

# EMC TEST REPORT

## For

2.4G Wireless Monitor System  
Transmitter  
Model Number: WW5000

Report Number : 237259-IT/WT

Test Laboratory : Shenzhen Academy of Metrology and  
Quality Inspection EMC Laboratory

Site Location : Bldg. of Metrology &Quality Inspection,  
Longzhu Road, Shenzhen, Guangdong,  
China

Tel : 0086-755-26941637, 26941531

Fax : 0086-755-26941545

## TABLE OF CONTENTS

Description	Page
Test Report Certification	
<b>1. TEST RESULTS .....</b>	<b>4</b>
<b>2. GENERAL INFORMATION .....</b>	<b>4</b>
<b>2.1. Description of EUT .....</b>	<b>4</b>
<b>2.2. Test Facility .....</b>	<b>5</b>
<b>3. TEST EQUIPMENT.....</b>	<b>5</b>
<b>3.1. For Conducted Disturbance Test .....</b>	<b>5</b>
<b>3.2. For Radiated Disturbance Test .....</b>	<b>5</b>
<b>4. CONDUCTED DISTURBANCE TEST .....</b>	<b>6</b>
<b>4.1. Block Diagram of Test Setup.....</b>	<b>6</b>
<b>4.2. Conducted Disturbance Test Standard and Limit.....</b>	<b>6</b>
<b>4.3. Test Procedure .....</b>	<b>6</b>
<b>4.4. Operating Condition of EUT .....</b>	<b>7</b>
<b>4.5. Test Data .....</b>	<b>7</b>
<b>5. RADIATED DISTURBANCE TEST.....</b>	<b>9</b>
<b>5.1. Block Diagram of Test Setup.....</b>	<b>9</b>
<b>5.2. Test Standard and Limit.....</b>	<b>9</b>
<b>5.3. Test Procedure .....</b>	<b>10</b>
<b>5.4. Operating Condition of EUT .....</b>	<b>10</b>
<b>5.5. Test Data .....</b>	<b>11</b>
<b>6. BAND EDGES TESTING.....</b>	<b>13</b>
<b>6.1 Test Procedure .....</b>	<b>13</b>
<b>6.2 Test Equipment .....</b>	<b>13</b>
<b>6.3 Test Results.....</b>	<b>14</b>
<b>7. OCCUPIED BANDWIDTH .....</b>	<b>15</b>
<b>8. ANTENNA REQUIREMENTS.....</b>	<b>17</b>
Appendix I	
Appendix II	

## CERTIFICATION

Applicant : Shenzhen Youjin Electronic Co., Ltd.  
Address : 3/F, No.116 Building, Jindi Industrial Park, Futian District, Shenzhen  
Manufacturer : Shenzhen Youjin Electronic Co., Ltd.  
Address : 3/F, No.116 Building, Jindi Industrial Park, Futian District, Shenzhen  
EUT Description : 2.4G Wireless Monitor System  
MODEL No : WW5000

Test Standards:

**FCC RULES AND REGULATIONS PART 15 :2001  
ANSI C63.4 2000**

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results. Also, this report shows that the EUT technically complies with FCC requirements.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Tested by : George Luo Date : Jul. 6,2002  
(George Luo)

Checked by : Peter Lin Date : Jul.6,2002  
(Peter Lin)

Approved by : Steven Yang Date : Jul.6,2002  
(Steven Yang)

## 1. TEST RESULTS

Table 1 Test Results

Test Items	Test Results
Conducted Disturbance	Pass
Radiated Disturbance	Pass
Band edge	Pass
Antenna requirement	Pass

## 2. GENERAL INFORMATION

### 2.1. Description of EUT

Description : 2.4G Wireless Monitor System  
 Model Number : WW5000  
 Applicant : Shenzhen Youjin Electronic Co., Ltd.  
 Manufacturer : Shenzhen Youjin Electronic Co., Ltd.  
 Input Voltage : 110V/60Hz  
 Transmitter:  
 Working Frequency : 2420/2440/2460/2480MHz  
 Channel : 4  
 Transmitting Power : 10mW  
 Power Supply : DC12V 400mA  
 Adaptor: Input Power: AC110V 60Hz  
 Output Power: DC8V 200mA  
 Receiver:  
 Working Frequency : 2140/2160/2180/2200MHz  
 Channel : 4  
 Power Supply : DC12V 1200mA  
 Adaptor: Input Power: AC110V 60Hz

Output Power: DC12V 200mA

The system have a Wireless camera(WW2000) and a wireless receiver(WW3000R). The system have Fixed and permanent antenna. The antenna have a plastic case. It is compliance with the 15.203 requirement.

This unit is mostly used in transmitting and receiving of Audio and Video signal. It is divided into two parts of transmitter and receiver. It has the functions of infrared remote control. The transmitter even has the function of automatically turning off when signal is not available.

## 2.2. Test Facility

Name of Facility	:	Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory
Site Location	:	Bldg. of Metrology & Quality Inspection, Longzhu Road, Shenzhen, Guangdong, China
Site Description	校	Apr. 17, 2000 file on Federal Communications Commission Registration Number: 97379
		Aug. 11, 2000 certificated by TUV Rheinland, Shenzhen.

## 3. TEST EQUIPMENT

### 3.1. For Conducted Disturbance Test

Table 2 Conducted Disturbance Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB2603	EMI Test Receiver	Rohde & Schwarz	ESCS30	Feb.27,2002	1 Year
SB3321	AMN	Rohde & Schwarz	ESH2-Z5	Feb.01,2002	1 Year
SB2589	L.I.S.N	KYROTISU	KNW-407	Feb.24,2002	1 Year

### 3.2. For Radiated Disturbance Test

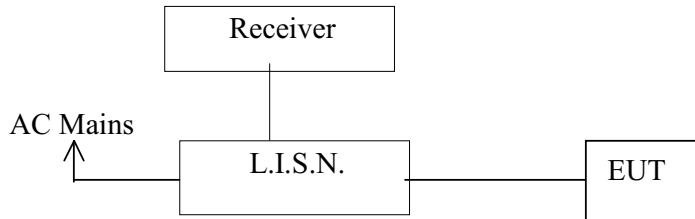
Table 3 Radiated Disturbance Test Equipment

NO.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB3436	EMI Test Receiver	Rohde & Schwarz	ESI26	Feb. 28,2002	1 Year
SB3440	Bilog Antenna	Chase	CBL6112B	Feb. 01,2002	1 Year
	Horn antenna	Rohde & Schwarz	HF906	Feb. 01,2002	1 Year

## 4. CONDUCTED DISTURBANCE TEST

### 4.1. Block Diagram of Test Setup

Figure 1 Conducted Disturbance Test Setup



### 4.2. Conducted Disturbance Test Standard and Limit

#### 4.2.1. Test Standard

FCC Part 15 :2001

#### 4.2.2. Test Limit

Table 4 Conducted Disturbance Test Limit(Class B)

Frequency	Maximum RF Line Voltage dB( $\mu$ V)
	Quasi-peak Level
450kHz ~ 1.705MHz	48.0
1.705MHz ~ 30MHz	48.0

### 4.3. Test Procedure

The measurement is performed at the shielding room, using the setup per ANSI C63.4-2000 test procedure .

The EUT is put on a table of non-conducting material which is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The adaptor of the EUT is connected to the 120V/60Hz AC mains through a LISN. A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions from both sides of AC line. First, use the PK detector to do the pretest. And then use QP detector to do final test. Pretest result is shown in the curve, and the final test result is shown in table.

Setup of EMI Test Receiver:

Start frequency	450kHz
Stop frequency	30MHz
IF bandwidth	9kHz.

#### 4.4. Operating Condition of EUT

4.4.1. Setup the EUT as shown in section 4.1.

4.4.2. Turn on the power.

4.4.3. Let the Transmitter in each channel.

When the power on the Transmitter can change the video signal from camera and the audio signal from the microphone to RF signal.

#### 4.5. Test Data

The emissions don't show in below are too low against the limits, the test curves are shown in the APPENDIX I

Table 5 Conducted Disturbance Test Data

Date of Test:	2002.6.28	Temperature:	23 档°C
EUT:	2.4G Wireless Monitor System	Humidity:	61 档%
M/N:	WW2000(Transmitter)	Test Mode:	Channel 1

Line			Neutral		
Frequency (MHz)	Quasi-Peak		Frequency (MHz)	Quasi-Peak	
	Reading dB(μV)	Limits dB(μV)		Reading dB(μV)	Limits dB(μV)
0.454	32.2	48.0	0.698	23.5	48.0
0.482	30.9	48.0	0.754	23.3	48.0

Table 6 Conducted Disturbance Test Data

Date of Test:	2002.6.28	Temperature:	23 档°C
EUT:	2.4G Wireless Monitor System	Humidity:	61 档%
M/N:	WW2000(Transmitter)	Test Mode:	Channel 2

Line			Neutral		
Frequency (MHz)	Quasi-Peak		Frequency (MHz)	Quasi-Peak	
	Reading dB(μV)	Limits dB(μV)		Reading dB(μV)	Limits dB(μV)
0.470	31.3	48.0	0.710	23.7	48.0
0.486	30.4	48.0	0.738	23.7	48.0

Table 7 Conducted Disturbance Test Data

Date of Test:	2002.6.28	Temperature:	23 档°C
EUT:	2.4G Wireless Monitor System	Humidity:	61 档%
M/N:	WW2000(Transmitter)	Test Mode:	Channel 3

Frequency (MHz)	Line		Neutral	
	Quasi-Peak		Frequency (MHz)	Quasi-Peak
	Reading dB(μV)	Limits dB(μV)		Reading dB(μV)
0.454	31.9	48.0	0.466	22.0
0.474	31.0	48.0	0.718	24.0
				48.0

Table 8 Conducted Disturbance Test Data

Date of Test:	2002.6.28	Temperature:	23 档°C
EUT:	2.4G Wireless Monitor System	Humidity:	61 档%
M/N:	WW2000(Transmitter)	Test Mode:	Channel 4

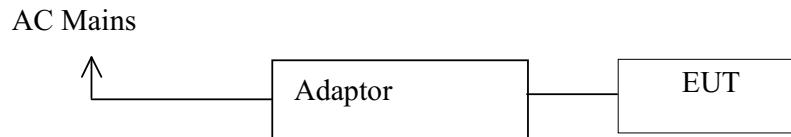
Frequency (MHz)	Line		Neutral	
	Quasi-Peak		Frequency (MHz)	Quasi-Peak
	Reading dB(μV)	Limits dB(μV)		Reading dB(μV)
0.458	31.8	48.0	0.450	23.1
0.478	30.8	48.0	0.726	23.9
				48.0

## 5. RADIATED DISTURBANCE TEST

### 5.1. Block Diagram of Test Setup

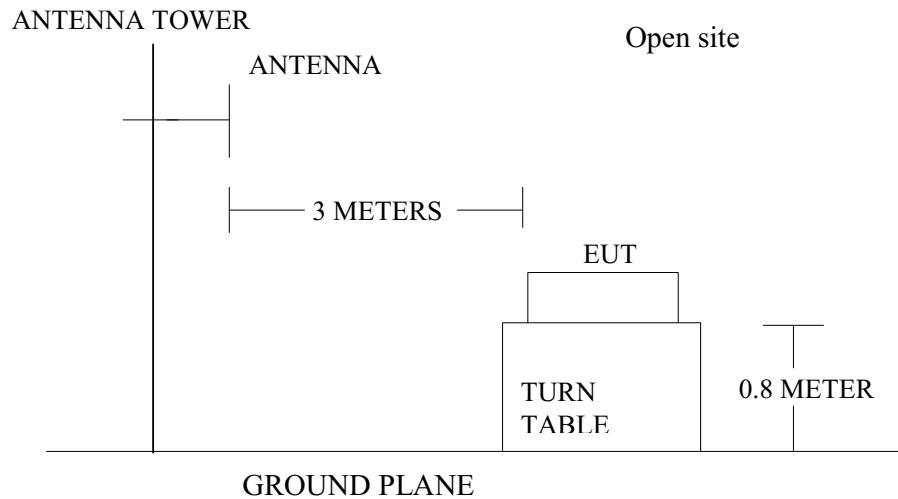
#### 5.1.1. Block Diagram of the EUT

Figure 2 EUT



#### 5.1.2. Test setup of Open Site Test

Figure 3 Test Setup(Open Site)



### 5.2. Test Standard and Limit

#### 5.2.1. Test Standard

FCC Part 15:2001

### 5.2.2. Test Limit

Table 9 Radiated Disturbance Test Limit For Transmitter

FREQUENCY MHz	FIELD STRENGTHS LIMITS dB( $\mu$ V/m)
Fundamental	94.0
Harmonics	54.0
other	
30 ~ 88	44.0
88 ~ 216	44.0
216 ~ 960	46.0
960 ~ 1000	54.0

\* The lower limit shall apply at the transition frequency.

