

EMC TEST REPORT

On Product Name: Wireless Microphone
Model Name: WM-369
Brand Name: *Rider*

Prepared for ENPING CITY SHUANGYI
ELECTRONICS INDUSTRIAL CO., LTD.

According to FCC CFR 47
Part 74H – Low Power Auxiliary Stations

Test Report #: ENP-0509-1007-TCB
Prepared by: Arcelia Maldonado
QC Manager: Tony Wang

Test Report Released By: _____



Tony Wang

October 20, 2005

Date

Test Location

EMC Compliance Management Group is located at 670 National Ave., Mountain View, CA 94043, USA.

Accreditation Bodies

EMC Compliance Management Group is a fully accredited Test Laboratory for ITE, ISM, MIL-STD and Telecommunications Products.



Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code # 200068-0.

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Opinions and Interpretations

This test report relates to the abovementioned equipment under test (EUT). Without the permission of EMC Compliance Management Group Test Lab this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products. The manufacturer has sole responsibility of continued compliance of the device.

Statement of Measurement Uncertainty

The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

Administrative Data

Test Sample : Wireless Microphone

Model Name : WM-369

Brand Name : *Rider*

Serial Number : Engineering Sample

Date Tested : 2005, September 15th

Applicant : ENPING CITY SHUANGYI ELECTRONICS
INDUSTRIAL CO., LTD.
B1. Foreign and Private Capital Industry Zone,
Enping, Guangdong, China

Telephone : 86-750-7820222

Fax : 86-750-7819928

Manufacturer : ENPING CITY SHUANGYI ELECTRONICS
INDUSTRIAL CO., LTD.
B1. Foreign and Private Capital Industry Zone,
Enping, Guangdong, China

EUT Description

ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD.,
model name WM-369 (referred to as the EUT in this report) is a
Wireless Microphone.

Test Summary

The Electromagnetic Compatibility requirements on model name WM-369 Wireless Microphone for these test are stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment Under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

FCC CFR 47 Part 74H Test Items			
Specification	Description	Test Results	Remark
Section 74.861(e)(1)	RF Output Power Test Limit ≤ 50 mW (16.99 dBm)	Complied, RF output power is 8.5mW (9.3dBm).	See Attachment A
Section 74.861(e)(5)	Emission Bandwidth Limit ≤ 200 KHz	Complied, 26 dB Bandwidth ≤ 200 KHz	See Attachment B
Section 74.861(e)(3) Section 2.1047(a) Section 74.861(e)(3)	1) Modulation Characteristics - Modulation Limit 2) Modulation Characteristics - Audio Frequency Response Limit: Maximum frequency deviation +/- 75 KHz	Complied, Peak deviation is 12.4 KHz	See Attachment C
Section 74.861(e)(6)	Unwanted Radiated Emissions Limit: 25dB for band 50% - 100%, 35dB for band 100% - 250%, 43+10Lg(P) for band >250%	Complied, Power of unwanted emission ≤ -13 dBm	See Attachment D
Section 74.861(e)(4)	Frequency Tolerance Limit $\leq 0.005\%$	Complied, Frequency error $\leq 0.0041\%$	See Attachment E

Test Mode Justification

All models are using the same RF module and antenna. All models operate the same.

EUT Exercise Software

N/A

Equipment Modification

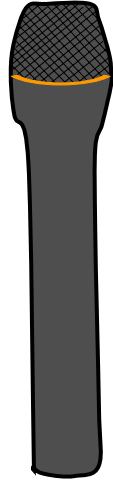
Any modifications installed previous to testing by ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD. will be incorporated in each production model sold or leased in U.S.A.

There were no modifications installed by EMC Compliance Management Group.

Test System Details

<i>EUT</i>					
<i>Product Name:</i>	<i>Wireless Microphone</i>				
<i>Model Name:</i>	<i>WM-369</i>				
<i>Serial Number:</i>	<i>Engineering Sample</i>				
<i>Manufacturer:</i>	<i>ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD.</i>				
<i>Modulation Type:</i>	<i>FM</i>				
<i>Communication Type:</i>	<i>Voice / Tone</i>				
<i>Emission Type:</i>	<i>F3E</i>				
<i>Emission Designator:</i>	<i>45K2F3E (2M + 2D, M=10, D=12.4)</i>				
<i>Frequency Range:</i>	<i>174.1 – 215.2MHz</i>				
<i>RF Output Power:</i>	<i>Maximum 8.5mW</i>				
<i>Frequency Deviation:</i>	<i>Peak Deviation 12.4KHz</i>				
<i>Antenna:</i>	<i>Integral</i>				
<i>Power Supply:</i>	<i>9VDC Battery</i>				
<i>Support Equipment</i>					
<i>Description</i>	<i>Model Number</i>	<i>Serial Number</i>	<i>Manufacturer</i>	<i>Power Cable Description</i>	
N/A	N/A	N/A	N/A	N/A	
<i>Cable Description</i>					
<i>Description</i>	<i>From</i>	<i>To</i>	<i>Length</i>	<i>Shielded</i>	<i>Ferrite</i>
N/A	N/A	N/A	N/A	N/A	N/A

