FCC Part 15, Subpart B, Class B

TEST REPORT

Shenzhen Jiayz photo industrial., Ltd

2.4G wireless microphone

Test Model: BY-WM4 PRO RXD

Additional Model No.: BY-WM4 PRO-K3, BY-WM4 PRO-K4

Prepared for	:	Shenzhen Jiayz photo industrial., Ltd
Address	:	A16 Builing, Intelligent Terminal Industrial Park of Silicon Valley Power, Guanlan, Longhua District, Shenzhen, China

Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, China
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Date of receipt of test sample	:	April 02, 2020
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	April 02, 2020 ~ April 07, 2020
Date of Report	:	April 14, 2020

FCC TEST REPORT
FCC Part 15, Subpart B, Class B

Report Reference No.	:	**LCS200301006AEA**
Date Of Issue	:	April 14, 2020
Testing Laboratory Name	:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, China
Testing Location/ Procedure...	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	:	**Shenzhen Jiayz photo industrial., Ltd**
Address	:	A16 Builing, Intelligent Terminal Industrial Park of Silicon Valley Power, Guanlan, Longhua District, Shenzhen, China
Test Specification		
Standard.....	:	FCC Part 15, Subpart B, Class B, ANSI C63.4 -2014
Test Report Form No.....	:	LCSEMC-1.0
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	:	Dated 2011-03

Test Item Description.	**:**	**2.4G wireless microphone**
Trade Mark	:	BOYA
Test Model.....	:	BY-WM4 PRO RXD
Ratings	:	Input: DC 5V, 0.5W
Result	**:**	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Ray Yang / File administrators	Jin Wang / Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS200301006AEA	April 14, 2020 Date of issue

Test Model	: BY-WM4 PRO RXD
EUT.....	: 2.4G wireless microphone
Applicant..... : Shenzhen Jiayz photo industrial., Ltd	
Address.....	: A16 Builing, Intelligent Terminal Industrial Park of Sililcon Valley Power, Guanlan, Longhua District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Manufacturer..... : Shenzhen Jiayz photo industrial., Ltd	
Address.....	: A16 Builing, Intelligent Terminal Industrial Park of Sililcon Valley Power, Guanlan, Longhua District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Factory..... : /	
Address.....	: /
Telephone.....	: /
Fax.....	: /

Test Result according to the standards on page 6: **Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	April 14, 2020	Initial Issue	Gavin Liang

TABLE OF CONTENTS

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.

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	FCC Part 15, Subpart B, Class B, ANSI C63.4 -2014	Class B	PASS
Radiated disturbance	FCC Part 15, Subpart B, Class B, ANSI C63.4 -2014	Class B	PASS
N/A is an abbreviation for Not Applicable.			

There was 2 test Modes. TM1 to TM2 were shown below:
TM1 : Operate in 2.4G Receive mode;
TM2 : Idle mode

***Note:
1. All test modes were tested, but we only recorded the worst case in this report.

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : 2.4G wireless microphone

Trade Mark : BY

Test Model : BY-WM4 PRO RXD

List Model No. : BY-WM4 PRO-K3, BY-WM4 PRO-K4

Model Declaration : PCB board, structure and internal of these model(s) are the same, So no additional models were tested.

Power Supply : Input: DC 5V, 0.5W

Highest internal frequency (Fx)	Highest measured frequency
Fx ≤ 108 MHz	1 GHz
108 MHz < Fx ≤ 500 MHz	2 GHz
500 MHz < Fx ≤ 1 GHz	5 GHz
Fx > 1 GHz	5 × Fx up to a maximum of 6 GHz
NOTE 1 For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies. Where Fx is unknown, the radiated emission measurements shall be performed up to 6 GHz.	

2.2. Support Equipment List

Name	Manufacturers	M/N	S/N
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2.3. Description of Test Facility

Site Description
EMC Lab. : FCC Registration Number is 254912.

Industry Canada Registration Number is 9642A.

ESMD Registration Number is ARCB0108.

UL Registration Number is 100571-492.

TUV SUD Registration Number is SCN1081.

TUV RH Registration Number is UA 50296516-001.

NVLAP Registration Code is 600167-0.

