## FCC CERTIFICATION On Behalf of Sun Hei Electronic Co., Ltd.

FM Wireless Transmitter Model No.: 7674

FCC ID: VAC7674FM

Prepared for : Sun Hei Electronic Co., Ltd.

Address : The third Industry District, Xiaobian, Changan Town

Dongguan City, Guangdong, China

Prepared by : Accurate Technology Co., Ltd.

Address : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.

Science & Industry Park, Nanshan, Shenzhen, Guangdong

P.R. China

Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number : ATE20070940
Date of Test : April 25, 2007
Date of Report : April 27, 2007

#### **TABLE OF CONTENTS**

Descr	ription	Page
Test I	Report Certification	
1. G	GENERAL INFORMATION	4
1.1.		
1.2.	1 ' '	
1.3.	<u>.</u>	
2. N	MEASURING DEVICE AND TEST EQUIPMENT	5
	RADIATED EMISSION FOR FCC PART 15 SECTION 15.239(C)	
3.1.	Block Diagram of Test Setup.	6
3.2.	The Emission Limit for section 15.239(c)	6
3.3.		
3.4.		
3.5.		
3.6.	6	
4. F	<b>FUNDAMENTAL RADIATED EMISSION FOR FCC PART 15 SECTION 15.2</b>	239(B)11
4.1.	Block Diagram of Test Setup	11
4.2.		
4.3.	$\boldsymbol{\mathcal{E}}$	
4.4.	- I	
4.5.		
4.6.		
<b>5.</b> O	OCCUPIED BANDWIDTH FOR FCC PART 15 SECTION 15.239(A)	
5.1.	The Requirement For Section 15.239(a)	16
5.2.		
5.3.	- r - · · · · · · · · · · · · · · · · ·	
5.4.		
5.5.	Test Result	17
6. T	TUNING RANGE	
6.1.	The Requirement For Section 15.239	18
6.2.	EUT Configuration on Measurement	
6.3.	- r · · · · · · · · · · · · · · · · · ·	
6.4.		
6.5.		19
Α	APPENDIX I ( TEST CURVES) (9pages)	

#### **Test Report Certification**

Applicant
 Sun Hei Electronic Co., Ltd.
 Manufacturer
 Sun Hei Electronic Co., Ltd.
 EUT Description
 FM Wireless Transmitter

(A) MODEL NO.: 7674(B) SERIAL NO.: N/A

(C) POWER SUPPLY: DC 3.0V (AAA Battery  $\times$ 2)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.239: 2006& ANSI 63.4: 2003

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section15.239 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test:	April 25, 2007	
Prepared by :	sky Long	
	(Engineer)	
Reviewer:	Seem =	
	(Quality Manager)	
Approved & Authorized Signer:	Martinh	
	(Manager)	

#### 1. GENERAL INFORMATION

#### 1.1.Description of Device (EUT)

**EUT** : FM Wireless Transmitter

Model Number : 7674

Power Supply : DC 3.0V (AAA Battery  $\times 2$ )

Operate Frequency : 88.1M-107.9MHz
Channel : Interval 0.1MHz
iPod : Manufacturer: Apple

M/N: A1136

S/N: JO543GF9SZA

Applicant : Sun Hei Electronic Co., Ltd.

Address : The third Industry District, Xiaobian, Changan Town

Dongguan City, Guangdong, China

Manufacturer : Sun Hei Electronic Co., Ltd.

Address : The third Industry District, Xiaobian, Changan Town

Dongguan City, Guangdong, China

Date of sample received: April 05, 2007 Date of Test: April 25, 2007

#### 1.2.Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen, May 10, 2004

Accredited by FCC, May 10, 2004

The Certificate Registration Number is 253065

Accredited by Industry Canada, May 18, 2004 The Certificate Registration Number is IC 5077

Name of Firm : ACCURATE TECHNOLOGY CO. LTD

Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.

