



TEST REPORT

Test report
On Behalf of
Shenzhen RuiYiBo Science & Technology Crop.Ltd
For
Automated dispensing cabint

**Model No.: N Serial, NR, CM, CV, CH, LM, LR, EH,
ES, RH, RM, RG, FH**

FCC ID: 2AXBX-NSXX

Prepared for : **Shenzhen RuiYiBo Science & Technology Crop.Ltd**
15/F, Building 7A, Baoneng Science&Technology Park, Qingxiang Road, Longhua District, Shenzhen, China

Prepared By : **Shenzhen HUAK Testing Technology Co., Ltd.**
1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

Date of Test: **Aug. 03, 2020 -- Aug. 19, 2020**
Date of Report: **Aug. 19, 2020**
Report Number: **HK2008072133-E**



TEST RESULT CERTIFICATION

Applicant's name: Shenzhen RuiYiBo Science & Technology Crop.Ltd

Address: 15/F, Building 7A, Baoneng Science&Technology Park, Qingxiang Road, Longhua District, Shenzhen, China

Manufacture's Name: Shenzhen RuiYiBo Science & Technology Crop.Ltd

Address: 15/F, Building 7A, Baoneng Science&Technology Park, Qingxiang Road, Longhua District, Shenzhen, China

Product description

Rybo
Technology

Trade Mark:  RYBO

Product name: Automated dispensing cabinet

Model and/or type reference: N Serial, NR, CM, CV, CH, LM, LR, EH, ES, RH, RM, RG, FH

Standards: FCC Part 15 Subpart C Section 15.225

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HUAK Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HUAK Testing Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Date of Test:

Date (s) of performance of tests: Aug. 03, 2020 -- Aug. 19, 2020

Date of Issue: Aug. 19, 2020

Test Result: **Pass**

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)



TABLE OF CONTENTS

1. Test Result Summary	4
1.1. TEST FACILITY.....	4
1.2. MEASUREMENT UNCERTAINTY.....	4
2. EUT Description.....	5
3. Genera Information.....	6
3.1. TEST ENVIRONMENT AND MODE	6
3.2. DESCRIPTION OF SUPPORT UNITS.....	6
4. Test Results and Measurement Data.....	7
4.1. ANTENNA REQUIREMENT	7
4.2. CONDUCTED EMISSION	8
4.3. RADIATED EMISSION MEASUREMENT	11
4.4. OCCUPIED BANDWIDTH	17
4.5. FREQUENCY STABILITY	19
5. Photos of Test Setup.....	21
6. Photos of EUT	23



1. Test Result Summary

Requirement	CFR 47 Section	Result
Conduction Emission, 0.15MHz to 30MHz	§15.207	PASS
Radiation Emission	§15.225, §15.205, §15.209, §15.35	PASS
Occupied Bandwidth	§ 15.215	PASS
Antenna requirement	§ 15.203	PASS
Frequency stability	§ 15.225	PASS

Note:

1. PASS: *Test item meets the requirement.*
2. Fail: *Test item does not meet the requirement.*
3. N/A: *Test case does not apply to the test object.*
4. *The test result judgment is decided by the limit of test standard.*

1.1. TEST FACILITY

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park,
: Fuhai Street, Bao'an District, Shenzhen City, China

FCC designation number : CN1229

test firm registration number : 616276

1.2. MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	= 2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	= 3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	= 4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	= 4.06dB, k=2



2. EUT Description

Product Name:	Automated dispensing cabinet
Model/Type reference:	N Serial
Serial Model:	NY, NR, CM, CV, CH, LM, LR, EH, ES, RH, RM, RG, FH
Model difference:	all models have the same functionality, software and electronics, only the model names may differ. So test sample model: N Serial
Trade Mark:	 Rybo Technology
FCC ID:	2AXBX-NSXX
Modulation:	ASK
Operation frequency:	13.56MHz
Channel number:	1
Channel separation:	/
Antenna type:	Coil Antenna

Note: 1. For more details, refer to the user's manual of the EUT.



3. General Information

3.1. Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
The sample was placed on 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.	

