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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C
REQUIREMENT

OF

NES classic wireless controller

MODEL No.: LBI-821

Trademark: N/A

FCC ID: 2AJTVLBI-821

REPORT NO: ES180112041W

ISSUE DATE: January 19, 2018

Prepared for

Dashine Electronics Co., Ltd
No. 53, Guangtian road, Yanchuan community, Yanluo street, Bao'an District, Shenzhen, China.

Prepared by

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VERIFICATION OF COMPLIANCE

Applicant:	Dashine Electronics Co., Ltd No. 53, Guangtian road, Yanchuan community, Yanluo street, Bao'an District, Shenzhen, China.
Manufacturer:	Dashine Electronics Co., Ltd No. 53, Guangtian road, Yanchuan community, Yanluo street, Bao'an District, Shenzhen, China.
Product Description:	NES classic wireless controller
Model Number:	LBI-281
Date of Test:	January 15, 2018 to January 17, 2018

We hereby certify that:
The above equipment was tested by EMTEK(SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.249.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : January 15, 2018 to January 17, 2018

Prepared by : Yaping Shen/Editor

Reviewer : Joe Xia/Supervisor

Approve & Authorized Signer : Lisa Wang/Manager

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1. GENERAL INFORMATION

1.1. Product Description

Dashine Electronics Co., Ltd Model: LBI-281
The product consists of two parts **dongle** and **gamepad,** The dongle is receiver, and the gamepad is a transmitter. It is designed by way of utilizing the FSK modulation achieves the system operating.

Gamepad information:	
Power supply:	DC 3V by battery
Operating Frequency Range:	2403-2471MHz
Modulation:	FSK
Number of Channels:	16 channels
Antenna Type:	PCB antenna
Antenna Gain:	0dBi

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2AJTVLBI-821 filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

1.3. Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2014). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4. Special Accessories

Not available for this EUT intended for grant.

1.5. Equipment Modifications

Not available for this EUT intended for grant.

1.6. Measurement Uncertainty

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.00dB
Fundamental Fieldstrength	Not Applicable	95%	±2.94dB
Transmitter 20 dB Bandwidth	Not Applicable	95%	±0.92PPm
Radiated Spurious Emissions	30 MHz to 40 GHz	95%	±3.00dB

1.7. Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2016.10.24
The certificate is valid until 2022.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen, 2010.5.25
The Laboratory has been assessed according to the requirements ISO/IEC 17025.

Name of Firm : Accredited by FCC
The Certificate Registration Number is 884923

2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. Emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013.

2.4. Description of test modes

The EUThas been tested under normal operating condition.
Pre-scanned tests, X, Y, Z in the three orthogonal panels, were conducted to determine the final configuration from all possible combinations. Let EUT transmit with highest power, and the worst result was reported with modulation FSK. The 3 channels of lower, medium and higher were chosen for test.

Pretest Mode	Description
Mode 1	Low – 2403MHz
Mode 2	Middle – 2441MHz
Mode 3	High -2471MHz

For Conducted Test	
Final Test Mode	Description
N/A	N/A

For Radiated Test	
Mode 1	Low – 2403MHz
Mode 2	Middle – 2441MHz
Mode 3	High -2471MHz

3. SUMMARY OF TEST RESULTS

FCC Part15, Subpart C (15.249)&Canada RSS-Gen:2010		
Standard Section	**Test Item**	**Result**
FCC		
15.207	Conducted Emission	N/A
15.209	Radiated Emission	Pass
15.249	Radiated Spurious Emission	Pass
15.249	Band edge test	Pass
15.249	20dB Bandwidth	Pass

Note: (1)"N/A" denotes test is not applicable in this test report.

3.1. CONFIGURATION OF TESTED SYSTEM

Fig. 2-1 Configuration of Tested System

3.2. DESCRIPTION OF SUPPORT UNITS

EUT(Gamepad)	Model: LBI-821 Band: Speedlink Serial No.: N/A

4. RADIATED EMISSION TEST

4.1. Measurement Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013

Below 30MHz：

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

30GHz-1GHz：

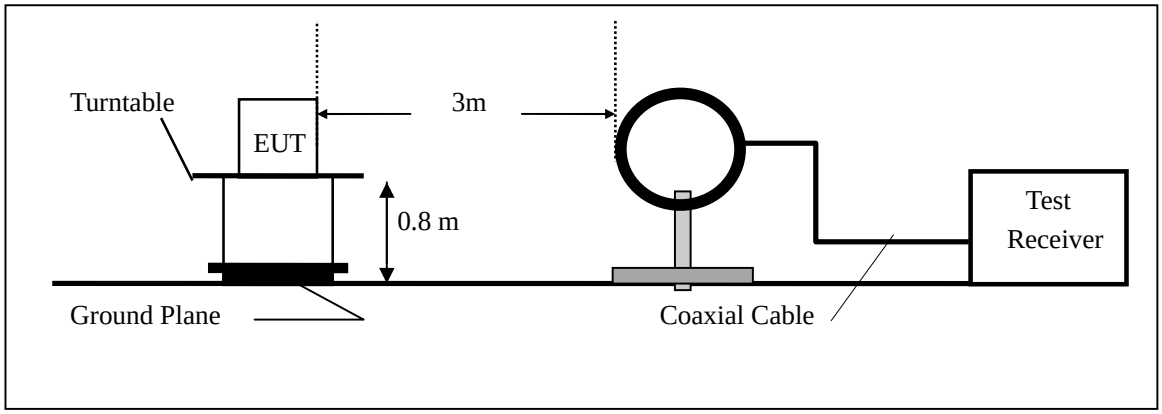
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz：