Science & Industry Park, Nanshan, Shenzhen, Guangdong

P.R. China

#### 1.3. Measurement Uncertainty

Conducted emission expanded uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty = 4.12dB, k=2

#### 2. MEASURING DEVICE AND TEST EQUIPMENT

**Table 1: List of Test and Measurement Equipment** 

Kind of equipment	Manufacturer	Туре	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	03.31.2008
EMI Test Receiver	Rohde&Schwarz	ESI26	838786/013	01.24.2008
Bilog Antenna	Schwarzbeck	VULB9163	9163-194	03.31.2008
Bilog Antenna	Chase	CBL6112B	2591	03.31.2008
Horn Antenna	Rohde&Schwarz	HF906	100013	01.24.2008
Spectrum Analyzer	Anritsu	MS2651B	6200238856	03.31.2008
Pre-Amplifier	Agilent	8447D	2944A10619	03.31.2008

#### 3. RADIATED EMISSION FOR FCC PART 15 SECTION 15.239(C)

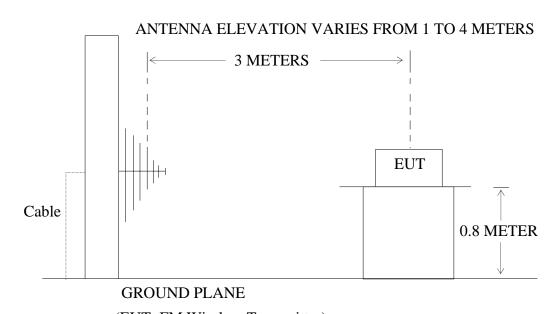
#### 3.1.Block Diagram of Test Setup

3.1.1.Block diagram of connection between the EUT and simulators



(EUT: FM Wireless Transmitter)

3.1.2. Anechoic Chamber Test Setup Diagram



(EUT: FM Wireless Transmitter)

#### 3.2. The Emission Limit for section 15.239(c)

3.2.1 The field strength of any emissions radiated on any frequency outside of the specified 200kHz band shall not exceed the general radiated emission limits in section 15.209

Radiation Emission Measurement Limits According to Section 15.209

1								
	Limit,							
Frequency (MHz)	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dBµV/m)	The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is					
30 - 88	100	40	performed with					
88 - 216	150	43.5	Average detector. Except those frequency bands					

216 - 960	200	46	mention above, the final measurement for
Above 960	500	54	frequencies below 1000MHz is performed with Quasi Peak detector.

#### 3.3.Configuration of EUT 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.

#### 3.3.1.FM Wireless Transmitter (EUT)

Model Number : 7674 Serial Number : N/A

Manufacturer : Sun Hei Electronic Co., Ltd.

#### 3.4. Operating Condition of EUT

3.4.1. Setup the EUT and simulator as shown as Section 3.1.

#### 3.4.2. Turn on the power of all equipment.

Let the EUT work in TX modes [Plug EUT audio input to iPod headphone dock and iPod playing typical audio signal(music song) with maximum audio level] measure it. The transmit frequency are 88.1-107.9MHz.We are select 88.1M, 98.1M, 107.9MHz TX frequency to transmitted.

Note: The EUT is connected to iPod by the base interface of iPod. The input signal of EUT is controlled by iPod. so the volume control of iPod was set to maximum during the test. It means that the test was performed with the maximum audio input.

#### 3.5.Test Procedure

The 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 an 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 bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver (R&S ESCS30) is set at 120KHz in 30-1000MHz; Set at 1MHz in above 1000MHz. The frequency range from 30MHz to 1100MHz is checked. The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

## 3.6. The Field Strength of Radiation Emission Measurement Results **PASS.**

The frequency range 30MHz to 1000MHz is investigated.

Date of Test:April 25, 2007Temperature:25°CEUT:FM Wireless TransmitterHumidity:53%Model No.:7674Power Supply:DC 3.0V (AAA Battery ×2)Test Mode:TX 88.1MHzTest Engineer:Andy

Polarization	Frequency (MHz)	Reading(dBµV/m) QP	Factor Corr.( dB)	` '	Limits(dBµV/m) QP	Margin(dBμV/m) QP
Horizontal	176.201	32.6	8.0	40.6	43.5	2.9
Horizontal	264.303	21.4	11.0	32.4	46.0	13.6
Horizontal	352.401	13.6	14.0	27.6	46.0	18.4
Horizontal	440.502	13.7	15.9	29.6	46.0	16.4
Vertical	176.201	27.4	8.4	35.8	43.5	7.7
Vertical	264.302	19.2	9.9	29.1	46.0	16.9
Vertical	352.402	8.3	14.0	22.3	46.0	23.7