2.4. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.5. Measurement Uncertainty

Test	Parameters	Expanded Uncertainty (Ulab)	Expanded Uncertainty (Ucispr)
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB

（1）Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

（2）The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

3. TEST RESULTS

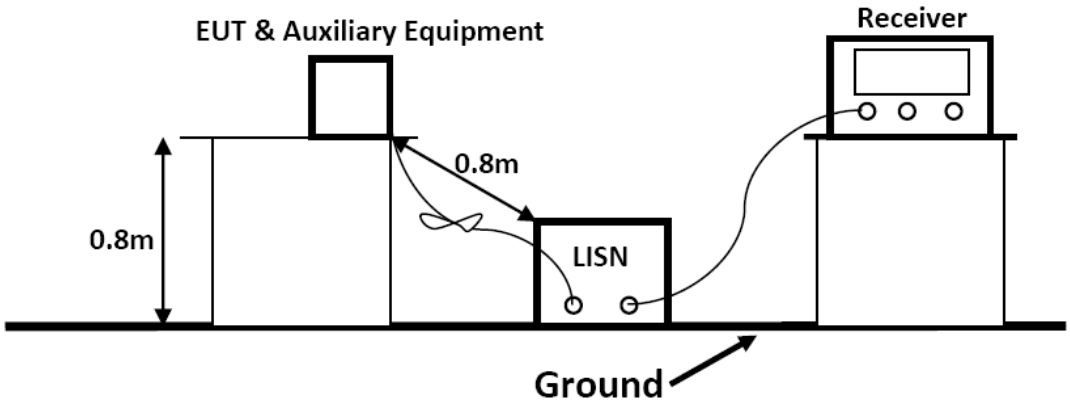
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1.1. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Software	EZ	EZ-EMC	/	N/A
2	EMI Test Receiver	R&S	ESPI	101840	2019-06-11
3	Artificial Mains	R&S	ENV216	101288	2019-06-12
4	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001 -0032	2019-06-11

3.1.2.Block Diagram of Test Setup



3.1.3.Test Standard

Power Line Conducted Emission Limits (Class B)

Frequency (MHz)			Limit (dBμV)	
			Quasi-peak Level	Average Level
0.15	~	0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50	~	5.00	56.0	46.0
5.00	~	30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.				

3.1.4.EUT Configuration on Test

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

3.1.5.Operating Condition of EUT

3.1.5.1.Setup the EUT as shown on Section 3.1.2

3.1.5.2.Turn on the power of all equipments.

3.1.5.3.Let the EUT work in measuring Mode 1 and measure it.

3.1.6.Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC/ANSI C63.4-2014 on Conducted Emission Measurement.

The bandwidth of the test receiver is set at 9kHz.

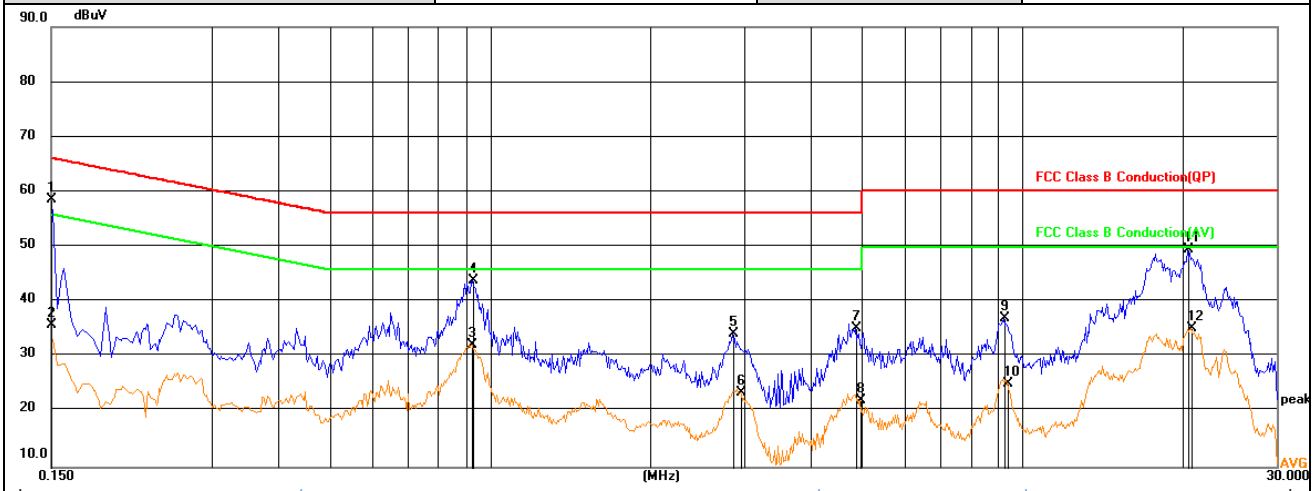
The frequency range from 150kHz to 30MHz is investigated

3.1.7.Test Results

PASS.