\* The test distance is 3m.

Table 10 Radiated Disturbance Test Limit For Receiver

FREQUENCY MHz	FIELD STRENGTHS LIMITS dB( $\mu$ V/m)
30 ~ 88	40.0
88 ~ 216	43.5
216 ~ 960	46.0
960 ~ 1000	54.0

\* The lower limit shall apply at the transition frequency.

\* The test distance is 3m.

### 5.3. Test Procedure

The measurement is performed at the shielding room, using the setup per ANSI C63.4-2000 test procedure

The EUT is placed on a turntable which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The pretest is processed in semi-anechoic chamber and do the final test in open area test site.

For 30~1000MHz, the detector of test receiver is QP. For 1~24GHz, the detector of the test receiver is AV.

### 5.4. Operating Condition of EUT

5.4.1. Setup the EUT as shown in section 5.1.

5.4.2. Turn on the power.

5.4.3. Let the Transmitter working in each channel.

When the power on the Transmitter can change the video signal from camera and the audio signal from the microphone to RF signal.

### 5.5. Test Data

The emissions don't show in below are too low against the limits, the test curves are shown in the APPENDIX I

Table 11 Radiated Disturbance Test Data

Date of Test	2002.6.29	Temperature	20 档°C
EUT	2.4G Wireless Monitor System	Humidity	58 档%
Model Number	WW2000(Transmitter)	Test Mode	Channel 1

Frequency GHz	Readings(AV) (dB $\mu$ V/m)	Polarization	Limits (dB $\mu$ V/m)
2.420	75.6	Horizontal	94.0
4.840	43.5	Horizontal	54.0
7.260	44.6	Horizontal	54.0
9.680	45.8	Horizontal	54.0
2.420	76.5	Vertical	94.0
4.840	44.3	Vertical	54.0
7.260	48.5	Vertical	54.0
9.680	44.4	Vertical	54.0

Table 12 Radiated Disturbance Test Data

Date of Test 枚 2002.6.29 Temperature 枚 20 枚°C

EUT 枚 2.4G Wireless Monitor Humidity 枚 58 枚%  
System

Model Number 枚 WW2000(Transmitter) Test Mode 枚 Channel 2

Frequency GHz	Readings(AV) (dB $\mu$ V/m)	Polarization	Limits (dB $\mu$ V/m)
2.440	69.2	Horizontal	94.0
4.880	46.4	Horizontal	54.0
7.320	42.7	Horizontal	54.0
9.760	44.7	Horizontal	54.0
2.440	72.4	Vertical	94.0
4.880	49.0	Vertical	54.0
7.320	46.3	Vertical	54.0
9.760	45.1	Vertical	54.0

Table 13 Radiated Disturbance Test Data

Date of Test 枚 2002.6.29 Temperature 枚 20 枚°C

EUT 枚 2.4G Wireless Monitor Humidity 枚 58 枚%  
System

Model Number 枚 WW2000(Transmitter) Test Mode 枚 Channel 3

Frequency GHz	Readings(AV) (dB $\mu$ V/m)	Polarization	Limits (dB $\mu$ V/m)
2.460	63.3	Horizontal	94.0
4.920	47.0	Horizontal	54.0
7.380	43.0	Horizontal	54.0
9.840	41.8	Horizontal	54.0
2.460	68.3	Vertical	94.0
4.920	46.7	Vertical	54.0
7.380	47.3	Vertical	54.0
9.840	41.8	Vertical	54.0

Table 14 Radiated Disturbance Test Data

Date of Test 枚 2002.6.29 Temperature 枚 20 枚°C

EUT 枚 2.4G Wireless Monitor Humidity 枚 58 枚%  
System

Model Number 枚 WW2000(Transmitter) Test Mode 枚 Channel 4

Frequency GHz	Readings(AV) (dB $\mu$ V/m)	Polarization	Limits (dB $\mu$ V/m)
2.480	68.2	Horizontal	94.0
4.960	45.4	Horizontal	54.0
7.440	45.3	Horizontal	54.0
9.920	42.8	Horizontal	54.0
2.480	72.9	Vertical	94.0
4.960	44.3	Vertical	54.0
7.440	47.5	Vertical	54.0
9.920	42.8	Vertical	54.0

## 6. BAND EDGES TESTING

Requirements: FCC 15.249 (c), the emission power at the START and STOP frequencies shall be at least 50 dB below the level of the fundamental or to the general radiated emission limits in FCC 15.209, whichever is the lesser attenuation.

### 6.1 Test Procedure

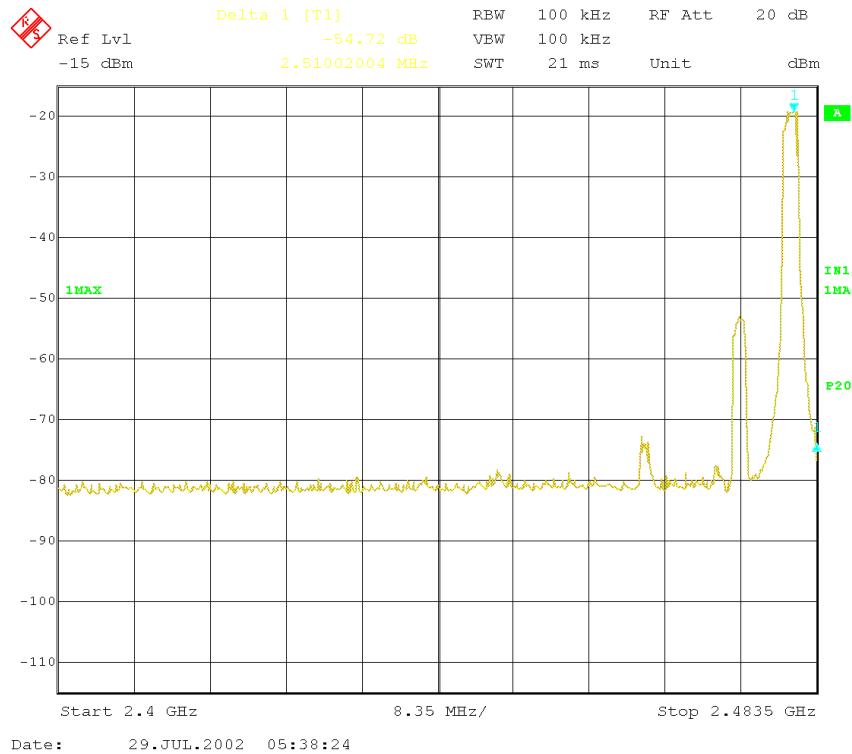
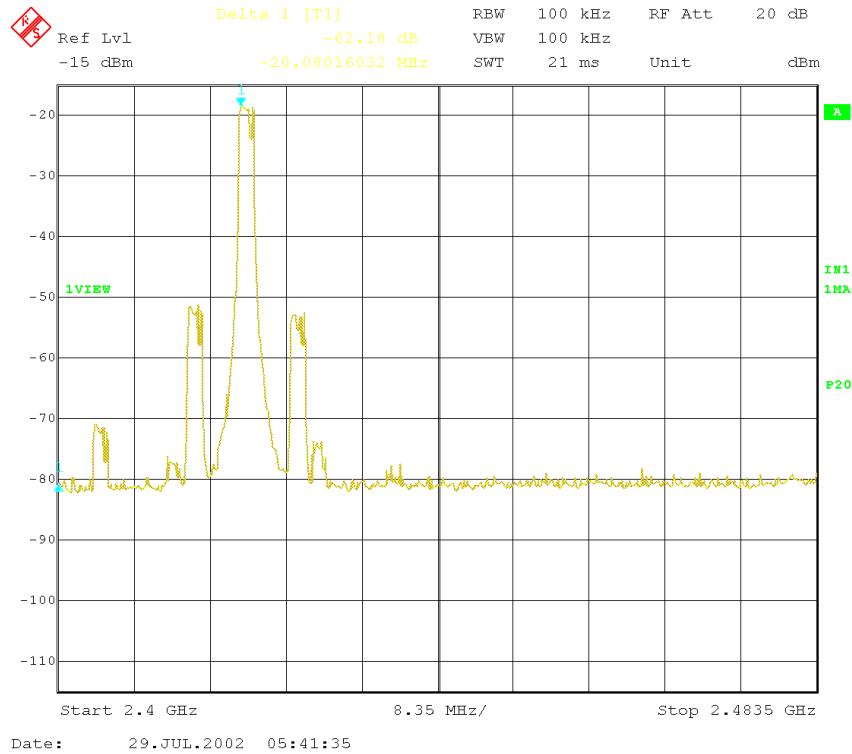
The antenna was removed and a low loss RF cable was connected to the transmitter output. The other end of cable was connected to a spectrum analyzer with the START and STOP frequencies set to the operation band. Transmitter output was read off the spectrum analyzer in dBm. The power output at the transmitter was determined by adding the value of the attenuator to the spectrum analyzer reading. The test was performed for handset and the base respectively.