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Date of Test: April 25, 2007 Temperature: 25°C

EUT: FM Wireless Transmitter Humidity: 53%

Model No.: 7674 Power Supply: DC 3.0V (AAA Battery × 2)

Test Mode: TX 98.1MHz Test Engineer: Andy

Polarization	Frequency (MHz)	Reading(dBµV/m) QP	Factor Corr.( dB)	Result(dBµV/m)  QP	Limits(dBµV/m) QP	Margin(dBμV/m) QP
Horizontal	196.202	30.0	9.6	39.6	43.5	3.9
Horizontal	294.303	23.8	12.4	36.2	46.0	9.8
Horizontal	392.401	15.0	14.9	29.9	46.0	16.1
Vertical	196.202	25.1	9.0	34.1	43.5	9.4
Vertical	294.301	15.6	12.1	27.7	46.0	18.3
Vertical	392.402	12.7	15.2	27.9	46.0	18.1

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Date of Test: April 25, 2007 Temperature: 25°C

EUT: FM Wireless Transmitter Humidity: 53%

Model No.: 7674 Power Supply: DC 3.0V (AAA Battery × 2)

Test Mode: TX 107.9MHz Test Engineer: Andy

Polarization	Frequency (MHz)	Reading(dBµV/m)  QP	Factor Corr.( dB)		Limits(dBµV/m) QP	Margin(dBμV/m) QP
Horizontal	215.801	29.5	9.6	39.1	43.5	4.4
Horizontal	323.702	21.0	13.2	34.2	46.0	11.8
Horizontal	431.603	16.0	15.7	31.7	46.0	14.3
Vertical	215.801	28.7	8.9	37.6	43.5	5.9
Vertical	323.702	14.4	13.1	27.5	46.0	18.5
Vertical	431.602	10.6	16.2	26.8	46.0	19.2

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain

Reviewer: Seam C

### 4. FUNDAMENTAL RADIATED EMISSION FOR FCC PART 15 SECTION 15.239(B)

#### 4.1.Block Diagram of Test Setup

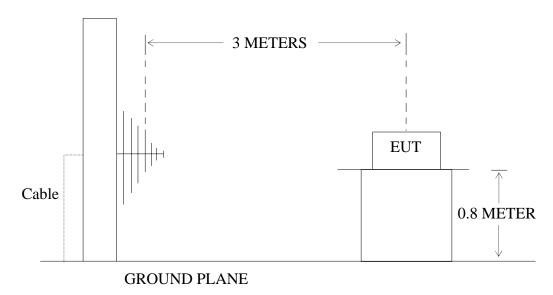
4.1.1.Block diagram of connection between the EUT and simulators



(EUT: FM Wireless Transmitter)

4.1.2. Anechoic Chamber Test Setup Diagram

#### ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



(EUT: FM Wireless Transmitter)

#### 4.2. The Emission Limit For Section 15.239(b)

4.2.1 The field strength of any emission within the permitted 200kHz band shall not exceed 250microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

#### 4.3.EUT Configuration on Measurement

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

#### 4.3.1.FM Wireless Transmitter (EUT)

Model Number : 7674 Serial Number : N/A

Manufacturer : Sun Hei Electronic Co., Ltd.

#### 4.4. Operating Condition of EUT

4.4.1. Setup the EUT and simulator as shown as Section 4.1.

#### 4.4.2. Turn on the power of all equipment.

Let the EUT work in TX modes [Plug EUT audio input to iPod headphone dock and iPod playing typical audio signal (music song) with maximum audio level] measure it. The transmit frequency are 88.1-107.9MHz.We are select 88.1M, 98.1M, 107.9MHz TX frequency to transmitted.

Note: The EUT is connected to iPod by the base interface of iPod. The input signal of EUT is controlled by iPod. so the volume control of iPod was set to maximum during the test. It means that the test was performed with the maximum audio input.