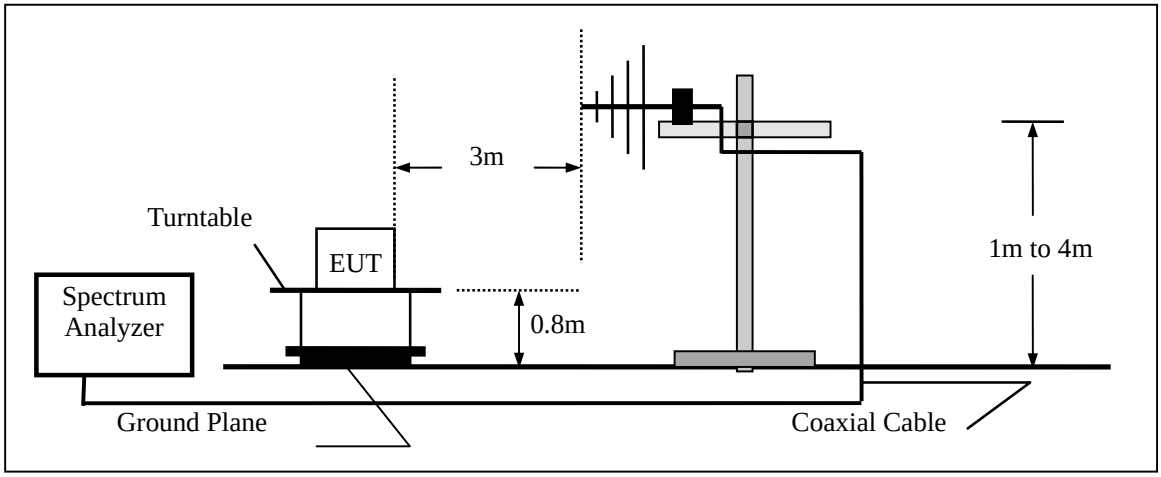
The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

4.2. Test SET-UP (Block Diagram of Configuration)

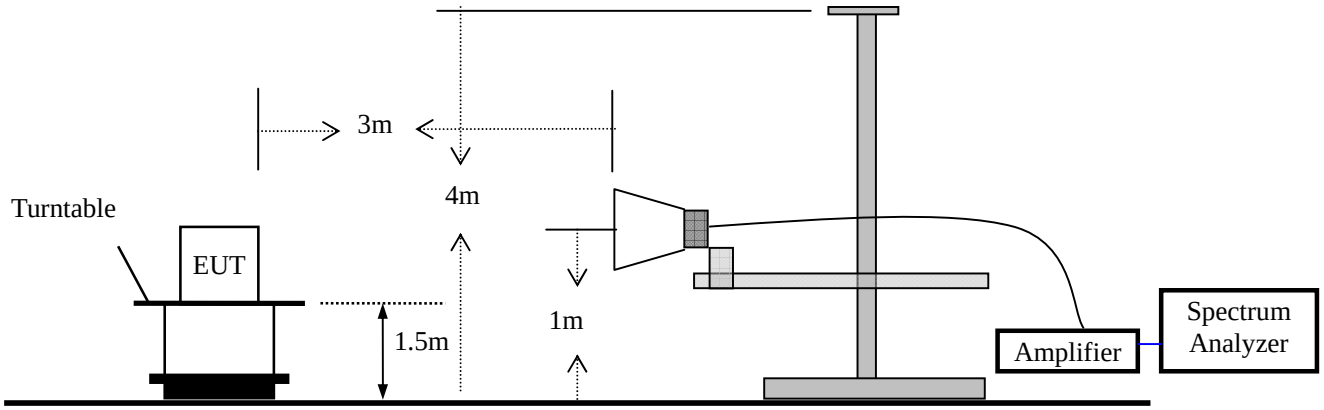
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



4.3. Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSP7	839511/010	May 21, 2017	May 20, 2018
Spectrum Analyzer	HP	E4407B	839840481	May 21, 2017	May 20, 2018
EMI Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 21, 2017	May 20, 2018
Pre-Amplifier	HP	8447D	2944A07999	May 21, 2017	May 20, 2018
Bilog Antenna	Schwarzbeck	VULB9163	142	May 21, 2017	May 20, 2018
Loop Antenna	ARA	PLA-1030/B	1029	May 21, 2017	May 20, 2018
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 21, 2017	May 20, 2018
Horn Antenna	Schwarzbeck	BBHA 9120	D143	May 21, 2017	May 20, 2018

4.4. Radiated Emission Limit

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 1 5.209(a) limit in the table below has to be followed.

Note:

(1) The tighter limit applies at the band edges.

(2) Emission level (dBuV/m)=20log Emission level (uV/m).

Limits of radiated emission measurement (FCC 15.209)

FREQUENCY (MHz)	(dBuV/m) (at 3m)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:
(1) The limit for radiated test was performed according to FCC PART 15C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m) =20log Emission level (uV/m).