Per-test mode.				
We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:				
Axis	X	Y	Z	
Field Strength(dBuV/m)	62.47	65.62	62.59	
Final Test Mode:				
According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup": Y axis (see the test setup photo)				

3.2. Description of Support Units

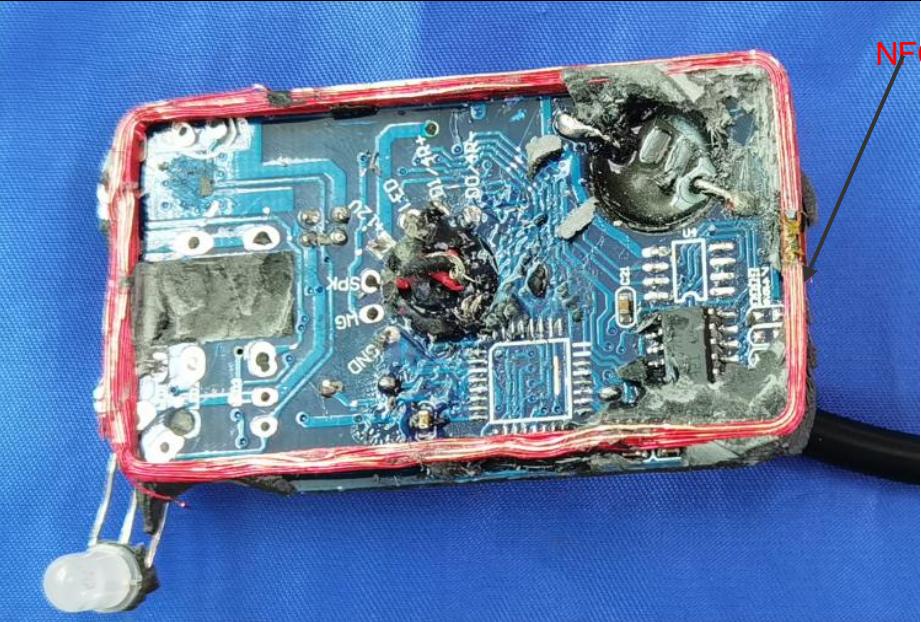
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Description	Information	Manufacturer	Remark	Certificate
Built-in industrial host	Intel Core i5 DDR3/8G,500G USB3.0*4 + USB2.0*5, RS232*2	/	/	SDOC
Monitor	/	Hikvision	/	SDOC
LCD Display	15.6 ", 1920*1080	/	/	SDOC

Note: 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4. Test Results and Measurement Data

4.1. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
<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>	
E.U.T Antenna:	Antenna
<p>The antenna is internal antenna which red and black wires are wound around the black box and fixed and the best case gain of the antenna is 0dBi.</p> 	

4.2. Conducted Emission

4.2.1. Conducted Power Line Emission Limit

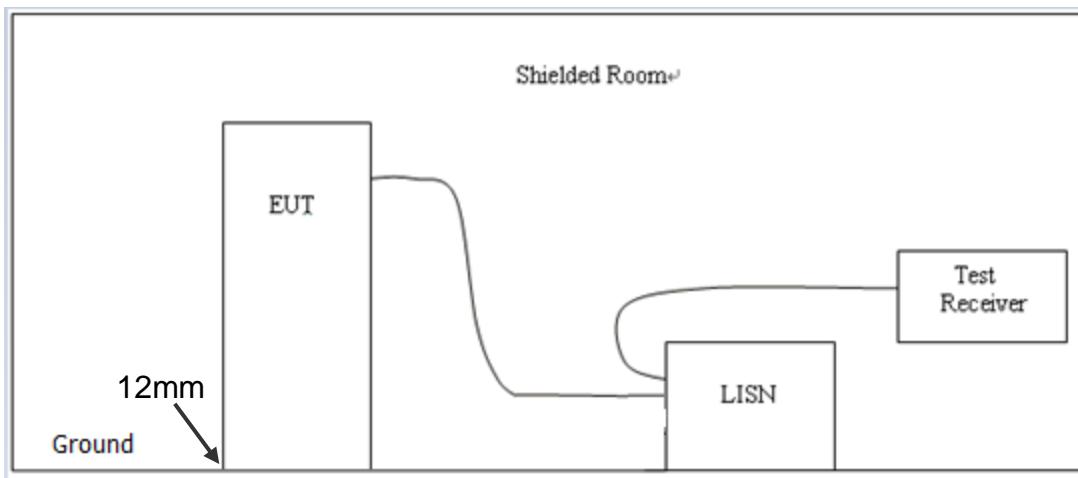
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