### 6.2 Test Equipment

RS ESI26 EMI Test Receiver  
HP 930C printer

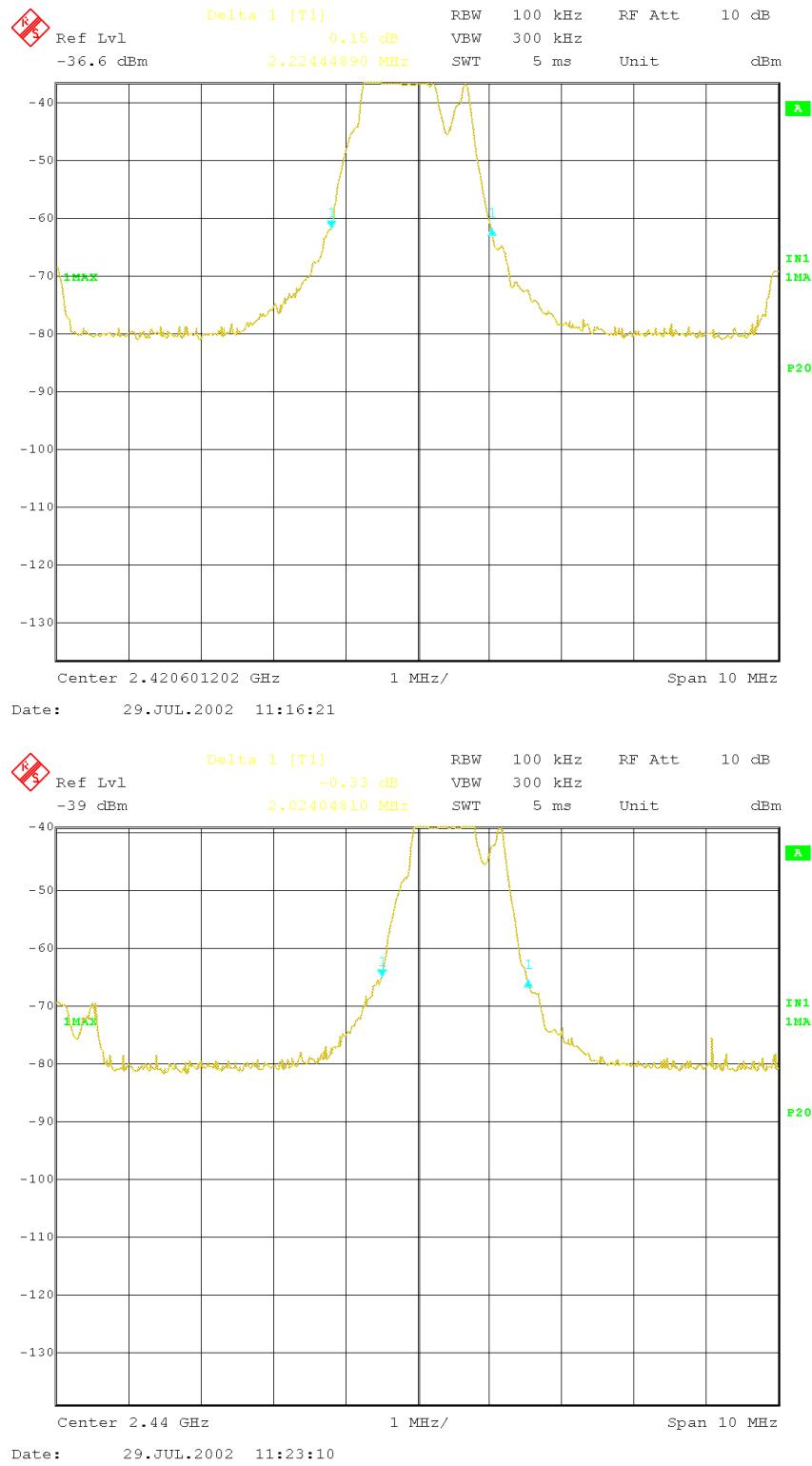
### 6.3 Test Results

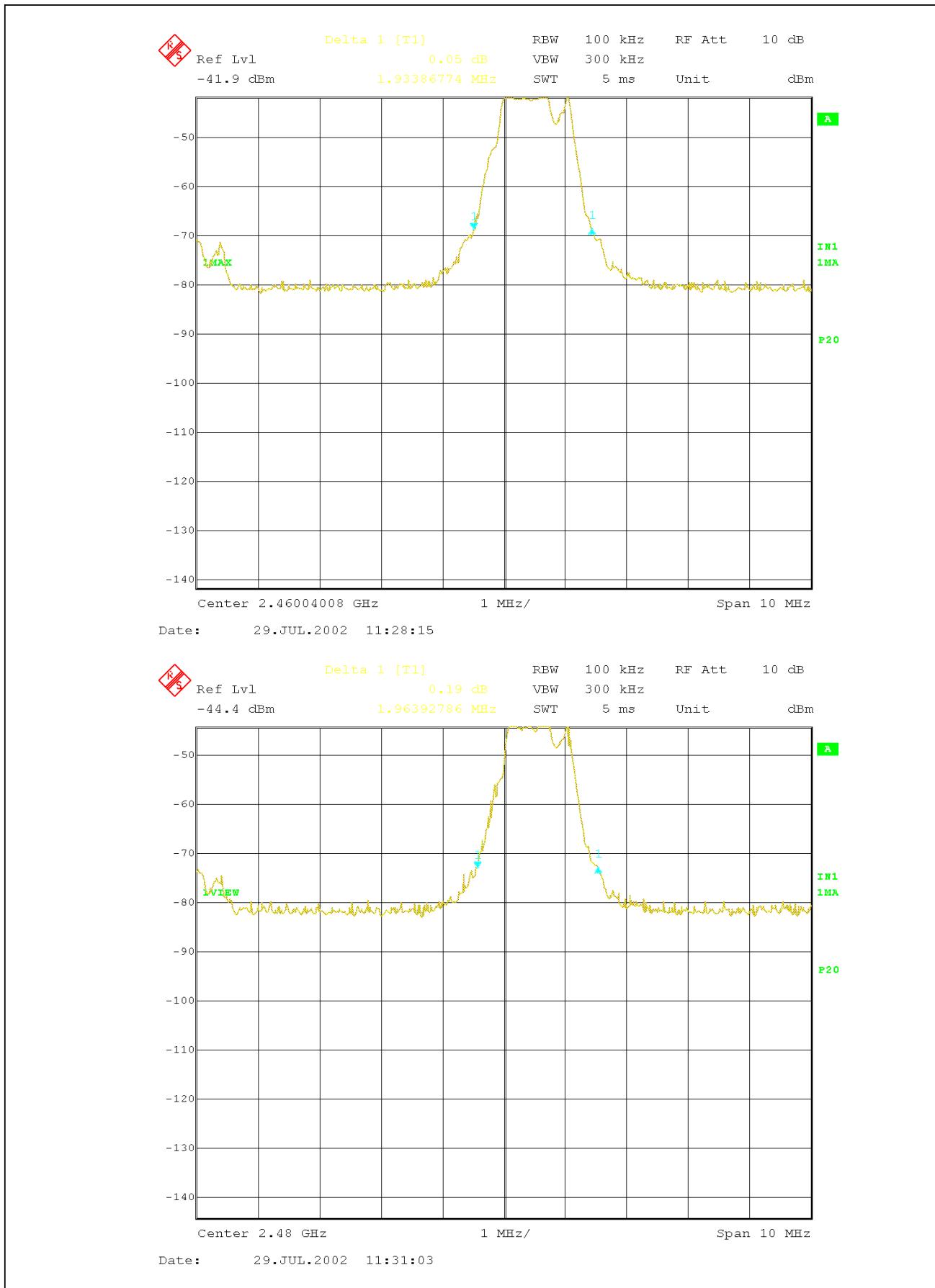
Please refer to the attached plots.



## 7. OCCUPIED BANDWIDTH

Use the ANSI C63.4 to do test the occupied band width. The results is shown in the the attached plots.





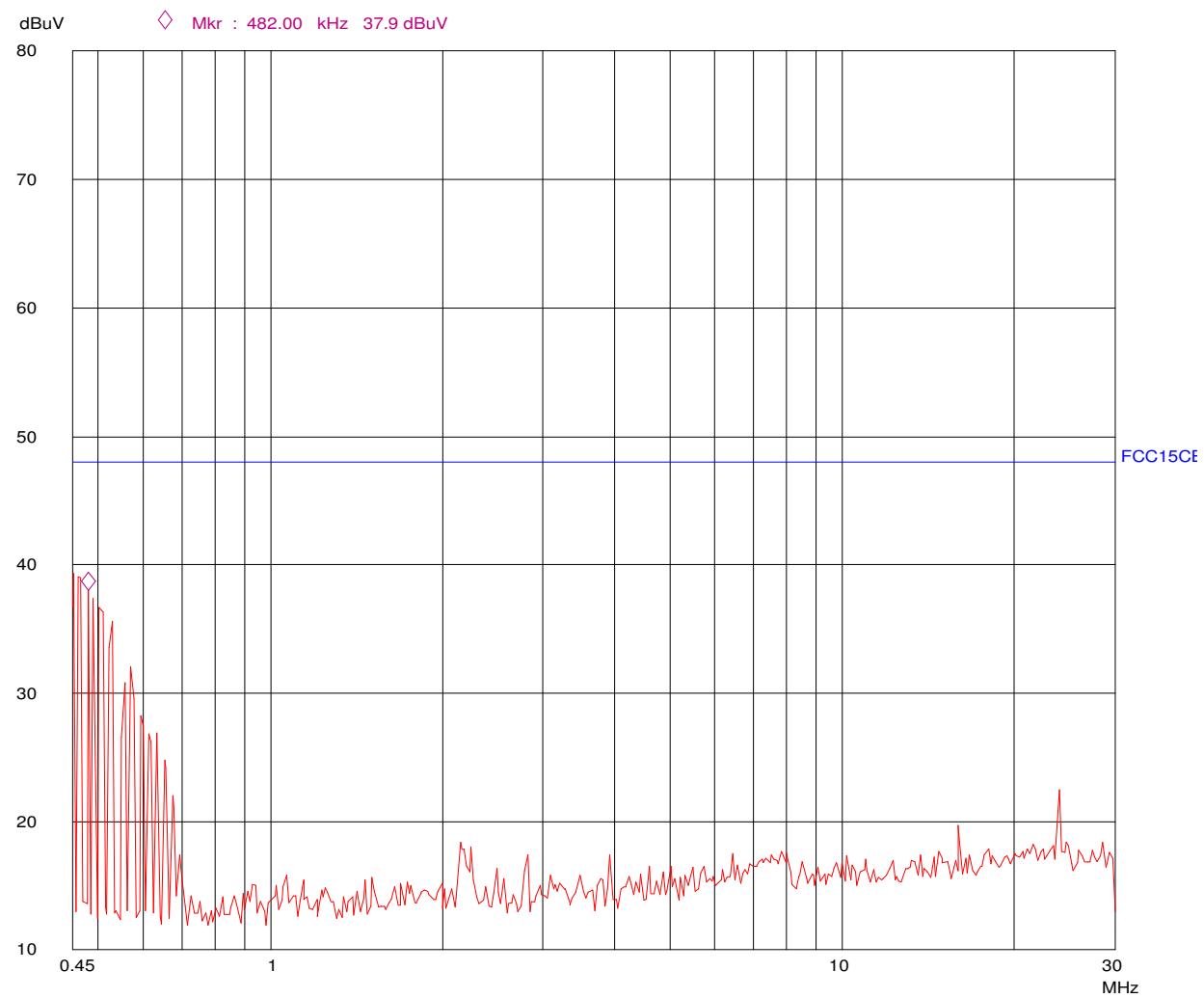
## **8. ANTENNA REQUIREMENTS**

According to 15.203 requirement, the Transmitter( WW2000) is used a fixed and permanent antenna.