#### 4.5.Test Procedure

The 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 an 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 bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

#### 4.6. The Emission Measurement Result

#### PASS.

Date of Test:April 25, 2007Temperature:25°CEUT:FM Wireless TransmitterHumidity:53%Model No.:7674Power Supply:DC 3.0V (AAA Battery ×2)Test Mode:TX 88.1MHzTest Engineer:Andy

#### **Fundamental Radiated Emissions**

Frequency	ency Reading(dBµV/m)		Factor(dB)	Result(dBµV/m)		Limit(dBµV/m)		Margin(dBμV/m)		Polarizati
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	on
88.1	36.1	40.1	6.4	42.5	46.5	48	68	5.5	21.5	Vertical
88.1	34.4	38.4	8.2	42.6	46.6	48	68	5.4	21.4	Horizontal

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Date of Test:April 25, 2007Temperature:25°CEUT:FM Wireless TransmitterHumidity:53%Model No.:7674Power Supply:DC 3.0V (AAA Battery ×2)Test Mode:TX 98.1MHzTest Engineer:Andy

#### **Fundamental Radiated Emissions**

Frequency	Reading(dBµV/m)		Factor(dB)	Result(dBµV/m)		Limit(dBµV/m)		Margin(dBµV/m)		Polarizati
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	on
98.1	34.3	38.7	6.7	41.0	45.4	48	68	7.0	22.6	Vertical
98.1	36.8	41.3	7.5	44.3	48.8	48	68	3.7	19.2	Horizontal

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Date of Test:April 25, 2007Temperature:25°CEUT:FM Wireless TransmitterHumidity:53%Model No.:7674Power Supply:DC 3.0V (AAA Battery ×2)Test Mode:TX 107.9MHzTest Engineer:Andy

#### **Fundamental Radiated Emissions**

Frequency	Reading(dBμV/m)		Factor(dB)	Result(dBµV/m)		Limit(dBµV/m)		Margin(dBμV/m)		Polarizati
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	on
107.9	35.5	39.1	7.0	42.5	46.1	48	68	5.5	21.9	Vertical
107.9	37.6	41.6	7.0	44.6	48.6	48	68	3.4	19.4	Horizontal

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

#### 5. OCCUPIED BANDWIDTH FOR FCC PART 15 SECTION

#### 15.239(A)

#### 5.1. The Requirement For Section 15.239(a)

5.1.1. Emission from the device shall be confined within a band 200kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88-108MHz.

#### 5.2.EUT Configuration on Measurement

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

5.2.1.FM Wireless Transmitter (EUT)

Model Number : 7674 Serial Number : N/A

Manufacturer : Sun Hei Electronic Co., Ltd.

#### 5.3. Operating Condition of EUT

- 5.3.1. Setup the EUT and simulator as shown as Section 4.1.
- 5.3.2. Turn on the power of all equipment.

Let the EUT work in TX modes [Plug EUT audio input to iPod headphone dock and iPod playing typical audio signal (music song) with maximum audio level] measure it. The transmit frequency are 88.1-107.9MHz.We are select 88.1M, 98.1M, 107.9MHz TX frequency to transmitted.

Note: The EUT is connected to iPod by the base interface of iPod. The input signal of EUT is controlled by iPod. so the volume control of iPod was set to maximum during the test. It means that the test was performed with the maximum audio input.

#### 5.4.Test Procedure

- 5.4.1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 5.4.2. Set EUT as normal operation. Playing MP3.(the volume control of iPod was set to maximum.)
- 5.4.3. Set EMI test receiver Center Frequency = fundamental frequency, RBW=3kHz, VBW= 10kHz, Span=300kHz.
- 5.4.4. Set EMI test receiver Max hold. Mark peak, -26dB.

#### 5.5.Test Result

#### The EUT does meet the FCC requirement.

Input signal: play typical audio signal(music song)

FM 88.1MHz

-26dB bandwidth = 126.0kHz

FM 98.1 MHz

-26dB bandwidth = 148.2kHz

FM 107.9 MHz

-26dB bandwidth = 170.4kHz

#### 6. TUNING RANGE

#### 6.1. The Requirement For Section 15.239

88-108MHz

#### 6.2.EUT Configuration on Measurement

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

#### 6.2.1.FM Wireless Transmitter (EUT)

Model Number : 7674 Serial Number : N/A

Manufacturer : Sun Hei Electronic Co., Ltd.