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

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

4.2.2. Test Setup



4.2.3. Test Procedure

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is floor-standing system, and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

4.2.4. Test Result

PASS

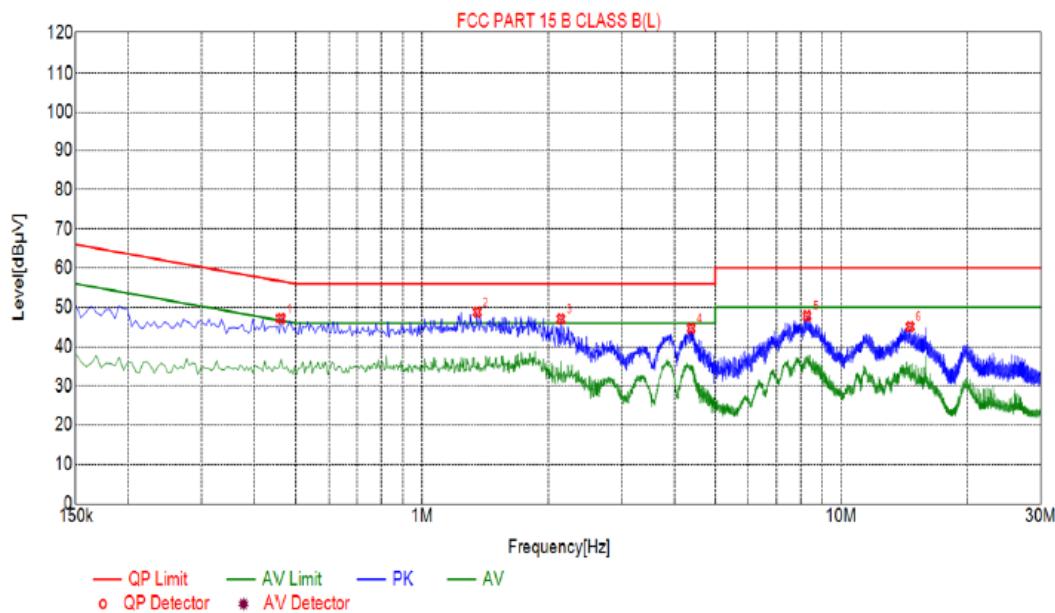
All the test modes completed for test. only the worst result was reported as below:

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

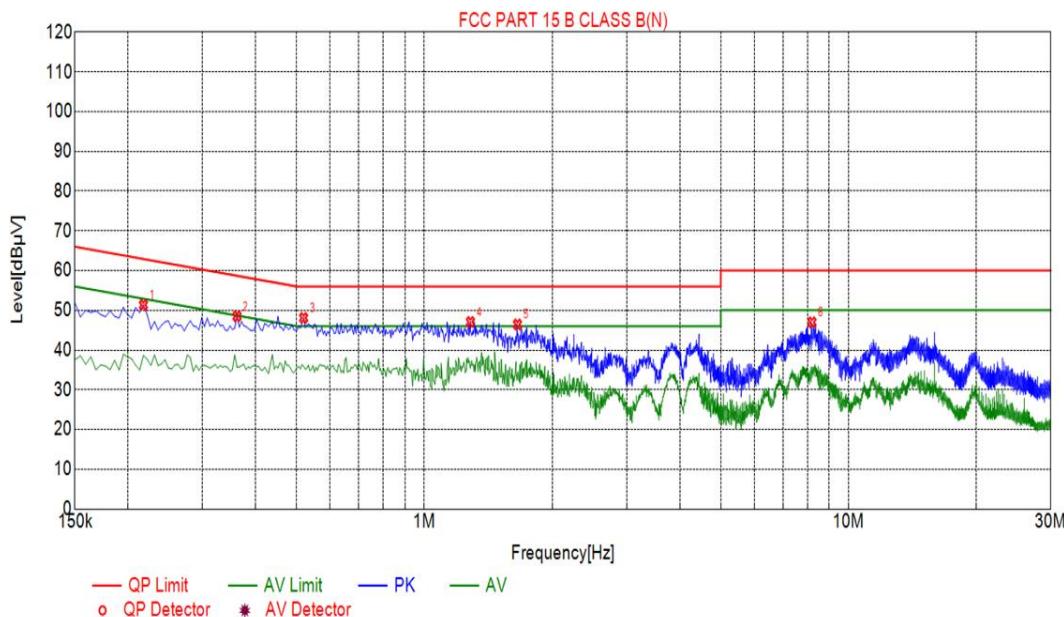
Test Specification: Line



Suspected List								
NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.4605	47.20	10.04	56.73	9.53	37.16	PK	L
1	0.4605	37.24	10.04	46.73	9.49	27.20	AV	L
2	1.3515	48.78	10.10	56.00	7.22	38.68	PK	L
2	1.3515	37.86	10.10	46.00	8.14	27.76	AV	L
3	2.1435	47.05	10.16	56.00	8.95	36.89	PK	L
3	2.1435	36.88	10.16	46.00	9.12	26.72	AV	L
4	4.3800	44.70	10.25	56.00	11.30	34.45	PK	L
5	8.2905	47.84	10.13	60.00	12.16	37.71	PK	L
6	14.6265	45.13	9.95	60.00	14.87	35.18	PK	L



Test Specification: Neutral



Suspected List								
NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.2175	51.36	10.05	62.95	11.59	41.31	PK	N
2	0.3615	48.53	10.04	58.73	10.20	38.49	PK	N
3	0.5190	48.10	10.04	56.00	7.90	38.06	PK	N
3	0.5190	36.42	10.04	46.00	9.58	26.38	AV	N
4	1.2840	47.08	10.09	56.00	8.92	36.99	PK	N
4	1.2840	37.74	10.09	46.00	8.62	27.65	AV	N
5	1.6575	46.46	10.12	56.00	9.54	36.34	PK	N
5	1.6575	36.28	10.12	46.00	9.72	26.16	AV	N
6	8.2050	46.99	10.14	60.00	13.01	36.85	PK	N



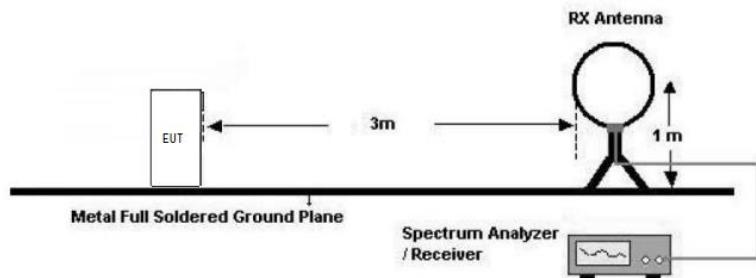
4.3. Radiated Emission Measurement

4.3.1. Test Specification

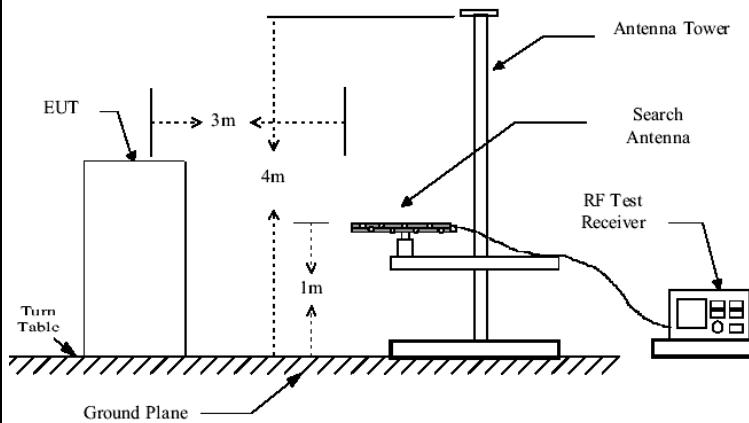
Test Requirement:	FCC Part15 C Section 15.225(a) and 15.209				
Test Method:	ANSI C63.10:2013				
Frequency Range:	9 kHz to 1 GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
	<ol style="list-style-type: none">1. The EUT was placed on the ground at a 3 meter camber in below 1GHz and above 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.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.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 table was turned from 0 degrees to 360 degrees to find the maximum reading.5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				