# **APPENDIX I**

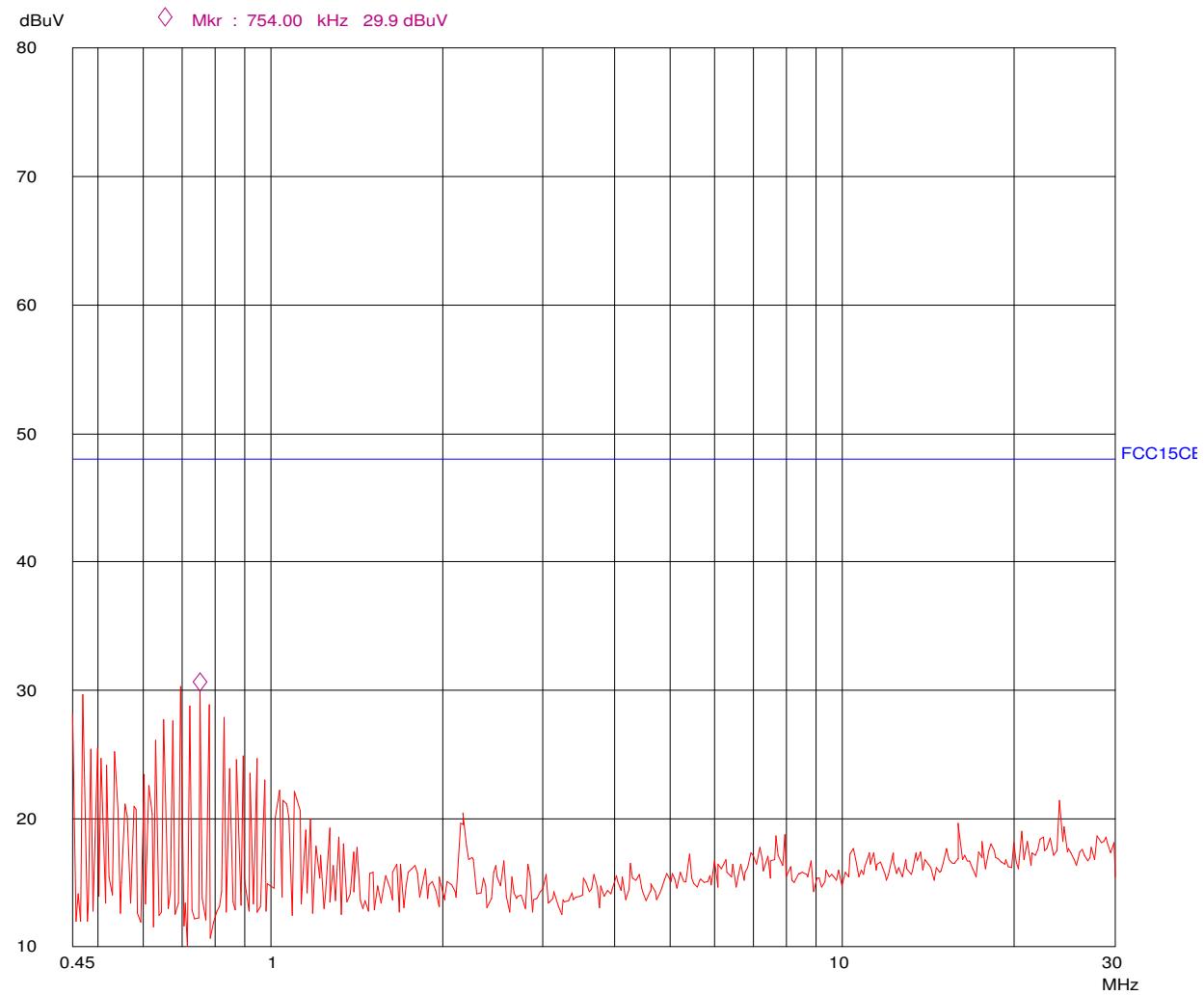
## Conducted Disturbance

EUT: 2.4G Wireless Camera M/N:WW5000  
Manuf: Shenzhen Youjin Electronic Co.Ltd  
Op Cond: ON  
Test Spec: L  
Comment: AC 120V/60Hz  
CH1



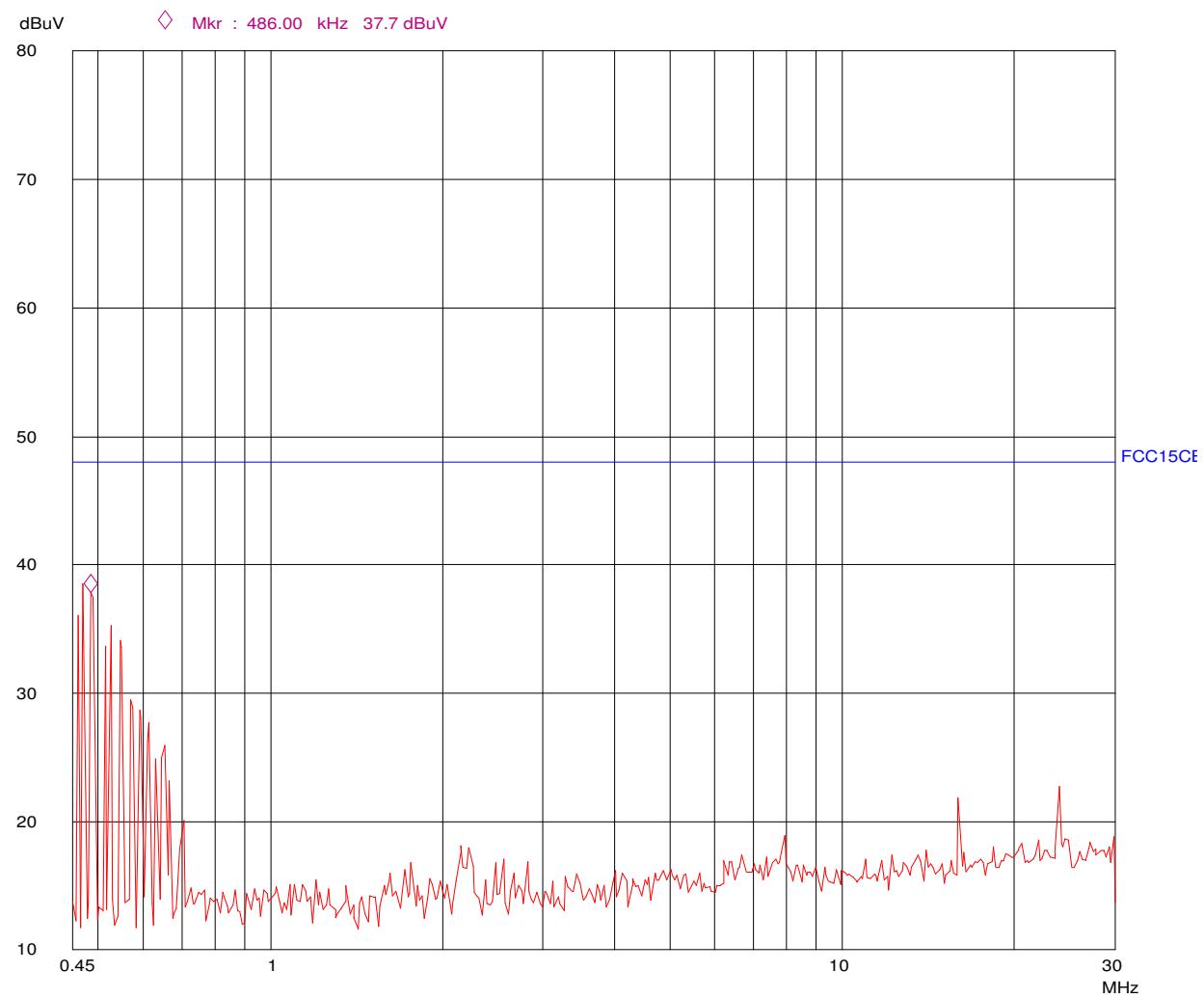
## Conducted Disturbance

EUT: 2.4G Wireless Camera M/N:WW5000  
Manuf: Shenzhen Youjin Electronic Co.Ltd  
Op Cond: ON  
Test Spec: N  
Comment: AC 120V/60Hz  
CH1



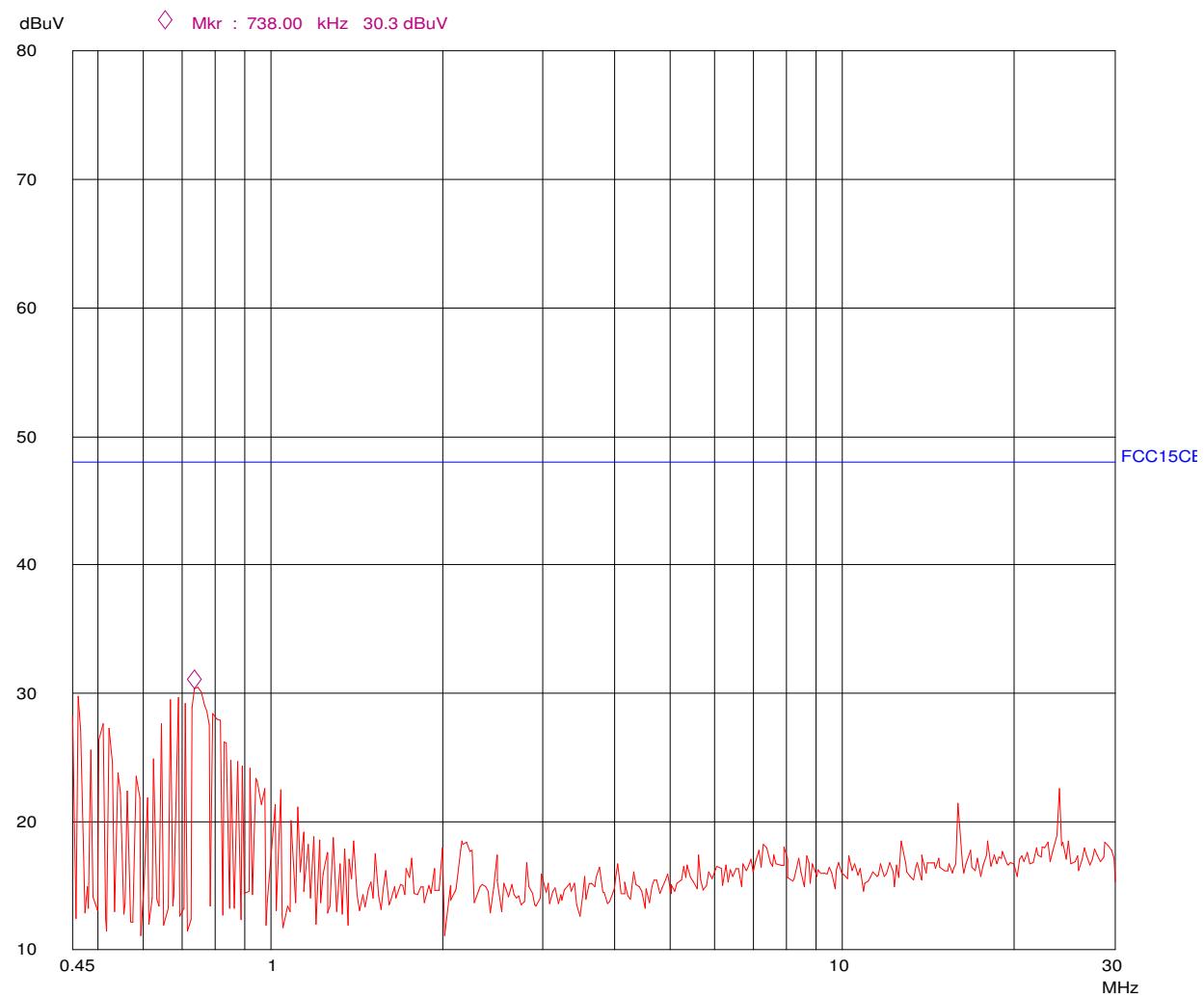
## Conducted Disturbance

EUT: 2.4G Wireless Camera M/N:WW5000  
Manuf: Shenzhen Youjin Electronic Co.Ltd  
Op Cond: ON  
Test Spec: L  
Comment: AC 120V/60Hz  
CH2