#### 6.3. Operating Condition of EUT

- 6.3.1. Setup the EUT and simulator as shown as Section 4.1.
- 6.3.2. Turn on the power of all equipment.

Let the EUT work in TX modes

#### 6.4. Test Procedure

- 6.4.1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 6.4.2. Set the EUT working on the working frequency.
- 6.4.3. Set EMI test receiver center frequency = working frequency, RBW=3kHz, VBW= 10kHz, Span=300kHz.
- 6.4.4. Measuring the working frequency.
- 6.4.5. The working frequency should be inside 88-108MHz.

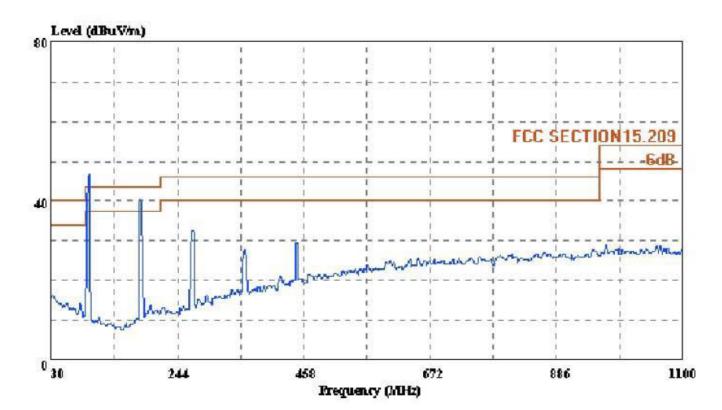
#### 6.5.Test Result

#### The EUT does meet the FCC requirement.

Low Frequency= 88.1042MHz Mid Frequency= 98.1018MHz High Frequency=107.9036MHz

The working frequency rang is from 88.1 to 107.9MHz. The working frequency can not to be displayed on EUT.

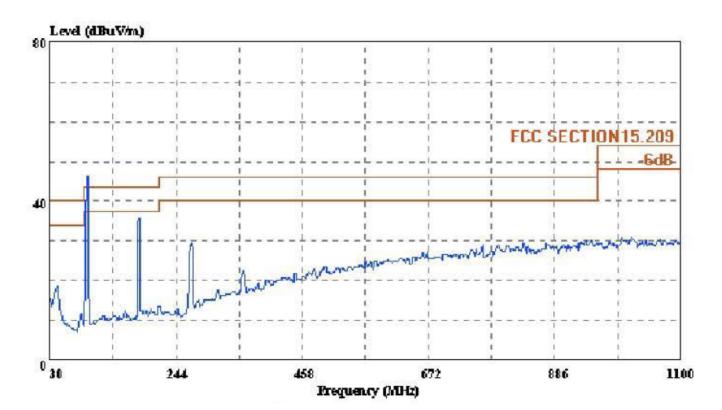
# APPENDIX I (Test Curves)



Condition: FCC SECTION15.209 3m ATC FCC15C ANTENNA HORIZONTAL

eut : FM wireless transmitter m/n:7674

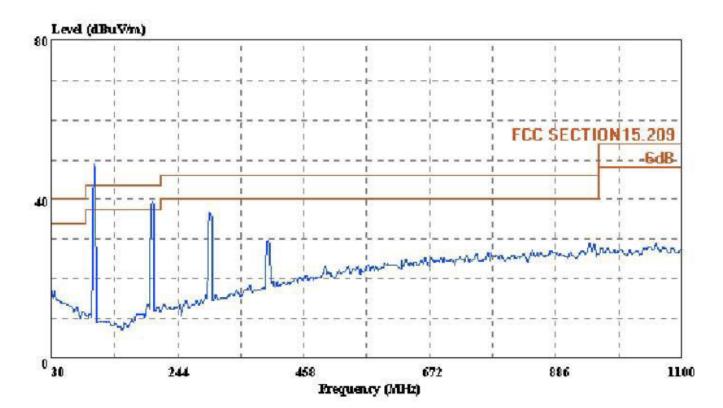
power : DC 3.0V memo : TX 88.1MHz manuf : SUN HEI sample no.: 071668