The test result please refer to the next page.

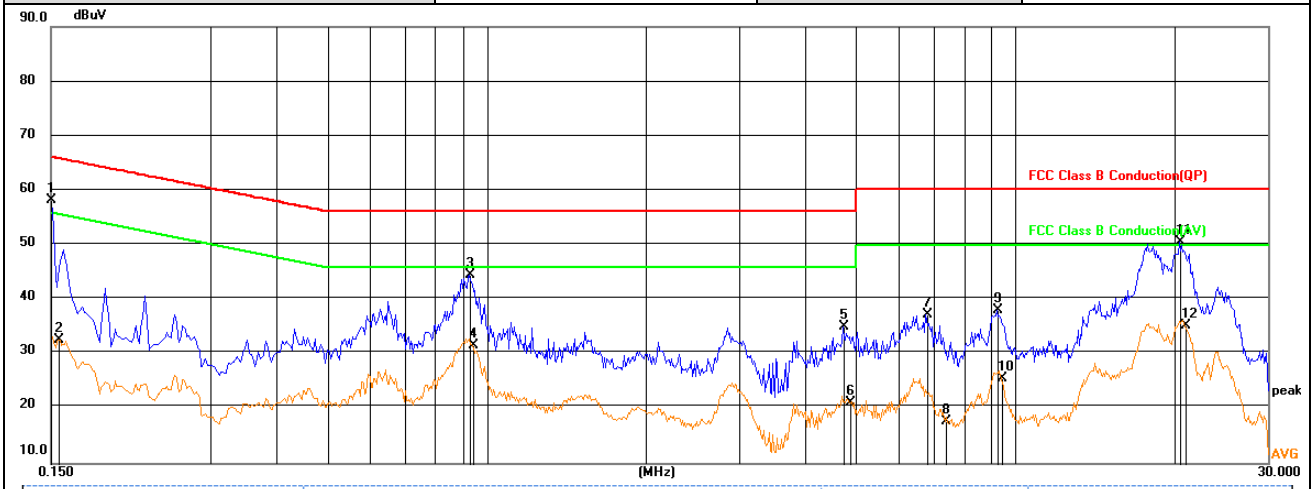
Test Model	BY-WM4 PRO RXD	Test Mode	Mode 1
Environmental Conditions	23.3℃, 53.7% RH	Test Engineer	Diamond Lu
Pol	Line	Test Voltage	AC 120V/60Hz



Temp.( )/Hum.(%RH):	23.3 / 53.7	Probe:	L1
Standard:	FCC Class B Conduction(QP)		
Test item:	Conduction Test		
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	39.56	19.14	58.70	66.00	-7.30	QP
2	0.1500	16.71	19.14	35.85	56.00	-20.15	AVG
3	0.9240	12.91	19.28	32.19	46.00	-13.81	AVG
4	0.9330	24.71	19.28	43.99	56.00	-12.01	QP
5	2.8680	14.92	19.45	34.37	56.00	-21.63	QP
6	2.9490	4.15	19.46	23.61	46.00	-22.39	AVG
7	4.8659	15.81	19.49	35.30	56.00	-20.70	QP
8	4.9650	2.67	19.49	22.16	46.00	-23.84	AVG
9	9.2490	17.38	19.66	37.04	60.00	-22.96	QP
10	9.3525	5.61	19.67	25.28	50.00	-24.72	AVG
11	20.3955	29.58	20.05	49.63	60.00	-10.37	QP
12	20.7330	15.24	20.06	35.30	50.00	-14.70	AVG

Test Model	BY-WM4 PRO RXD	Test Mode	Mode 1
Environmental Conditions	23.3℃, 53.7% RH	Test Engineer	Diamond Lu
Pol	Neutral	Test Voltage	AC 120V/60Hz