Configuration of Tested System

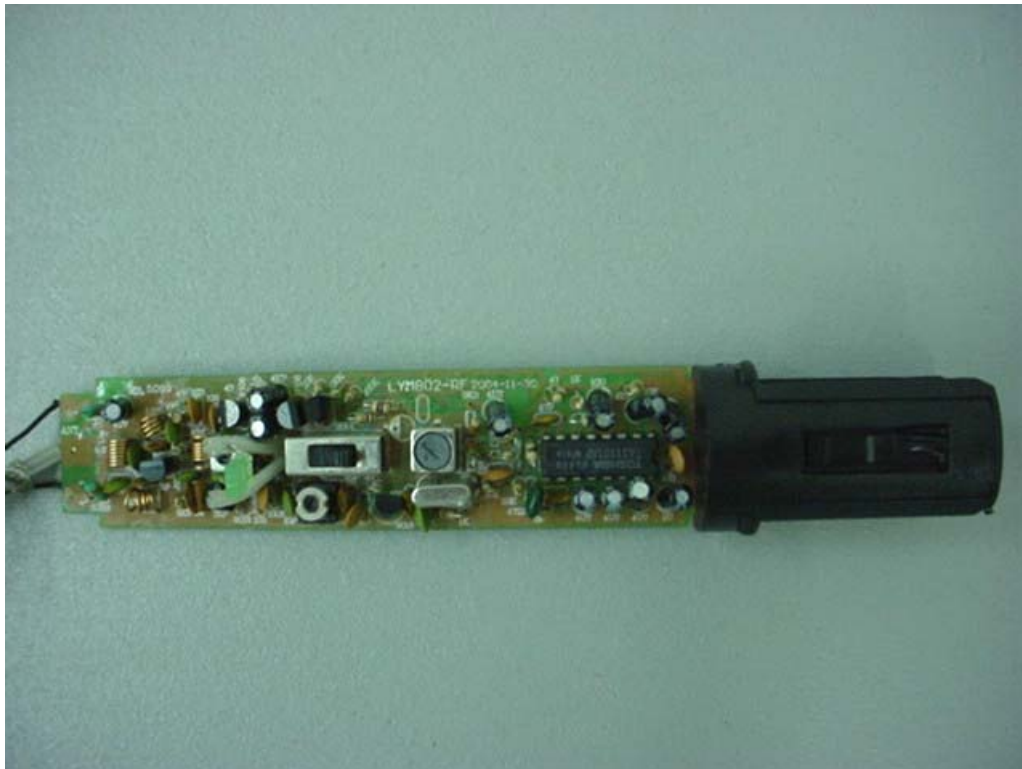


EUT
Wireless Microphone

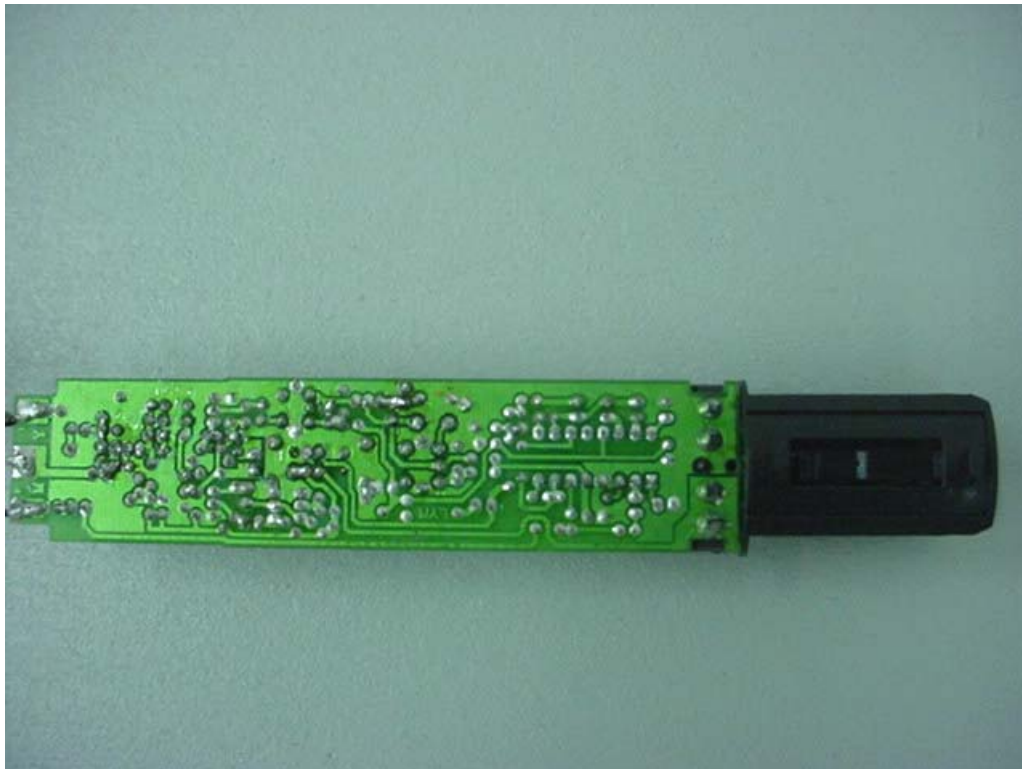
EUT Sample Photos



View of EUT



Top View of PCBAs



Bottom View of PCBAs

FCC CFR 47 Part 74H Assessment Report

FCC CFR 47 PART 74H					
SUBCLAUSE		RESULTS			COMMENTS
		PASS	FAIL	N/A	
Section 74.861(e)(1)	The power of the carrier at the output of the transmitter power amplifier may not exceed 50 mW (Band 174 – 216 MHz).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The RF output power is < 50 mW, See attachment A.
Section 74.861(e)(5)	The operating bandwidth shall not exceed 200 KHz,	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26dB bandwidth < 200 KHz, See attachment B.
Section 74.861(e)(3) Section 2.1047(a)	Maximum deviation of +/-75 KHz is permitted for FM modulation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See attachment C.
Section 74.861(e)(6)	On any frequency removed from the operating frequency by more than 250 % of the authorized bandwidth, the mean power of emissions shall be attenuated below the mean output power of the transmitter at least $43 + 10 \text{ Lg}(P)$.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See attachment D.
Section 74.861(e)(4)	Frequency tolerance shall be 0.005%.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See attachment E.

ATTACHMENT A - RF OUTPUT POWER TEST RESULT

CLIENT:	ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD.	TEST REFERENCE:	FCC CFR 47 Part 74H
EUT MODEL NAME:	WM-369	PRODUCT NAME:	Wireless Microphone