For radiated emissions

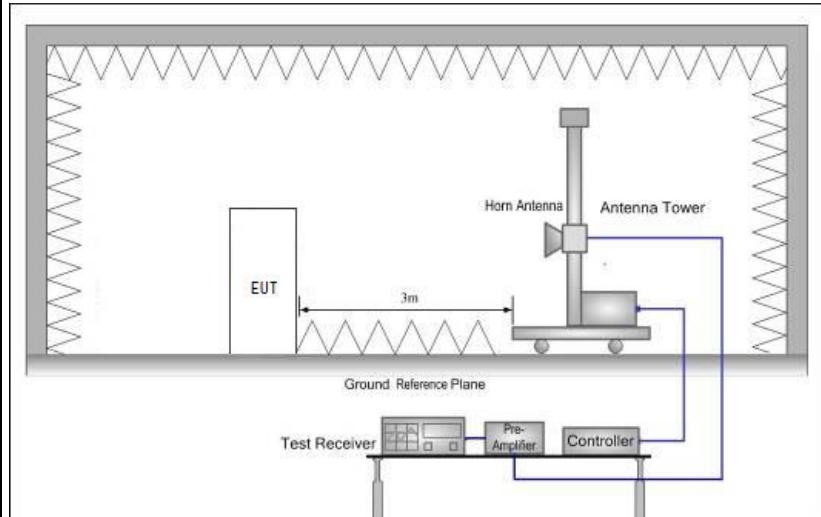
Below 30 MHz



30MHz to 1GHz



Above 1GHz



Test setup:

Test Mode: Transmitting Mode

Test results: PASS

4.3.2. Limit

(a) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.



4.3.3. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)	Field strength (microvolts/meter)
0.009-0.490	300	20log 2400/F (kHz)	2400/F (kHz)
0.490-1.705	30	20log 24000/F (kHz)	24000/F (kHz)
1.705-30	30	20log 30	30
30-88	3	40.0	100**
88-216	3	43.5	150**
216-960	3	46.0	200**
Above 960	3	54.0	500

NOTE:

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., S 15.231 and 15.241.

4.3.4. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESPI Test Receiver	ROHDE&SCHWARZ	ESVD	100008	Dec. 27, 2019
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	Dec. 27, 2019
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Dec. 27, 2019
Pre-amplifier	HP	8447D	2727A05017	Dec. 27, 2019
Loop antenna	ZHINAN	ZN30900A	12024	Dec. 27, 2019
Broadband Antenna	Schwarzbeck	VULB9163	340	Dec. 27, 2019
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Dec. 27, 2019
Coax cable	HUAK	N/A	N/A	Dec. 27, 2019
Coax cable	HUAK	N/A	N/A	Dec. 27, 2019
Coax cable	HUAK	N/A	N/A	Dec. 27, 2019
Coax cable	HUAK	N/A	N/A	Dec. 27, 2019
EMI Test Software	Shurples Technology	EZ-EMC	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.3.5. Test Data

Field Strength of Fundamental

Frequency (MHz)	Reading (dBuV/m)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar (H/V)	Detector
13.19	47.22	15.82	63.04	80.51	-17.47	H	QP
13.19	45.34	15.82	61.16	80.51	-19.35	V	QP
13.84	46.87	15.82	62.69	80.51	-17.82	H	QP
13.84	47.88	15.82	63.70	80.51	-16.81	V	QP
13.56	67.31	12.33	79.64	124	-44.36	H	QP
13.56	68.56	12.33	80.89	124	-43.11	V	QP
13.45	47.93	15.82	63.75	90.47	-26.72	H	QP
13.45	48.38	15.82	64.20	90.47	-26.27	V	QP
13.64	48.43	15.82	64.25	90.47	-26.22	H	QP
13.64	45.37	15.82	61.19	90.47	-29.28	V	QP