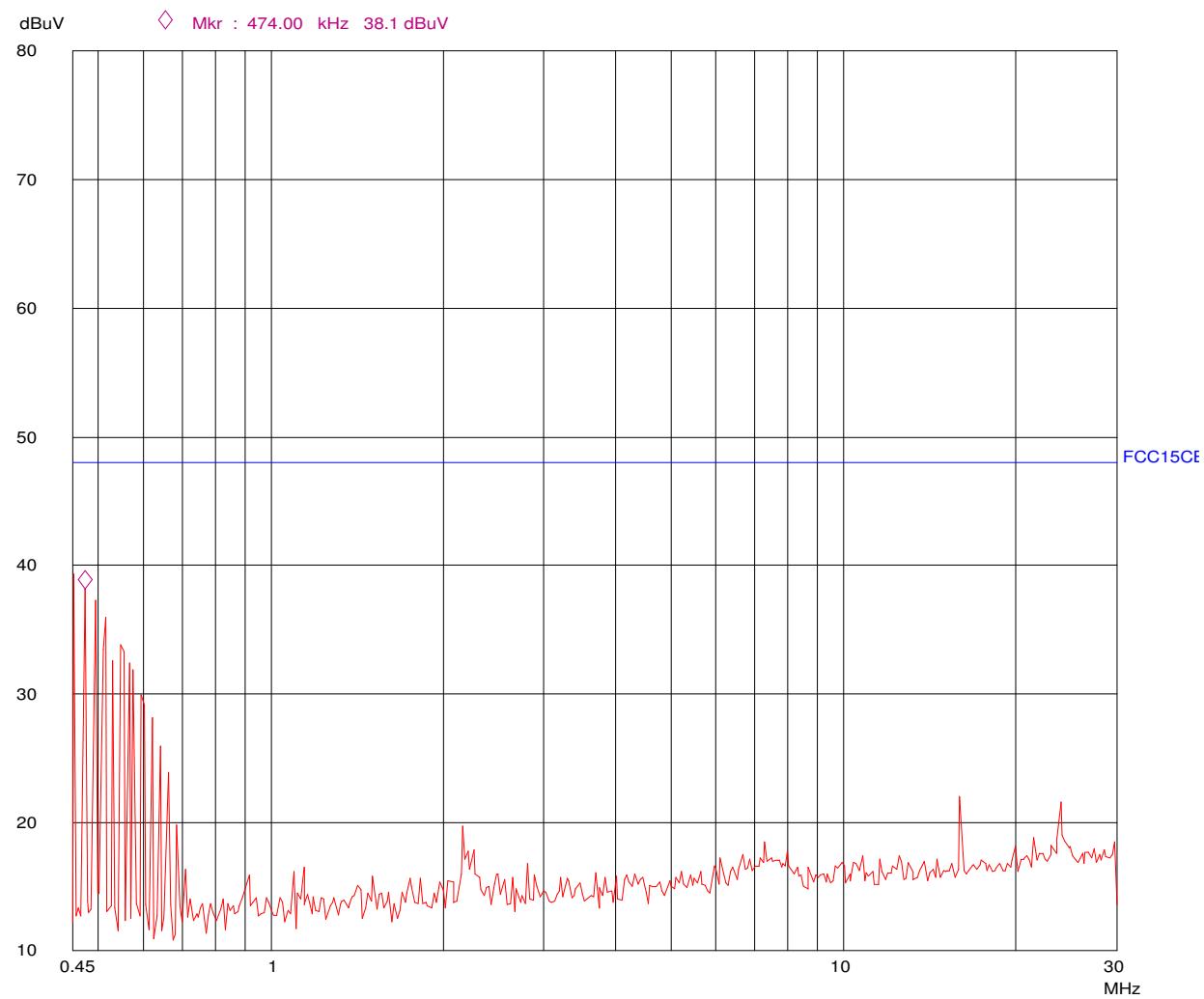
## Conducted Disturbance

EUT: 2.4G Wireless Camera M/N:WW5000  
Manuf: Shenzhen Youjin Electronic Co.Ltd  
Op Cond: ON  
Test Spec: N  
Comment: AC 120V/60Hz  
CH2



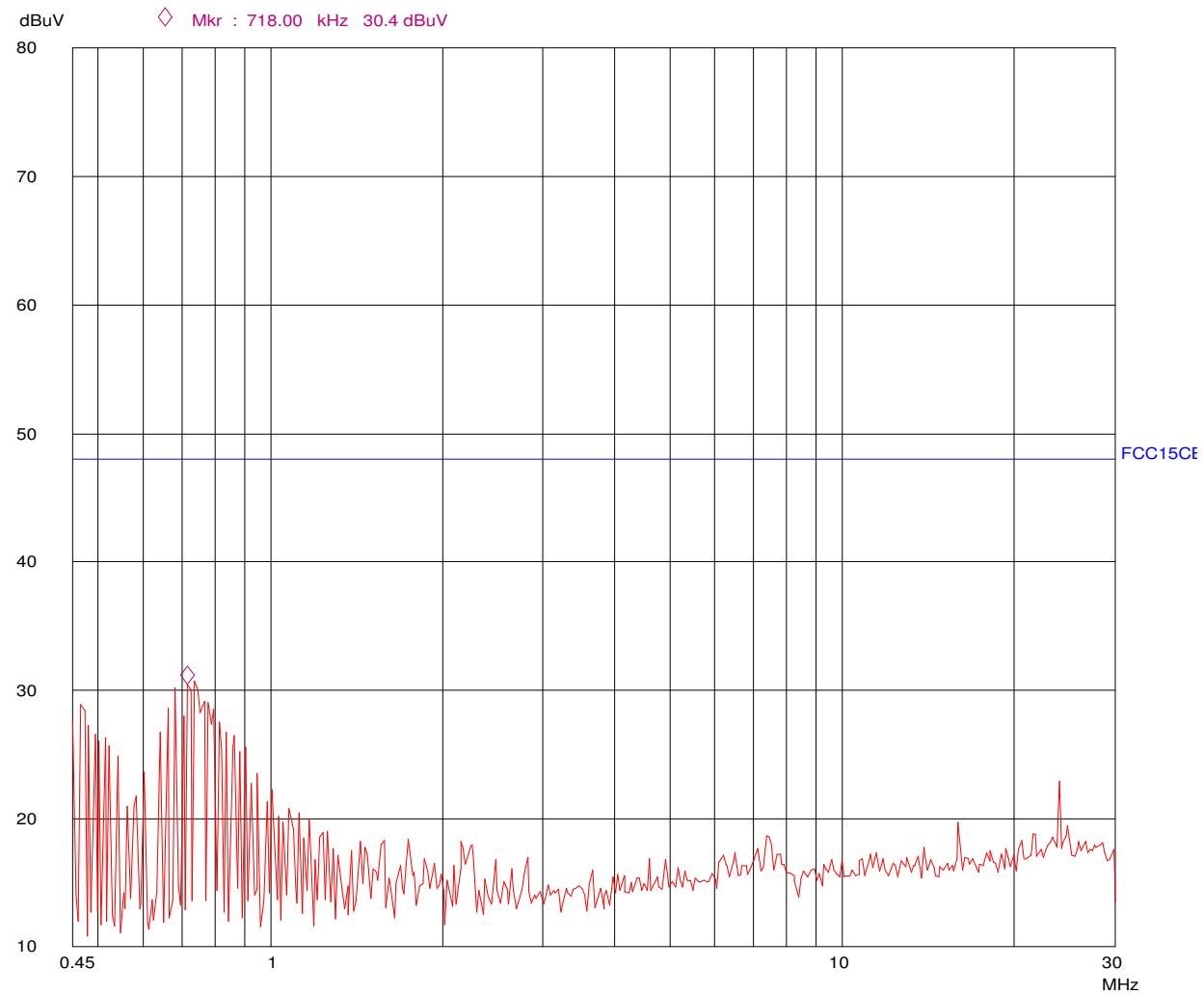
## Conducted Disturbance

EUT: 2.4G Wireless Camera M/N:WW5000  
Manuf: Shenzhen Youjin Electronic Co.Ltd  
Op Cond: ON  
Test Spec: L  
Comment: AC 120V/60Hz  
CH3



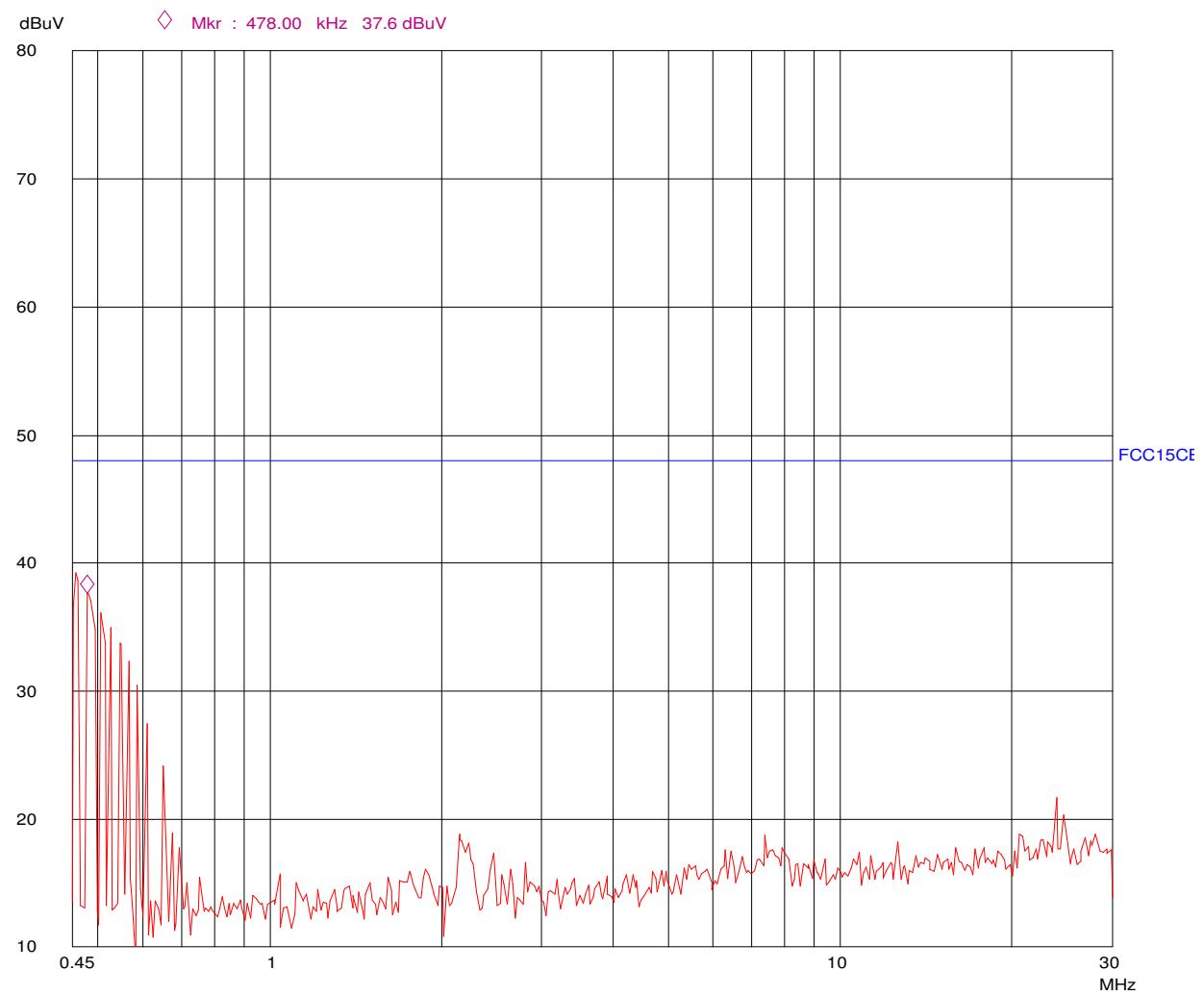
## Conducted Disturbance

EUT: 2.4G Wireless Camera M/N:WW5000  
Manuf: Shenzhen Youjin Electronic Co.Ltd  
Op Cond: ON  
Test Spec: N  
Comment: AC 120V/60Hz  
CH3