Limits of radiated emission measurement (FCC 15.249)

FCC Part15 (15.249) , Subpart C	
Limit	Frequency Range (MHz)
Field strength of fundamental 50000uV/m (94 dBV/m) @ 3 m	2400-2483.5
Field strength of harmonics 500uV/m (54 dBV/m) @ 3 m	Above 2483.5

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.
Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

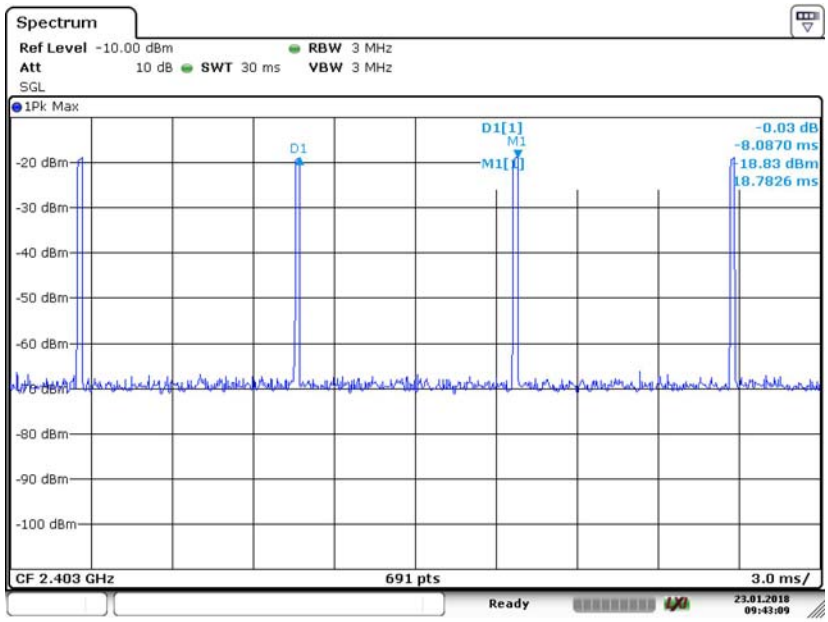
- Calculation of Average factor

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.
The duty cycle is measured in 100ms or the repetition cycle period, whichever is a shorter time frame, the duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.
Averaging factor in dB=20log(duty cycle)
Where the duty factor is calculated from following formula:
20log(Duty cycle)= 20log[(178.26)/8087ms]=-33.13dB
Therefore, the averaging factor is -32.13dB.
Repeat above procedures until all frequency measured was complete.

4.5. Test Results

■ Duty cycle measure

Test Model	Duty cycle measure



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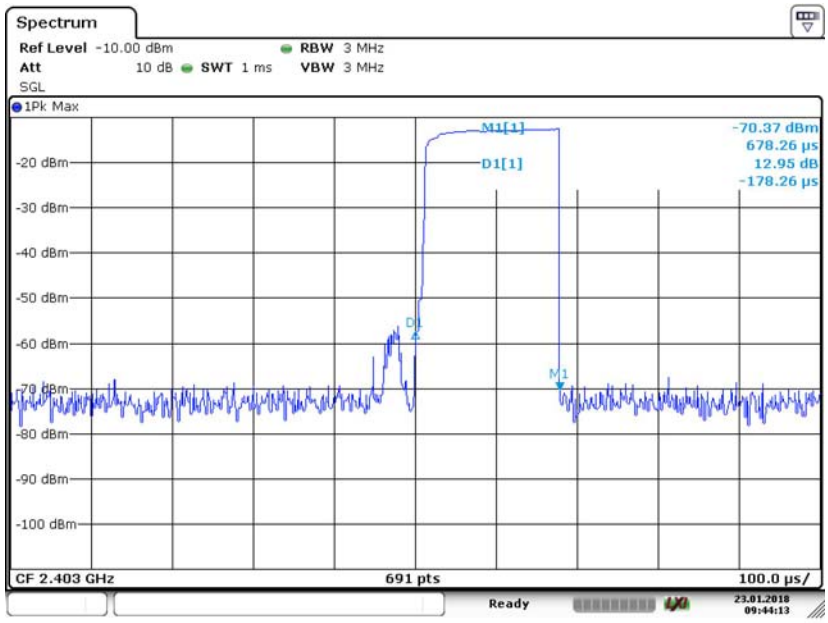

Date: 23.JAN.2018 09:44:13

4.6. Radiated Spurious Emissions

Operation Mode:	TX	Test Date :	January 16, 2018
Frequency Range:	9KHz~30MHz	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
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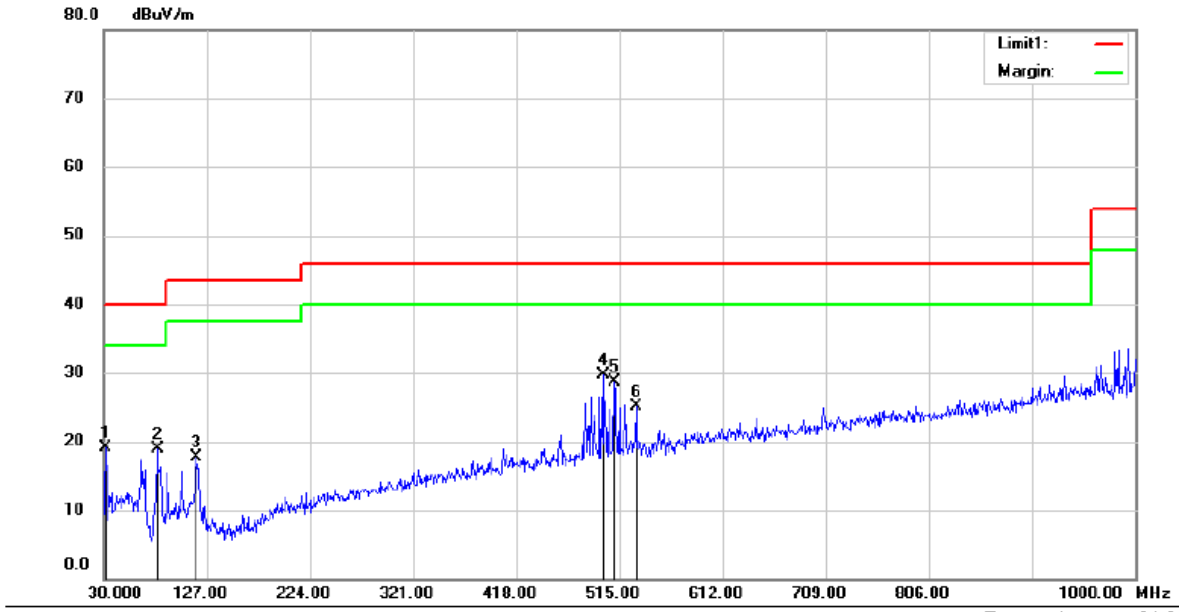
Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Operation Mode:	2403MHz	Test Date :	January 16, 2018
Frequency Range:	30~1000MHz	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP



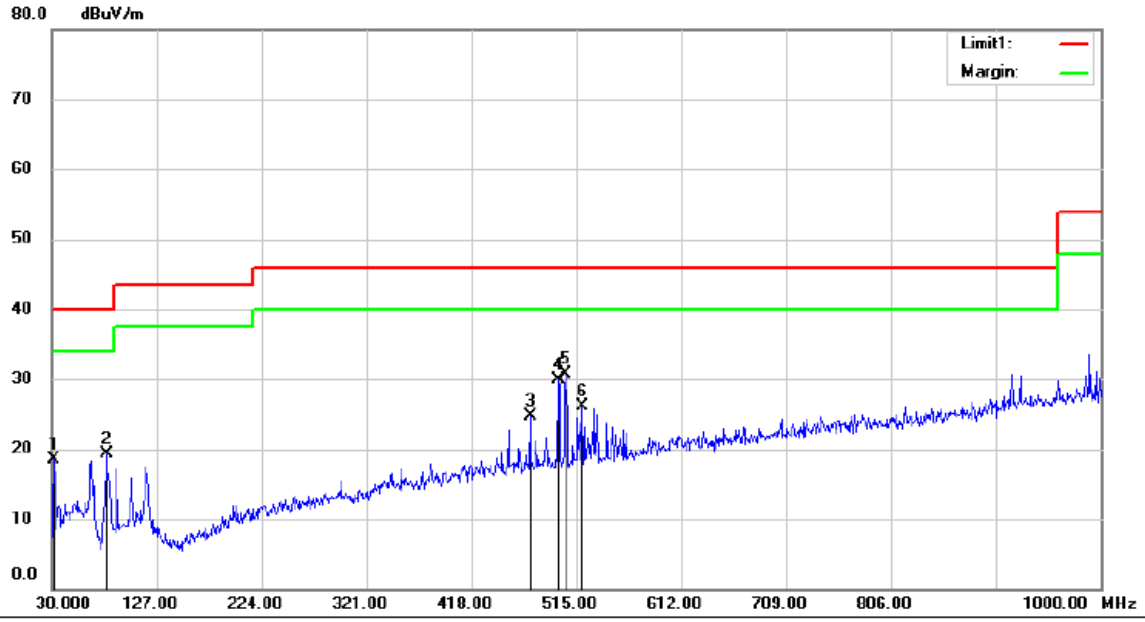
Site 3m Chamber 3# Polarization: *Horizontal* Temperature: 24 C

Limit: (RE)FCC PART 15C Power: DC 3V Humidity: 53 %

Mode:TX 2403

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.9400	36.01	-16.99	19.02	40.00	-20.98	QP			
2		80.4400	35.12	-16.16	18.96	40.00	-21.04	QP			
3		117.3000	34.67	-17.05	17.62	43.50	-25.88	QP			
4	*	499.4800	37.32	-7.59	29.73	46.00	-16.27	QP			
5		510.1500	36.07	-7.45	28.62	46.00	-17.38	QP			
6		530.5200	31.78	-6.67	25.11	46.00	-20.89	QP			



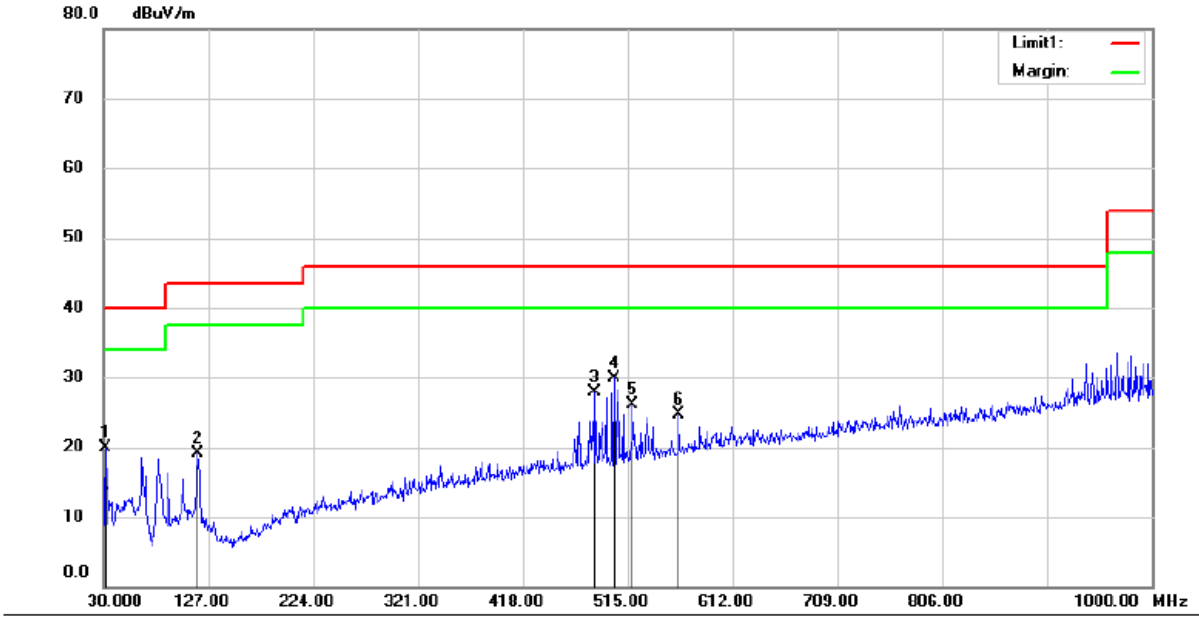
Site 3m Chamber 3#
Limit: (RE)FCC PART 15C
Mode:TX 2403
Note:

Polarization: *Vertical*
Power: DC 3V

Temperature: 24 C
Humidity: 53 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.9400	35.50	-16.99	18.51	40.00	-21.49	QP			
2		80.4400	35.52	-16.16	19.36	40.00	-20.64	QP			
3		472.3200	33.05	-8.26	24.79	46.00	-21.21	QP			
4		498.5100	37.55	-7.59	29.96	46.00	-16.04	QP			
5	*	505.3000	38.29	-7.52	30.77	46.00	-15.23	QP			
6		520.8200	33.18	-7.07	26.11	46.00	-19.89	QP			

Operation Mode:	2441MHz	Test Date :	January 16, 2018
Frequency Range:	30~1000MHz	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP



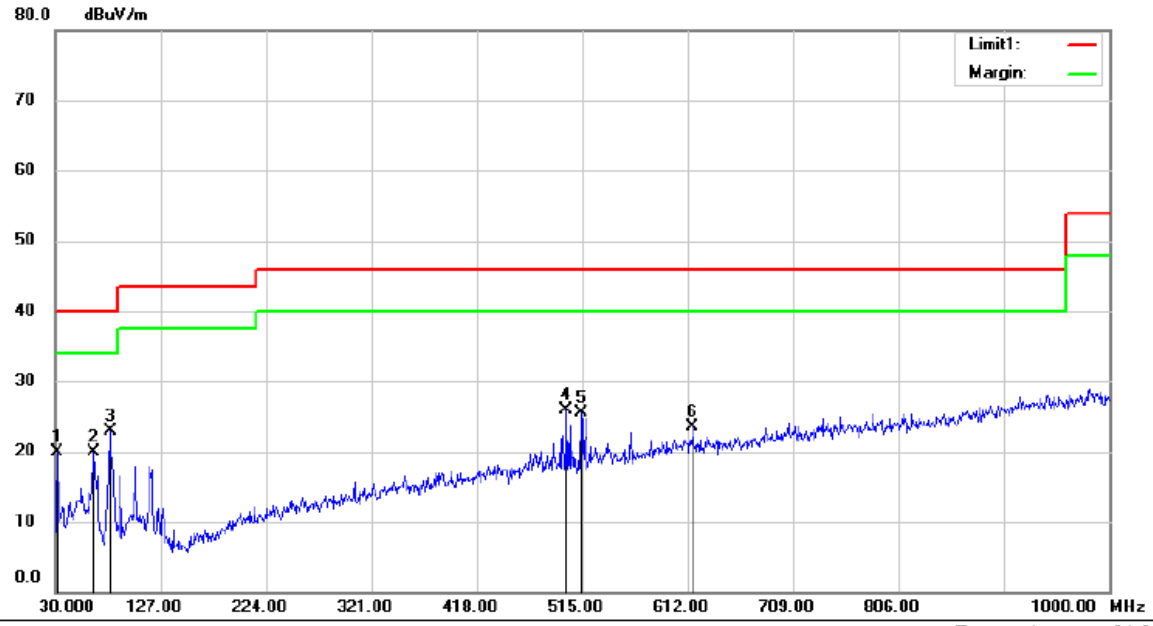
Site 3m Chamber 3# Polarization: *Horizontal* Temperature: 24 C

Limit: (RE)FCC PART 15C Power: DC 3V Humidity: 53 %

Mode:TX 2441

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.9400	36.91	-16.99	19.92	40.00	-20.08	QP			
2		117.3000	36.06	-17.05	19.01	43.50	-24.49	QP			
3		484.9300	35.62	-7.77	27.85	46.00	-18.15	QP			
4	*	502.3900	37.48	-7.57	29.91	46.00	-16.09	QP			
5		519.8500	33.23	-7.11	26.12	46.00	-19.88	QP			
6		562.5300	31.00	-6.32	24.68	46.00	-21.32	QP			



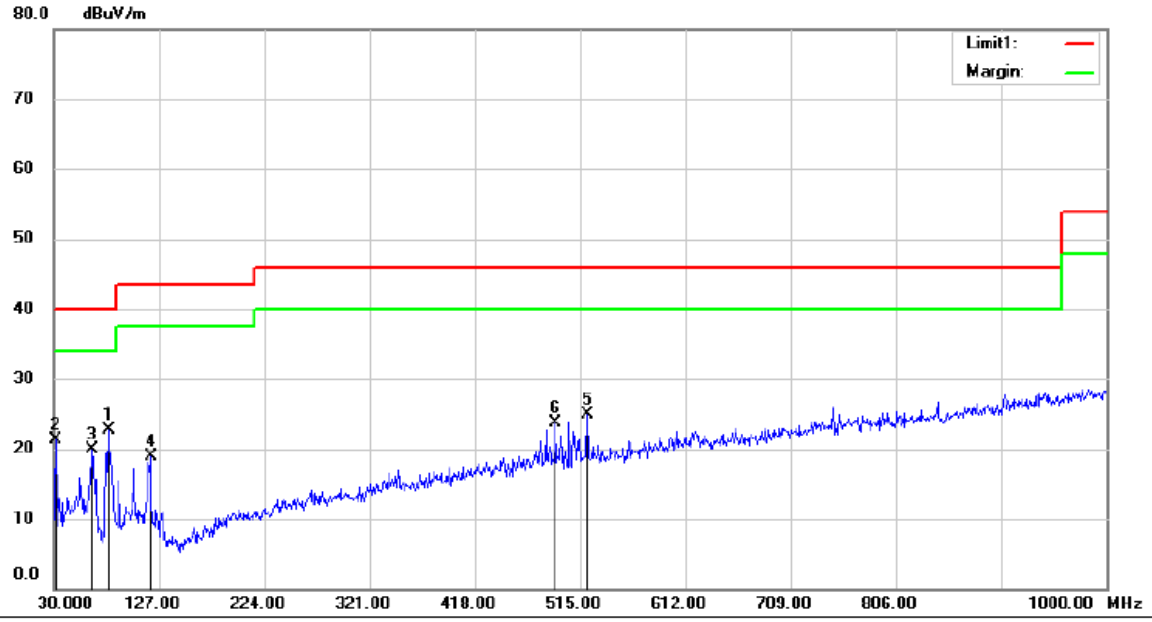
Site 3m Chamber 3#
Limit: (RE)FCC PART 15C
Mode:TX 2441
Note:

Polarization: *Vertical*
Power: DC 3V

Temperature: 24 C
Humidity: 53 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.9400	36.94	-16.99	19.95	40.00	-20.05	QP			
2		65.8900	36.40	-16.58	19.82	40.00	-20.18	QP			
3	*	80.4400	42.77	-19.81	22.96	40.00	-17.04	QP			
4		500.4500	33.41	-7.60	25.81	46.00	-20.19	QP			
5		514.0300	32.85	-7.32	25.53	46.00	-20.47	QP			
6		616.8500	28.34	-4.84	23.50	46.00	-22.50	QP			

Operation Mode:	2471MHz	Test Date :	January 16, 2018
Frequency Range:	30~1000MHz	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP



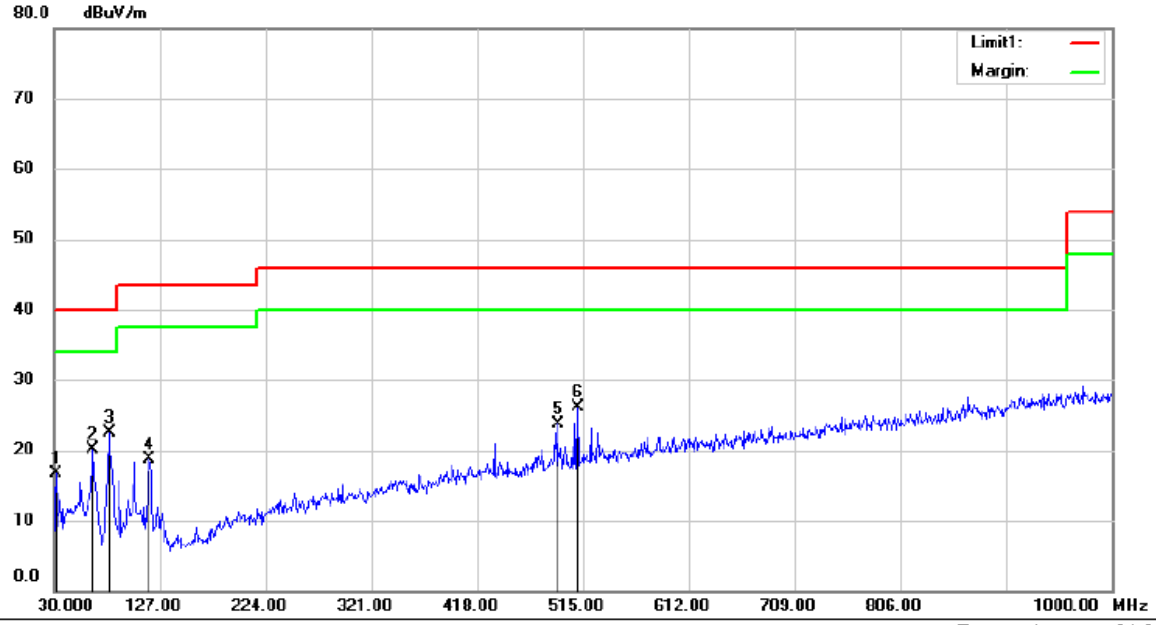
Site 3m Chamber 3# Polarization: *Horizontal* Temperature: 24 C

Limit: (RE)FCC PART 15C Power: DC 3V Humidity: 53 %

Mode:TX 2471

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	80.4400	42.45	-19.81	22.64	40.00	-17.36	QP			
2		31.9400	38.33	-16.99	21.34	40.00	-18.66	QP			
3		65.8900	36.49	-16.58	19.91	40.00	-20.09	QP			
4		119.2400	36.24	-17.31	18.93	43.50	-24.57	QP			
5		521.7900	32.00	-7.03	24.97	46.00	-21.03	QP			
6		492.6900	31.21	-7.56	23.65	46.00	-22.35	QP			



Site 3m Chamber 3#
Limit: (RE)FCC PART 15C
Mode:TX 2471
Note:

Polarization: *Vertical*
Power: DC 3V

Temperature: 24 C
Humidity: 53 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.9400	33.69	-16.99	16.70	40.00	-23.30	QP			
2		65.8900	36.65	-16.58	20.07	40.00	-19.93	QP			
3	*	80.4400	42.36	-19.81	22.55	40.00	-17.45	QP			
4		117.3000	35.77	-17.05	18.72	43.50	-24.78	QP			
5		491.7200	31.36	-7.56	23.80	46.00	-22.20	QP			
6		510.1500	33.47	-7.45	26.02	46.00	-19.98	QP			

