	50.67	74.00	-23.33	Horizontal
Detector: AverageValue						
Frequency (MHz)	Read Level (dBuV)	Correct Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	25.45	7.79	33.24	54.00	-20.76	Vertical
4884.00	26.48	7.79	34.27	54.00	-19.73	Horizontal
Test channel: Highest channel						
Detector: PeakValue						
Frequency (MHz)	Read Level (dBuV)	Correct Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	39.84	8.06	47.90	74.00	-26.10	Vertical
4960.00	46.37	8.06	54.43	74.00	-19.57	Horizontal
Detector: AverageValue						
Frequency (MHz)	Read Level (dBuV)	Correct Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	25.07	8.06	33.13	54.00	-20.87	Vertical
4960.00	29.11	8.06	37.17	54.00	-16.83	Horizontal
<b>Remark:</b> 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor. 2. The emission levels of other frequencies are very lower than the limit and not show in test report.						

-----End of report-----