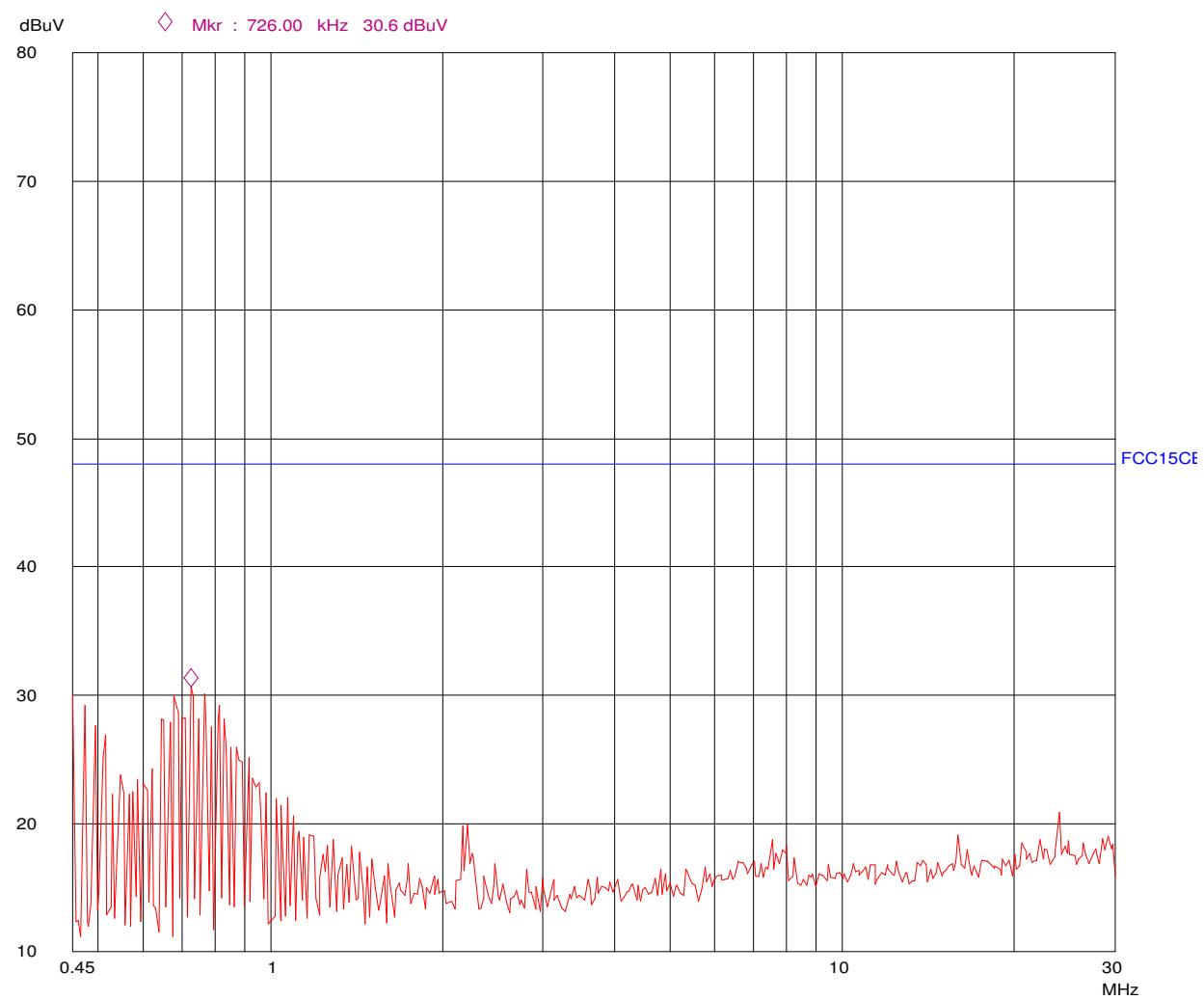
## Conducted Disturbance

EUT: 2.4G Wireless Camera M/N:WW5000  
Manuf: Shenzhen Youjin Electronic Co.Ltd  
Op Cond: ON  
Test Spec: L  
Comment: AC 120V/60Hz  
CH4



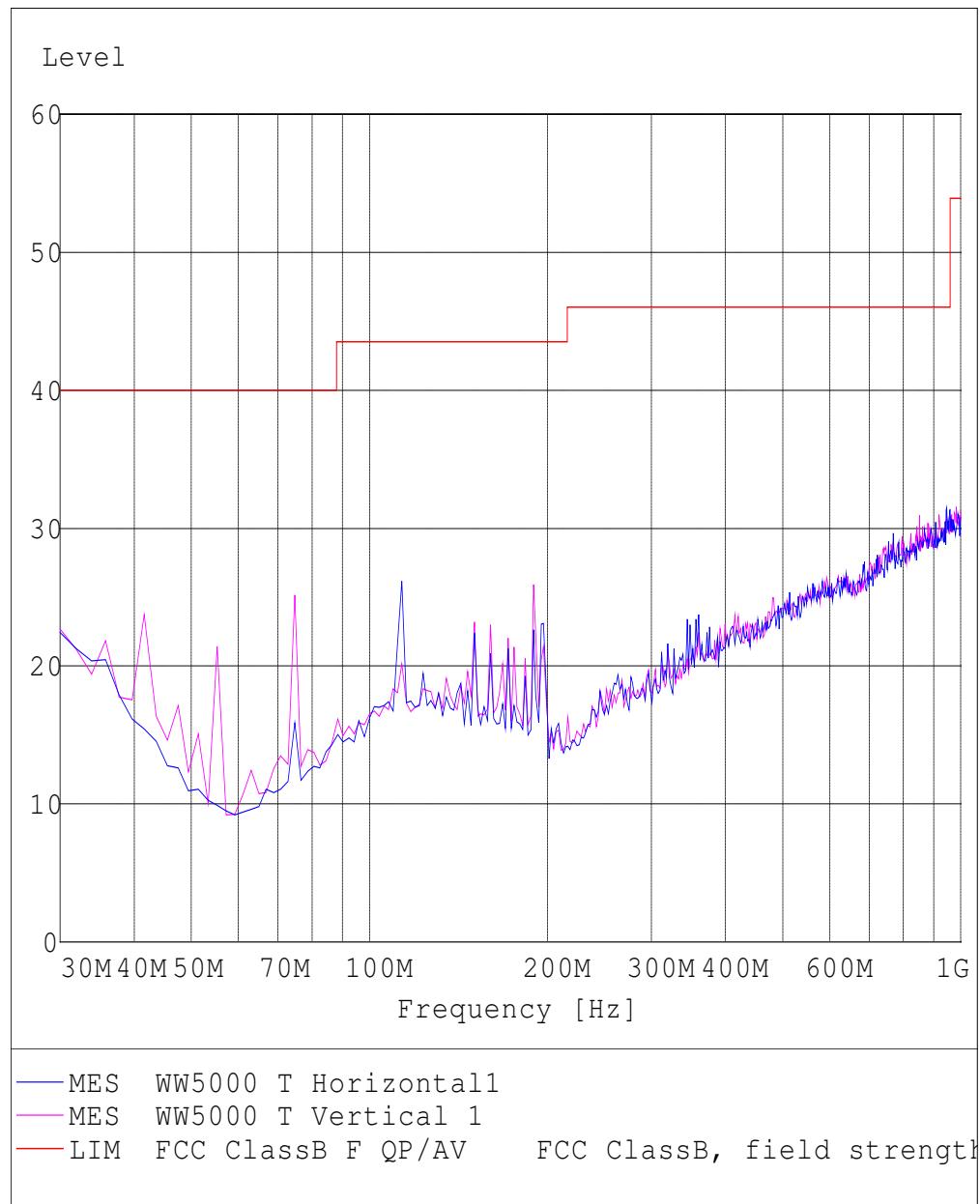
## Conducted Disturbance

EUT: 2.4G Wireless Camera M/N:WW5000  
Manuf: Shenzhen Youjin Electronic Co.Ltd  
Op Cond: ON  
Test Spec: N  
Comment: AC 120V/60Hz  
CH4



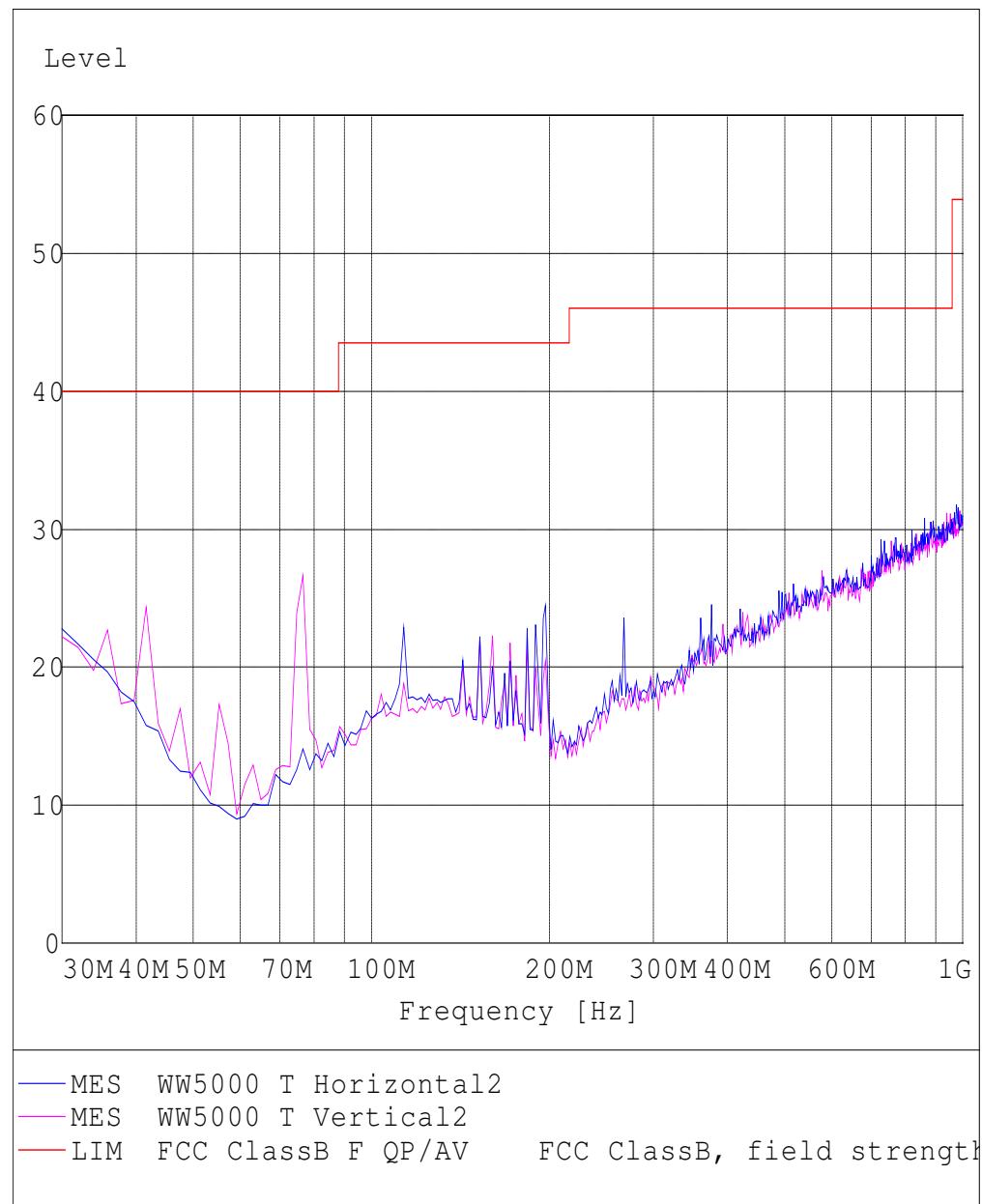
**Radiated Disturbance**  
**FCC 15 Class B**

**EUT:** 2.4G Wireless Monitor System M/N:WW5000  
**Manufacturer:** Youjin  
**Operating Condition:** Transmitter CH1  
**Test Site:** SMQ EMC Lab.SAC  
**Test Specification:** Vertical & Horizontal  
**Comment:** AC 120V/60Hz