Operation Mode:	2403MHz	Test Date :	January 16, 2018
Frequency Range:	1-25GHz	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP

Freq.	Ant.Pol.	Emission Level(dBuV/m)			Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV factory(dB)	AV	PK	AV	PK	AV
9675	V	62.44	-33.13	29.31	74	54	-11.56	-24.69
12174	V	62.06	-33.13	28.93	74	54	-11.94	-25.07
16645	V	68.03	-33.13	34.9	74	54	-5.97	-19.1
8706	H	60.79	-33.13	27.66	74	54	-13.21	-26.34
9692	H	61.53	-33.13	28.4	74	54	-12.47	-25.6
16628	H	68.19	-33.13	35.06	74	54	-5.81	-18.94

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(4) All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Operation Mode:	2441MHz	Test Date :	January 16, 2018
Frequency Range:	1-25GHz	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP

Freq.	Ant.Pol.	Emission Level(dBuV/m)			Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV factory(dB)	AV	PK	AV	PK	AV
8447	V	58.47	-33.13	25.34	74	54	-15.53	-28.66
9671	V	61.27	-33.13	28.14	74	54	-12.73	-25.86
15383	V	66.43	-33.13	33.3	74	54	-7.57	-20.7
9535	H	60.39	-33.13	27.26	74	54	-13.61	-26.74
14601	H	66.88	-33.13	33.75	74	54	-7.12	-20.25
16522	H	67.52	-33.13	34.39	74	54	-6.48	-19.61

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(4) All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Operation Mode:	2471MHz	Test Date :	January 16, 2018
Frequency Range:	1-25GHz	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP

Freq.	Ant.Pol.	Emission Level(dBuV/m)			Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV factory(dB)	AV	PK	AV	PK	AV
9702	V	59.79	-33.13	26.66	74	54	-14.21	-27.34
14683	V	64.76	-33.13	31.63	74	54	-9.24	-22.37
17692	V	67.49	-33.13	34.36	74	54	-6.51	-19.64
9668	H	60.35	-33.13	27.22	74	54	-13.65	-26.78
14785	H	64.22	-33.13	31.09	74	54	-9.78	-22.91
16570	H	66.13	-33.13	33.00	74	54	-7.87	-21.00

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(4) All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Transmitter Fundamental Field Strength

Operation Mode:	CH1: 2403MHz	Test Date :	January 16, 2018
FCC Part:	15.249(a)	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP
Test Method Used:			

Freq.	Ant.Pol.	Emission Level(dBuV/m)			Limit 3m(dBuV/m)		Over(dB)	
(MHz)	H/V	PK	AV factory(dB)	AV	PK	AV	PK	AV
2403	V	100.10	-33.13	66.97	114	94	-13.9	-27.03
2403	H	102.35	-33.13	69.22	114	94	-11.65	-24.78

Operation Mode:	CH9: 2441MHz	Test Date :	January 16, 2018
FCC Part:	15.249(a)	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP
Test Method Used:			

Freq.	Ant.Pol.	Emission Level(dBuV/m)			Limit 3m(dBuV/m)		Over(dB)	
(MHz)	H/V	PK	AV factory(dB)	AV	PK	AV	PK	AV
2441	V	99.84	-33.13	66.71	114	94	-14.16	-27.29
2441	H	101.44	-33.13	68.31	114	94	-12.56	-25.69

Operation Mode:	CH16: 2471MHz	Test Date :	January 16, 2018
FCC Part:	15.249(a)	Temperature :	24℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	SYP
Test Method Used:			

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)			Limit 3m(dBuV/m)		Over(dB)	
		PK	AV factory(dB)	AV	PK	AV	PK	AV
2471	V	98.65	-33.13	65.52	114	94	-15.35	-28.48
2471	H	100.61	-33.13	67.48	114	94	-13.39	-26.52

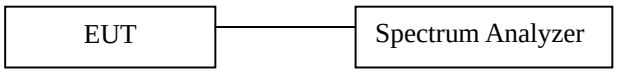
Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(4) All the x/y/z orientation has been investigated, and only worst case is presented in this report.

5. BANDWIDTH TEST

5.1. Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

5.2. Test SET-UP (Block Diagram of Configuration)



5.3. Measurement Equipment Used:

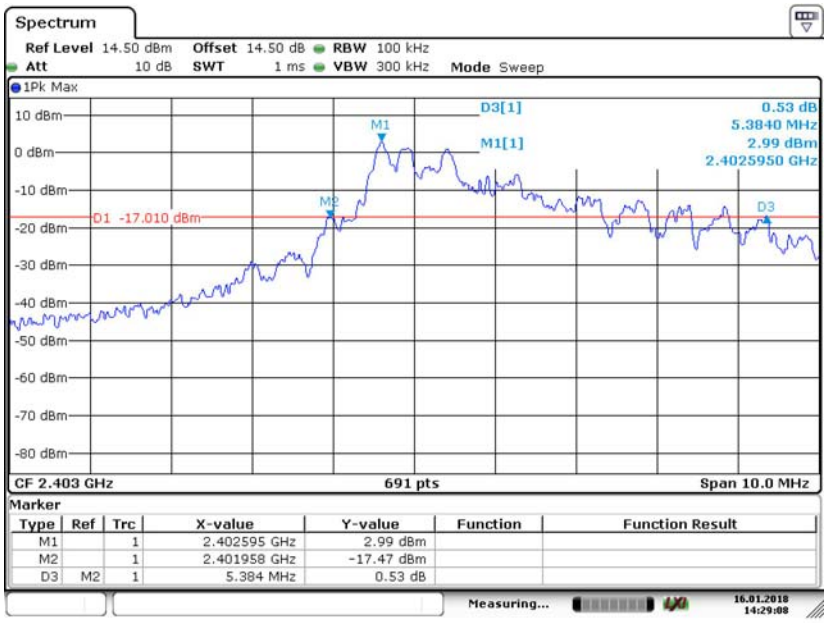
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4407B	88156318	05/21/2017	05/20/2018