Remark: Margin = Result - Limit

Result = Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Factor

Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dB μ V/m)	Limit@3m (dB μ V/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: 1. Emission Level=Reading+Cable loss+Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement



About 30MHz-1GHz

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

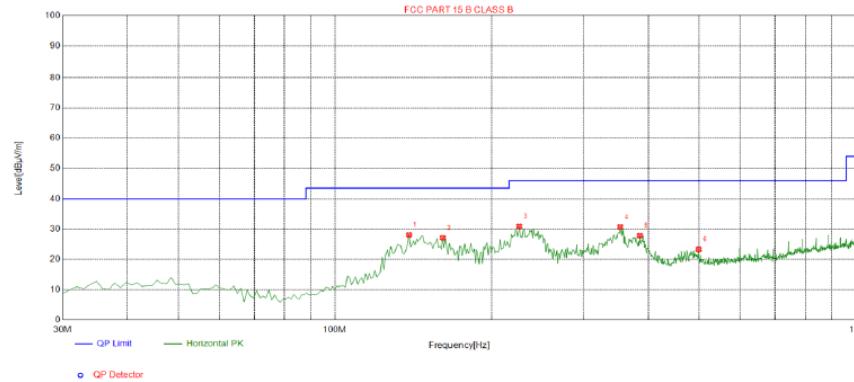
Remark:

Margin = Limit – Level

Level=Test receiver reading + correction factor

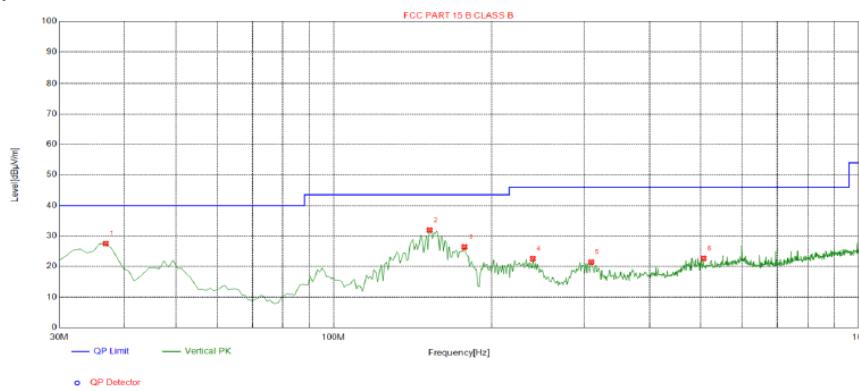
Horizontal

Test Graph



Suspected List

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	138.7487	-19.10	47.24	28.14	43.50	15.36	100	182	Horizontal
2	161.0811	-18.12	45.22	27.10	43.50	16.40	100	12	Horizontal
3	226.1361	-14.41	45.36	30.95	46.00	15.05	100	289	Horizontal
4	353.3333	-11.58	42.31	30.73	46.00	15.27	100	91	Horizontal
5	385.3754	-10.73	38.63	27.90	46.00	18.10	100	263	Horizontal
6	499.9500	-8.30	31.69	23.39	46.00	22.61	100	194	Horizontal

*Vertical***Test Graph****Suspected List**

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7968	-15.57	43.09	27.52	40.00	12.48	100	283	Vertical
2	152.3423	-18.77	50.67	31.90	43.50	11.60	100	202	Vertical
3	177.5876	-16.96	43.40	26.44	43.50	17.06	100	192	Vertical
4	239.7297	-13.87	36.42	22.55	46.00	23.45	100	182	Vertical
5	309.6396	-12.61	34.08	21.47	46.00	24.53	100	341	Vertical
6	506.7467	-8.10	30.78	22.68	46.00	23.32	100	108	Vertical