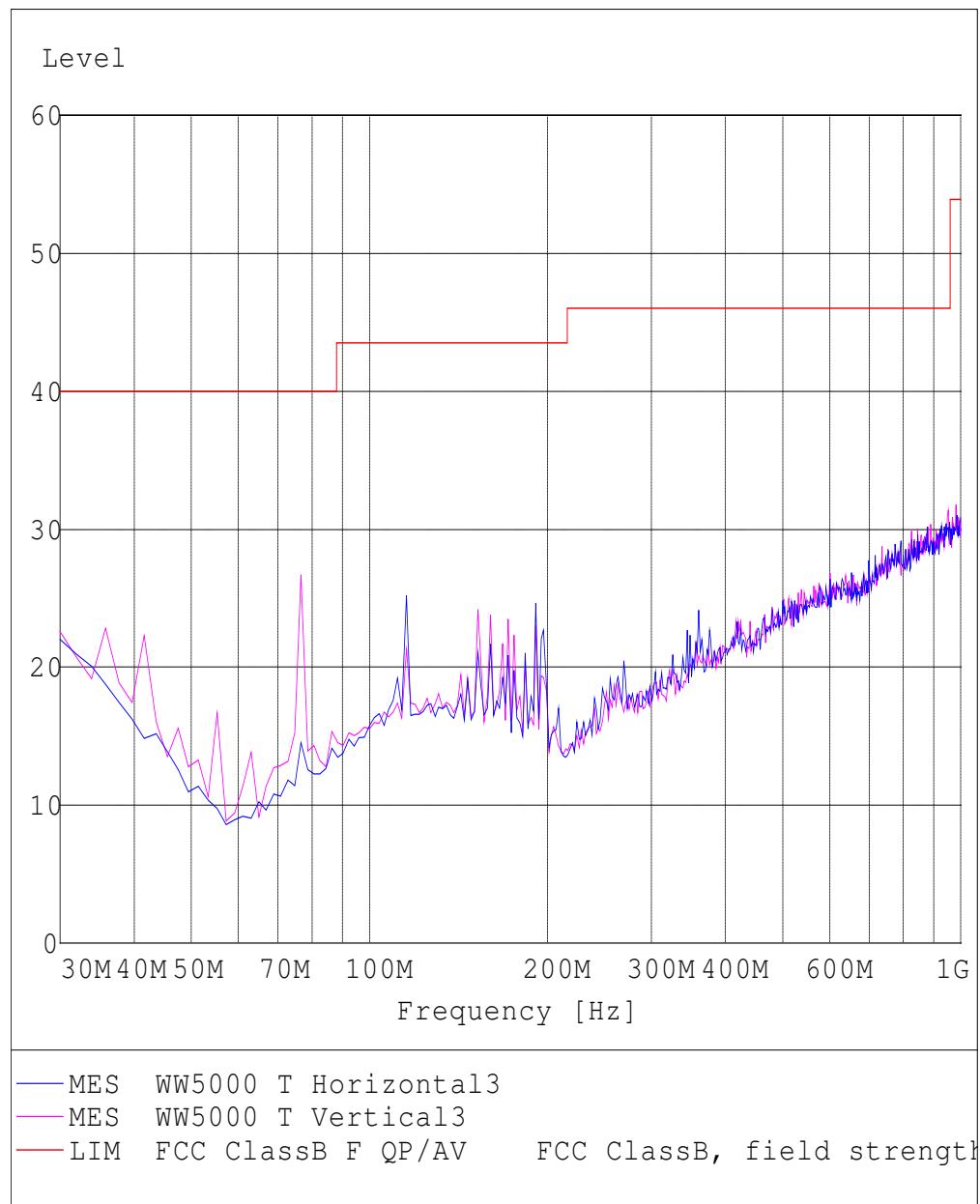
**Radiated Disturbance**  
**FCC 15 Class B**

**EUT:** 2.4G Wireless Monitor System M/N:WW5000  
**Manufacturer:** Youjin  
**Operating Condition:** Transmitter CH2  
**Test Site:** SMQ EMC Lab.SAC  
**Test Specification:** Vertical & Horizontal  
**Comment:** AC 120V/60Hz



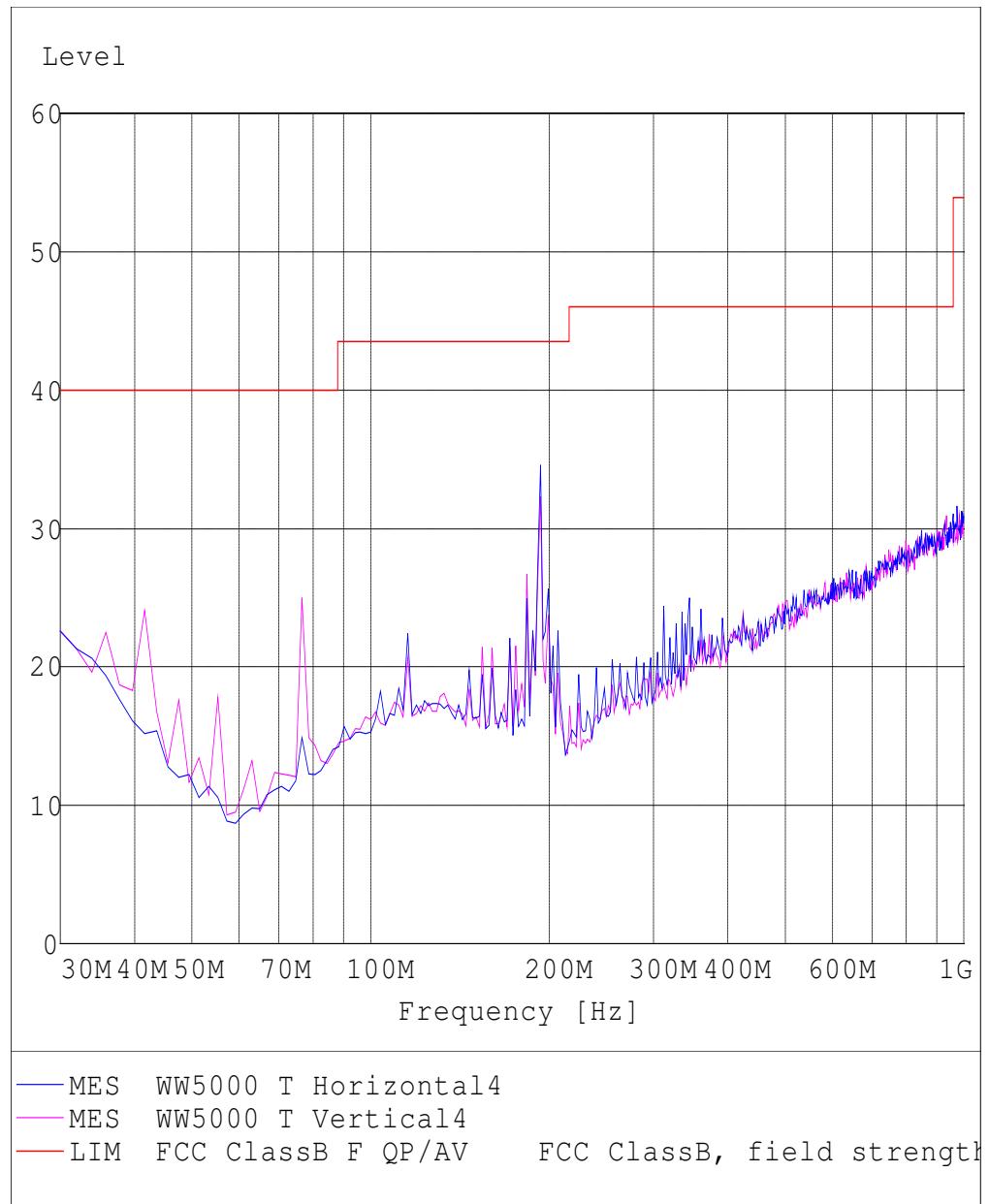
***Radiated Disturbance***  
**FCC 15 Class B**

**EUT:** 2.4G Wireless Monitor System M/N:WW5000  
**Manufacturer:** Youjin  
**Operating Condition:** Transmitter CH3  
**Test Site:** SMQ EMC Lab.SAC  
**Test Specification:** Vertical & Horizontal  
**Comment:** AC 120V/60Hz



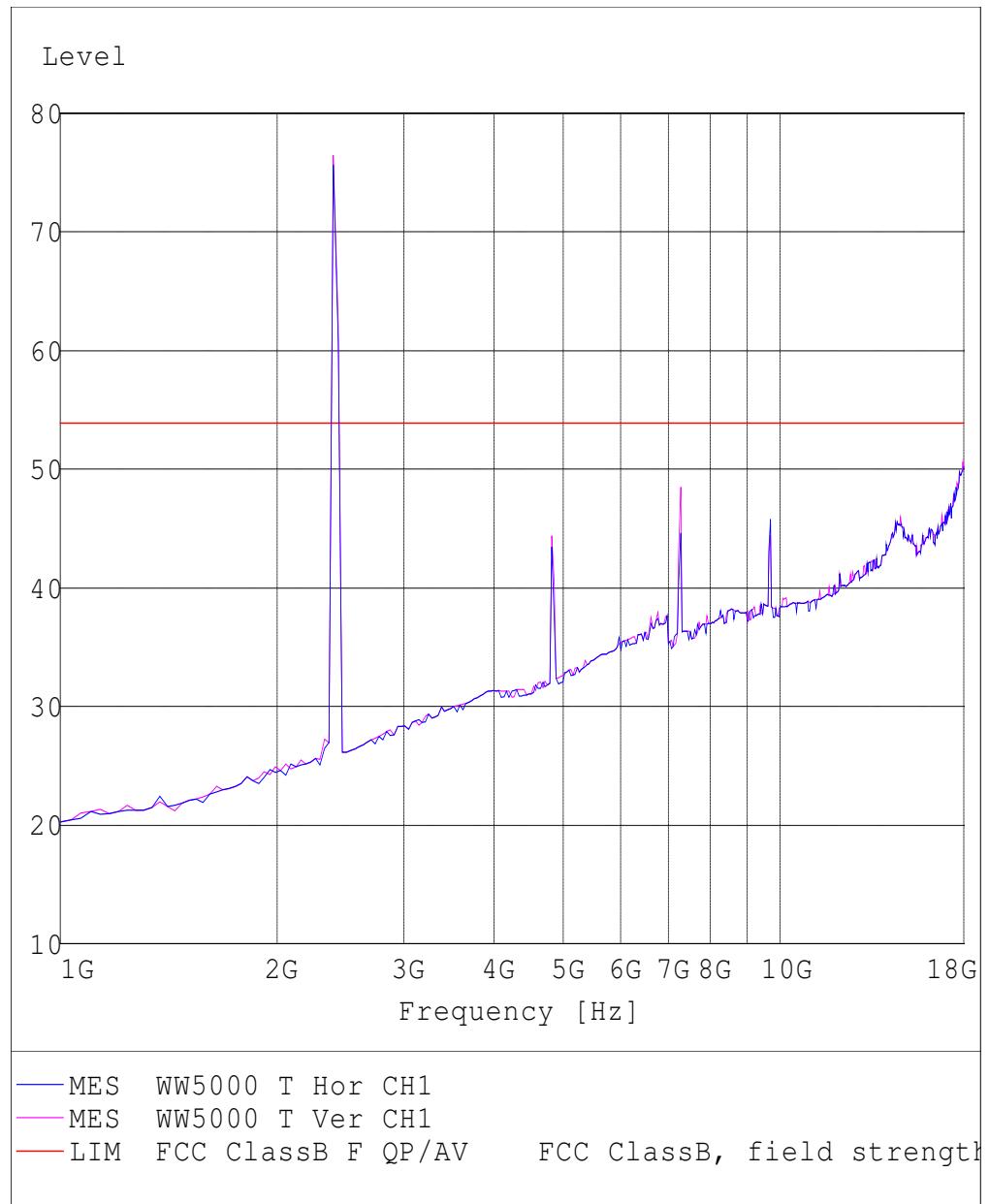
**FCC 15 Class B**

**EUT:** 2.4G Wireless Monitor System M/N:WW5000  
**Manufacturer:** Youjin  
**Operating Condition:** Transmitter CH4  
**Test Site:** SMQ EMC Lab.SAC  
**Test Specification:** Vertical & Horizontal  
**Comment:** AC 120V/60Hz