5.4. Measurement Results:

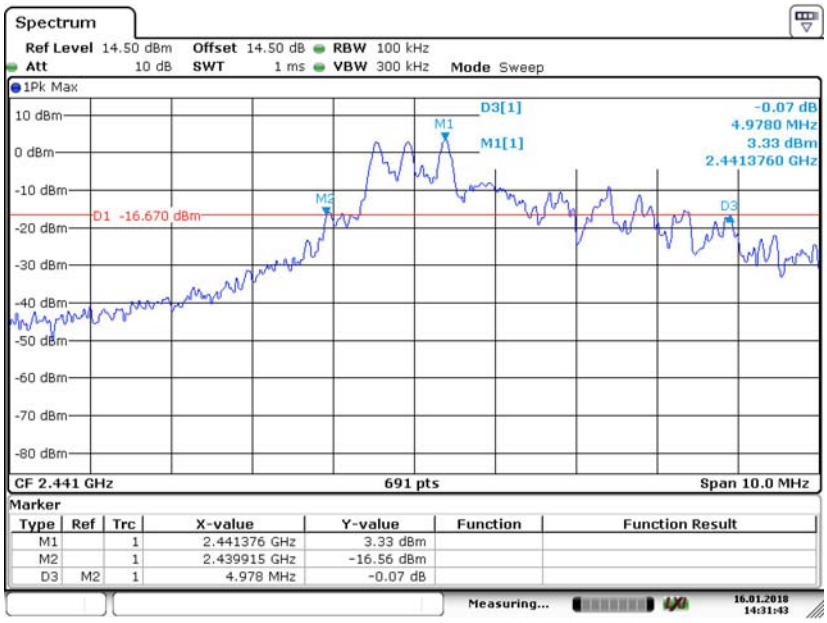
20dB Bandwidth test data Chart:
Refer to attached data chart.

Spectrum Detector:	PK	Test Date:	January 16, 2018
Test By:	SYP	Temperature:	24℃
Test Result:	PASS	Humidity:	55 %
Modulation:	FSK		

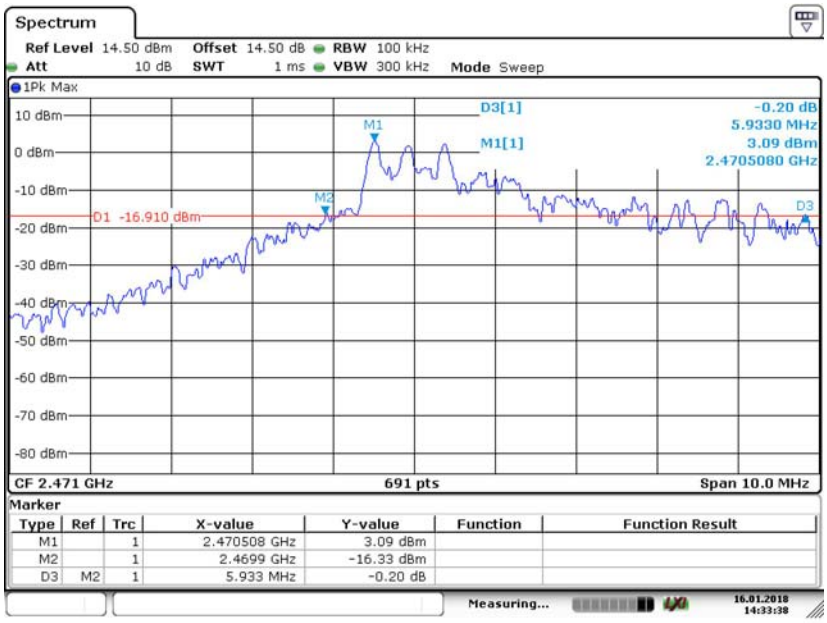
Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
CH01	2403	5384
CH09	2441	4978
CH16	2471	5933



Date: 16.JAN.2018 14:29:08



Date: 16.JAN.2018 14:31:43



Date: 16.JAN.2018 14:33:38

6. BAND EDGE TEST

6.1. Measurement Procedure

1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.

6.2. Test SET-UP (Block Diagram of Configuration)

As 5.2 Test set up (B) and (C)

6.3. Measurement Equipment Used:

Same as 5.3 Radiated Emission Measurement.

6.4. Measurement Results:

Spectrum Detector:	PK/AV	Test Date :	January 16, 2018
Test By:	SYP	Temperature :	24℃
Test channel:	CH1(2403MHz)	Humidity :	55 %

Frequency (MHz)	Polarity	Level (dBuV/m)		Limited (dBuV/m)	
		PK	AV	PK	AV
2389.60	H	44.03	10.90	74	54
2388.64	V	43.24	10.11	74	54

Spectrum Detector:	PK/AV	Test Date :	January 16, 2018
Test By:	SYP	Temperature :	24℃
Test channel:	CH16(2471MHz)	Humidity :	55 %

Frequency (MHz)	Polarity	Level (dBuV/m)		Limited (dBuV/m)	
		PK	AV	PK	AV
2483.68	H	44.13	11.00	74	54
2483.78	V	44.09	10.96	74	54

7. Antenna Application

7.1. Antenna Requirement

Standard	Requirement
FCC CRF Part 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

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

7.2. Result

The EUT has a PCB antenna, the gain is 0 dBi, which in accordance to section 15.203, please refer to the internal photos.