4.4. Occupied Bandwidth

4.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)
Test Method:	ANSI C63.10: 2013
Limit:	N/A
	<ol style="list-style-type: none">1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.2. Set to the maximum power setting and enable the EUT transmit continuously.3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; $RBW \geq 1\%$ of the 20 dB bandwidth; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.4. Measure and record the results in the test report.
Test setup:	
Test Mode:	Transmitting Mode
Test results:	PASS

4.4.2. Test Instruments

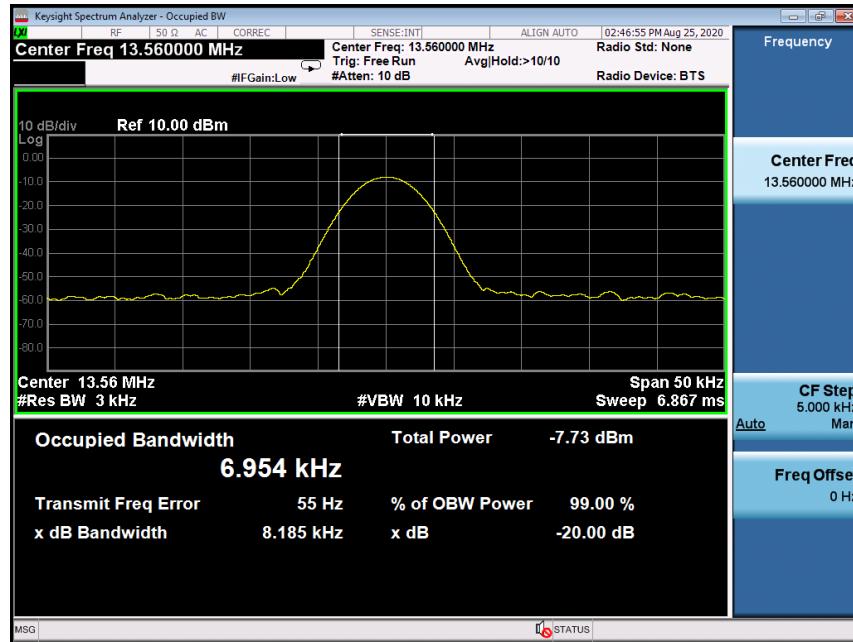
RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Dec. 27, 2019

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

4.4.3. Test data

Test Channel (MHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
13.56	8.185	N/A	PASS

Test plots as follows:



4.5. Frequency stability

4.5.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.225
Test Method:	ANSI C63.10: 2013
Limit:	+/-0.01%
	<ol style="list-style-type: none">1. The equipment under test was connected to an external DC power supply and input rated voltage.2. RF output was connected to a spectrum analyzer.3. The EUT was placed inside the temperature chamber.4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.5. Turn EUT off and set the chamber temperature to - 20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test setup:	<p>The diagram shows a green rectangular box labeled "Spectrum Analyzer" on the left. A horizontal line extends from its right side to a yellow rectangular box labeled "EUT" on the right. The "EUT" box has two small black feet at the bottom.</p>
Test Mode:	Transmitting Mode
Test results:	PASS



4.5.2. Test Data

Voltage (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (%)	Limit (%)
110	-20	13.560015	0.00011	+/-0.01%
110	-10	13.560161	0.00119	
110	0	13.560629	0.00464	
110	10	13.560777	0.00573	
110	20	13.560095	0.00070	
110	30	13.560655	0.00483	
110	40	13.560731	0.00539	
110	50	13.560952	0.00702	
120	-20	13.560928	0.00684	
120	-10	13.560865	0.00638	
120	0	13.560931	0.00687	
120	10	13.560794	0.00585	
120	20	13.560506	0.00373	
120	30	13.560686	0.00506	
120	40	13.560157	0.00115	
120	50	13.560294	0.00217	
120	-20	13.560172	0.00127	
120	-10	13.560747	0.00551	
100	0	13.560099	0.00073	
100	10	13.560010	0.00007	
100	20	13.560517	0.00381	
100	30	13.560967	0.00713	
100	40	13.560161	0.00119	
100	50	13.560099	0.00073	

5. Photos of Test Setup

Radiated Emission below 30MHz



Radiated Emission 30-1000MHz



Conduction Emission





6. Photos of EUT

Please refer to the external photos file and internal photos file

END