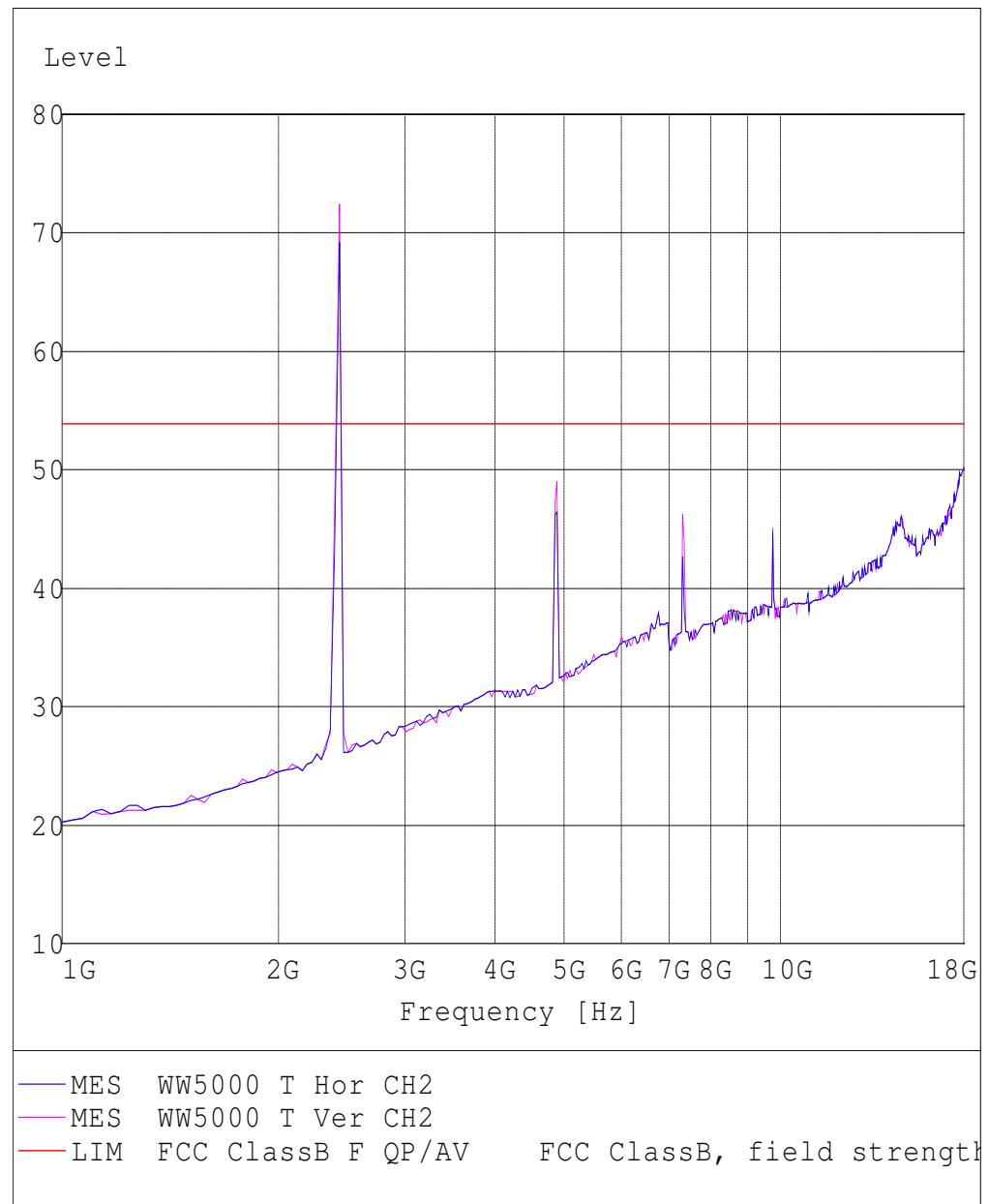
**FCC 15 Class B**

**EUT:** 2.4G Wireless Monitor System M/N:WW5000  
**Manufacturer:** Youjin  
**Operating Condition:** Transmitter CH1  
**Test Site:** SMQ EMC Lab.SAC  
**Test Specification:** Vertical & Horizontal  
**Comment:** AC 120V/60Hz



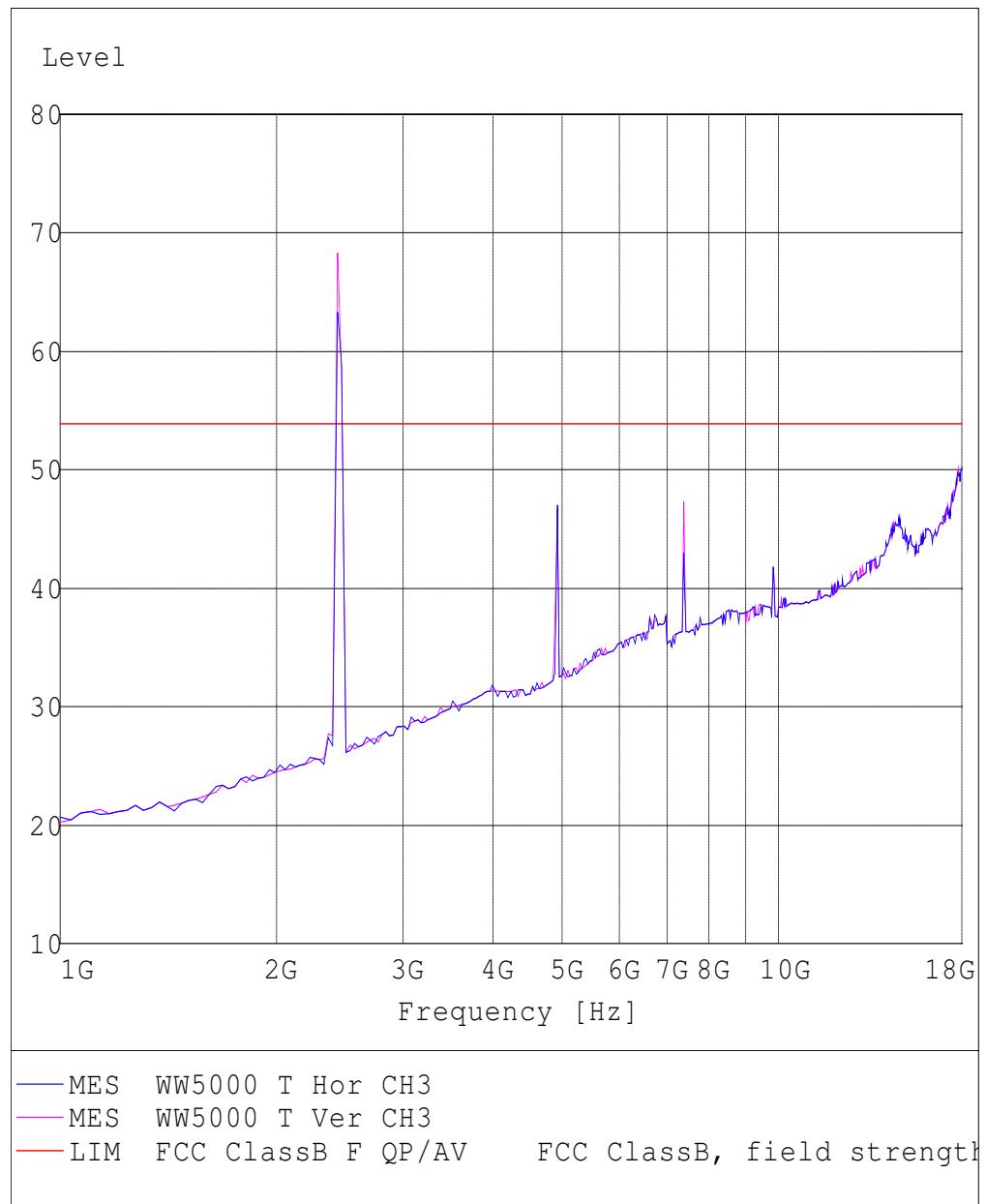
**Radiated Disturbance**  
**FCC 15 Class B**

**EUT:** 2.4G Wireless Monitor System M/N:WW5000  
**Manufacturer:** Youjin  
**Operating Condition:** Transmitter CH2  
**Test Site:** SMQ EMC Lab.SAC  
**Test Specification:** Vertical & Horizontal  
**Comment:** AC 120V/60Hz



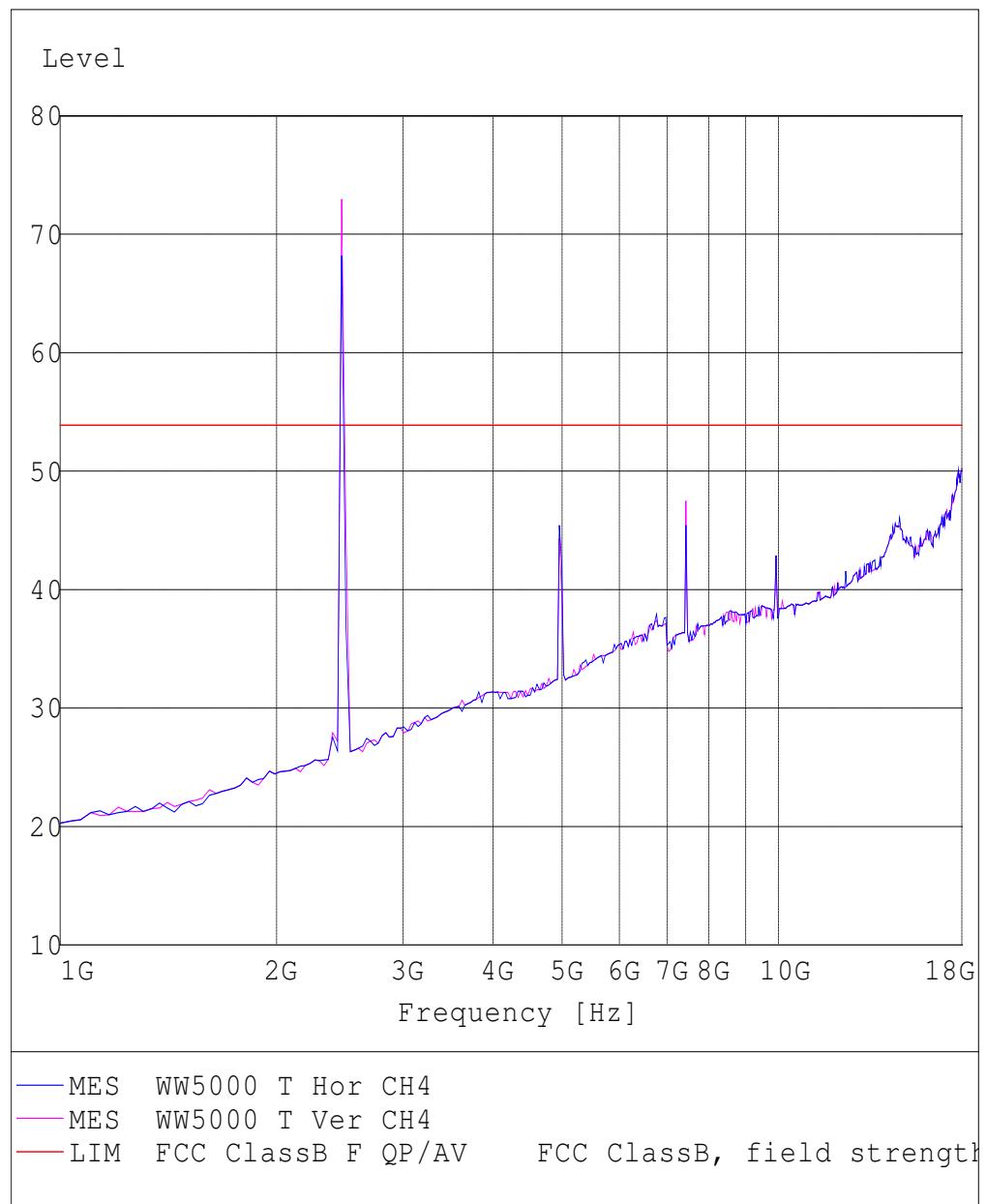
**Radiated Disturbance**  
**FCC 15 Class B**

**EUT:** 2.4G Wireless Monitor System M/N:WW5000  
**Manufacturer:** Youjin  
**Operating Condition:** Transmitter CH3  
**Test Site:** SMQ EMC Lab.SAC  
**Test Specification:** Vertical & Horizontal  
**Comment:** AC 120V/60Hz



**Radiated Disturbance**  
**FCC 15 Class B**

**EUT:** 2.4G Wireless Monitor System M/N:WW5000  
**Manufacturer:** Youjin  
**Operating Condition:** Transmitter CH4  
**Test Site:** SMQ EMC Lab.SAC  
**Test Specification:** Vertical & Horizontal  
**Comment:** AC 120V/60Hz



## Appendix II

Photo 1 Test Setup for Conducted Disturbance Test(Transmitter Front View)



Photo2 Test Setup for Conducted Disturbance Test(Transmitter Rear View)



Photo3 Test Setup for Radiated Disturbance Test(Transmitter Front View)