Condition: FCC SECTION15.209 3m ATC FCC15C ANTENNA VERTICAL

eut : FM wireless transmitter m/n:7674

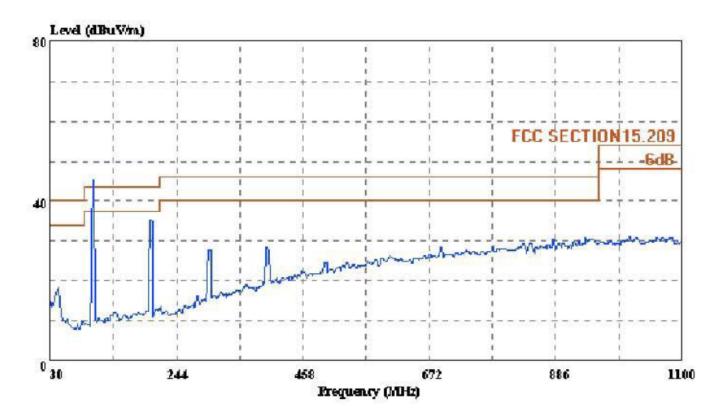
power : DC 3.0V memo : TX 88.1MHz manuf : SUN HEI sample no.: 071668



Condition: FCC SECTION15.209 3m ATC FCC15C ANTENNA HORIZONTAL

eut : FM wireless transmitter m/n:7674

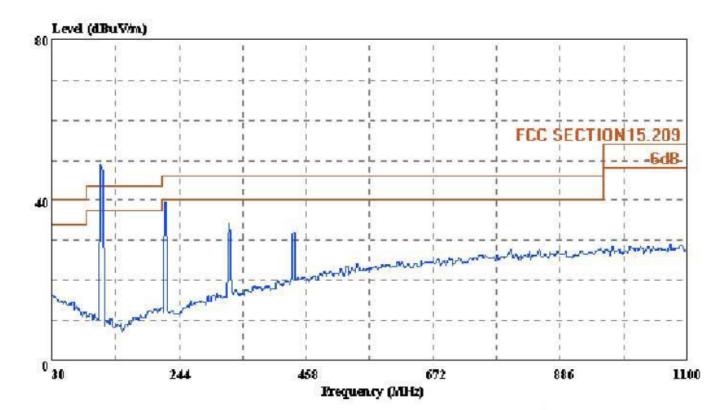
power : DC 3.0V
memo : TX 98.1MHz
manuf : SUN HEI
sample no.: 071668



Condition: FCC SECTION15.209 3m ATC FCC15C ANTENNA VERTICAL

eut : FM wireless transmitter m/n:7674

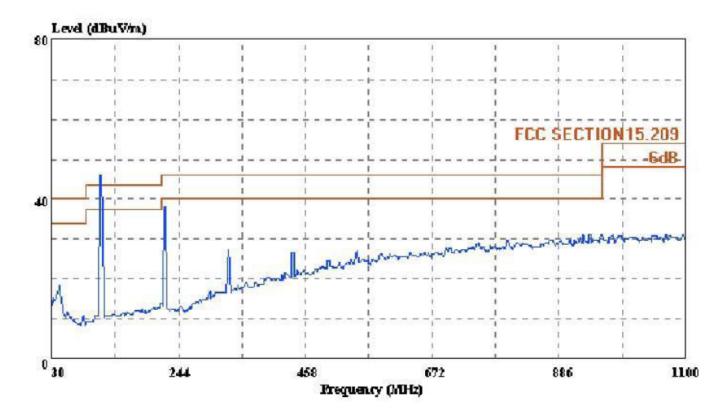
power : DC 3.0V memo : TX 98.1MHz manuf : SUN HEI sample no.: 071668



Condition: FCC SECTION15.209 3m ATC FCC15C ANTENNA HORIZONTAL

eut : FM wireless transmitter m/n:7674

power : DC 3.0V memo : TX 107.9MHz manuf : SUN HEI sample no.: 071668



Condition: FCC SECTION15.209 3m ATC FCC15C ANTENNA VERTICAL

eut : FM wireless transmitter m/n:7674

power : DC 3.0V memo : TX 107.9MHz manuf : SUN HEI sample no.: 071668