Temp.( )/Hum.(%RH):	23.3 / 53.7	Probe:	N
Standard:	FCC Class B Conduction(QP)		
Test item:	Conduction Test		
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	39.06	19.14	58.20	66.00	-7.80	QP
2	0.1556	13.56	19.15	32.71	55.70	-22.99	AVG
3	0.9330	25.21	19.28	44.49	56.00	-11.51	QP
4	0.9420	12.42	19.28	31.70	46.00	-14.30	AVG
5	4.7355	15.55	19.48	35.03	56.00	-20.97	QP
6	4.8659	1.62	19.49	21.11	46.00	-24.89	AVG
7	6.7695	17.81	19.57	37.38	60.00	-22.62	QP
8	7.3815	-1.78	19.60	17.82	50.00	-32.18	AVG
9	9.2490	18.38	19.66	38.04	60.00	-21.96	QP
10	9.4245	6.01	19.67	25.68	50.00	-24.32	AVG
11	20.3955	30.58	20.05	50.63	60.00	-9.37	QP
12	20.9310	15.16	20.07	35.23	50.00	-14.77	AVG

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

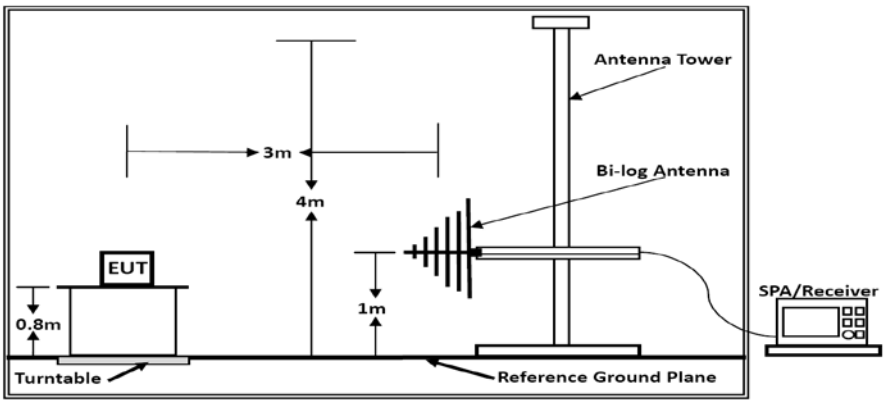
3.2. Radiated emission Measurement

3.2.1. Test Equipment

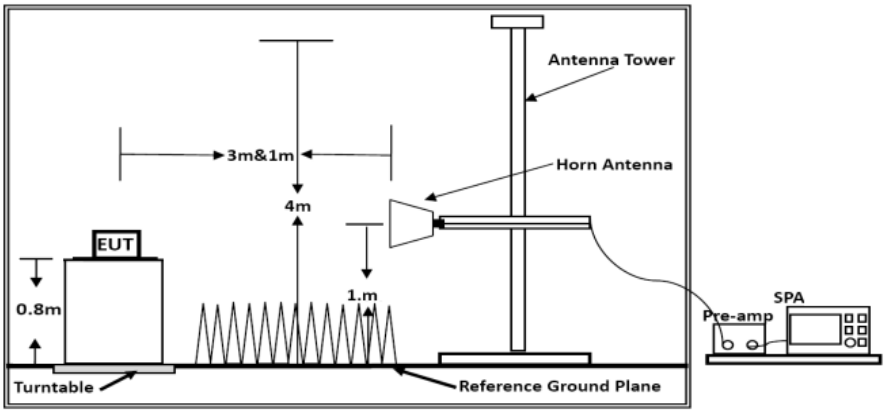
The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Software	EZ	EZ-EMC	/	N/A
2	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2019-06-12
3	Positioning Controller	MF	MF-7082	/	2019-06-12
4	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2019-07-25
5	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2019-07-01
6	EMI Test Receiver	R&S	ESR 7	101181	2019-06-12
7	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2019-11-14
8	Broadband Preamplifier	/	BP-01M18G	P190501	2019-07-01
9	RF Cable-R03m	Jye Bao	RG142	CB021	2019-06-12
10	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2019-06-12

3.2.2. Block Diagram of Test Setup



Below 1GHz



Above 1GHz

3.2.3. Radiated Emission Limit (Class B)

Limits for Radiated Disturbance Below 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46
960 ~ 1000	3	500	54

Remark：(1) Emission level (dB)μV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

Limits for Radiated Emission Above 1GHz

Frequency (MHz)	Distance (Meters)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)
Above 1000	3	74	54

***Note: The lower limit applies at the transition frequency.

3.2.4. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.2.5. Operating Condition of EUT

3.2.5.1.Setup the EUT as shown in Section 3.2.2.
3.2.5.2.Let the EUT work in test Mode 1 and measure it.

3.2.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.

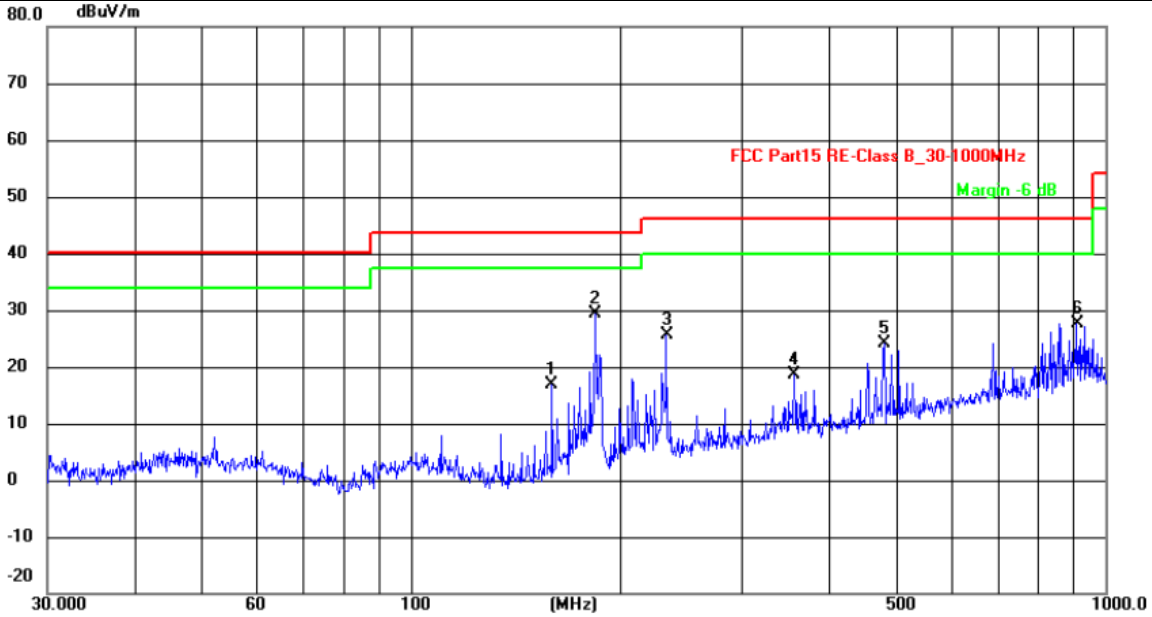
The bandwidth of the EMI test receiver is set at 120kHz, 300kHz.
The frequency range from 30MHz to 1000MHz is checked.
The bandwidth of the EMI test receiver is set at 1MHz, 3MHz.
The frequency range from 1GHz to 13GHz is checked.

3.2.7. Radiated Emission Noise Measurement Result

PASS.

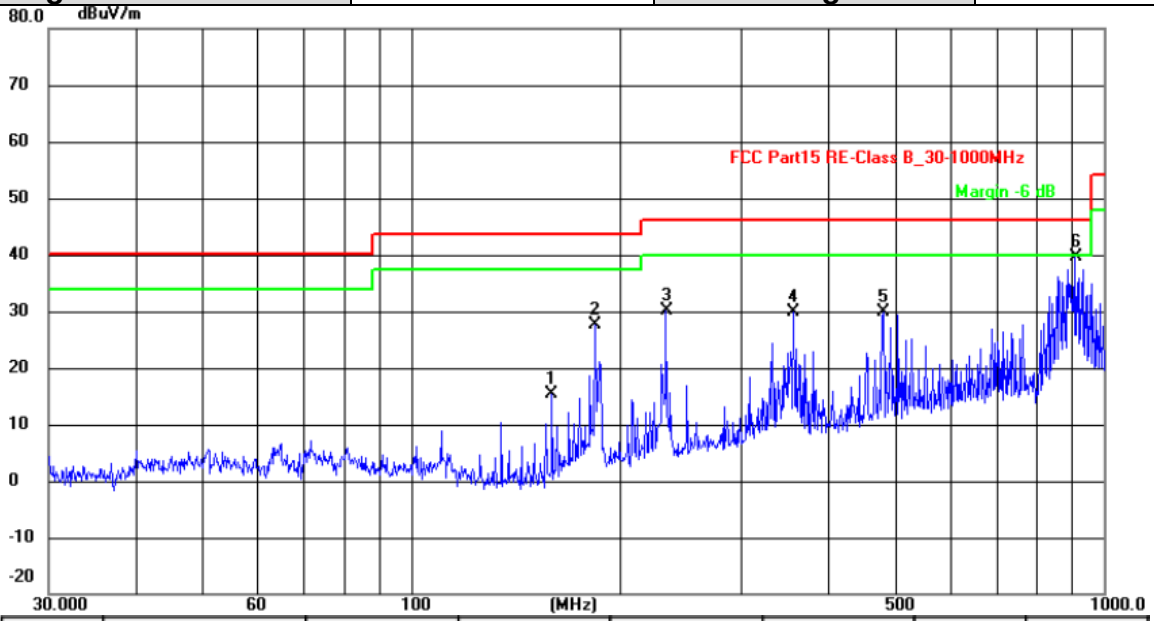
The scanning waveforms please refer to the next page.

Test Model	BY-WM4 PRO RXD	**Test Mode**	Mode 1
Environmental Conditions	24.6℃, 54.1% RH	**Detector Function**	Quasi-peak
Pol	Vertical	**Distance**	3m
Test Engineer	Diamond Lu	**Test Voltage**	DC 5V



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	159.7844	38.02	-21.26	16.76	43.50	-26.74	QP
2	184.4898	48.99	-19.71	29.28	43.50	-14.22	QP
3	233.3487	42.87	-17.26	25.61	46.00	-20.39	QP
4	356.6758	32.96	-14.28	18.68	46.00	-27.32	QP
5	480.5276	35.99	-11.86	24.13	46.00	-21.87	QP
6	909.6667	33.13	-5.60	27.53	46.00	-18.47	QP

Test Model	BY-WM4 PRO RXD	Test Mode	Mode 1
Environmental Conditions	24.6℃, 54.1% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	Diamond Lu	Test Voltage	DC 5V



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	159.7844	36.57	-21.26	15.31	43.50	-28.19	QP
2	184.4898	47.46	-19.71	27.75	43.50	-15.75	QP
3	233.3487	47.37	-17.26	30.11	46.00	-15.89	QP
4	356.6758	44.23	-14.28	29.95	46.00	-16.05	QP
5	480.5276	41.75	-11.86	29.89	46.00	-16.11	QP
6	909.6667	45.29	-5.60	39.69	46.00	-6.31	QP

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

Radiated Emission Above 1GHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
1697.60	51.30	33.06	35.04	3.94	53.26	74.00	-20.74	Peak	Horizontal
1697.60	40.23	33.06	35.04	3.94	42.19	54.00	-11.81	Average	Horizontal
2546.40	56.02	33.06	35.04	3.94	57.98	74.00	-16.02	Peak	Horizontal
2546.40	36.21	33.06	35.04	3.94	38.17	54.00	-15.83	Average	Horizontal
3424.80	50.47	33.06	35.04	3.94	52.43	74.00	-21.57	Peak	Horizontal
3424.80	40.40	33.06	35.04	3.94	42.36	54.00	-11.64	Average	Horizontal

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
1673.20	53.01	33.06	35.04	3.94	54.97	74.00	-19.03	Peak	Vertical
1673.20	39.75	33.06	35.04	3.94	41.71	54.00	-12.29	Average	Vertical
3815.20	52.48	33.16	35.06	3.96	54.54	74.00	-19.46	Peak	Vertical
3815.20	39.70	33.16	35.06	3.96	41.76	54.00	-12.24	Average	Vertical
5722.80	51.07	33.06	35.04	3.94	53.03	74.00	-20.97	Peak	Vertical
5722.80	40.36	33.06	35.04	3.94	42.32	54.00	-11.68	Average	Vertical

4. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

5. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

6. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

----------THE END OF TEST REPORT----------