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	Transmission Equipment Operating in the 174 – 216MHz
TEMPERATURE:	25°C	HUMIDITY:	33%
ATM PRESSURE:	1020 Mbar	GROUNDING:	Floating
TESTED BY:	Ben Jing	DATE OF TEST:	2005, September 15
SETUP METHOD:	CFR 47 Sec. 74.861(e) & TIA/EIA 603		
TEST PROCEDURE:	The maximum RF output power was measured with a power meter connected to the antenna terminal while the EUT was operating in unmodulated situation using a test		
TESTED RANGE:	Low, Middle, and High channel.		
TEST VOLTAGE:	9 VDC Battery		
RESULTS:	PASS - The EUT meets the reference requirements. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There is no modification installed by EMC Compliance Management Group test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB, Temp: 1°C, Humidity: 5%.		

Measurement Data:


<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Output Power (dBm)</i>	<i>Output Power (mW)</i>	<i>Limit (mW)</i>
<i>Low</i>	<i>174.1</i>	<i>9.3</i>	<i>8.5</i>	<i>50</i>
<i>Middle</i>	<i>195.6</i>	<i>9.3</i>	<i>8.5</i>	<i>50</i>
<i>High</i>	<i>215.2</i>	<i>9.2</i>	<i>8.3</i>	<i>50</i>


Test Result: EUT Pass, Meets Requirement.

Test Equipment List:

<i>Test Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial No.</i>	<i>Last Cal.</i>	<i>Cal. Due</i>
<i>Power Meter</i>	<i>HP</i>	<i>436A</i>	<i>2347A17569</i>	<i>05/07/05</i>	<i>05/07/06</i>
<i>Attenuator</i>	<i>MCL</i>	<i>0346</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>

Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).

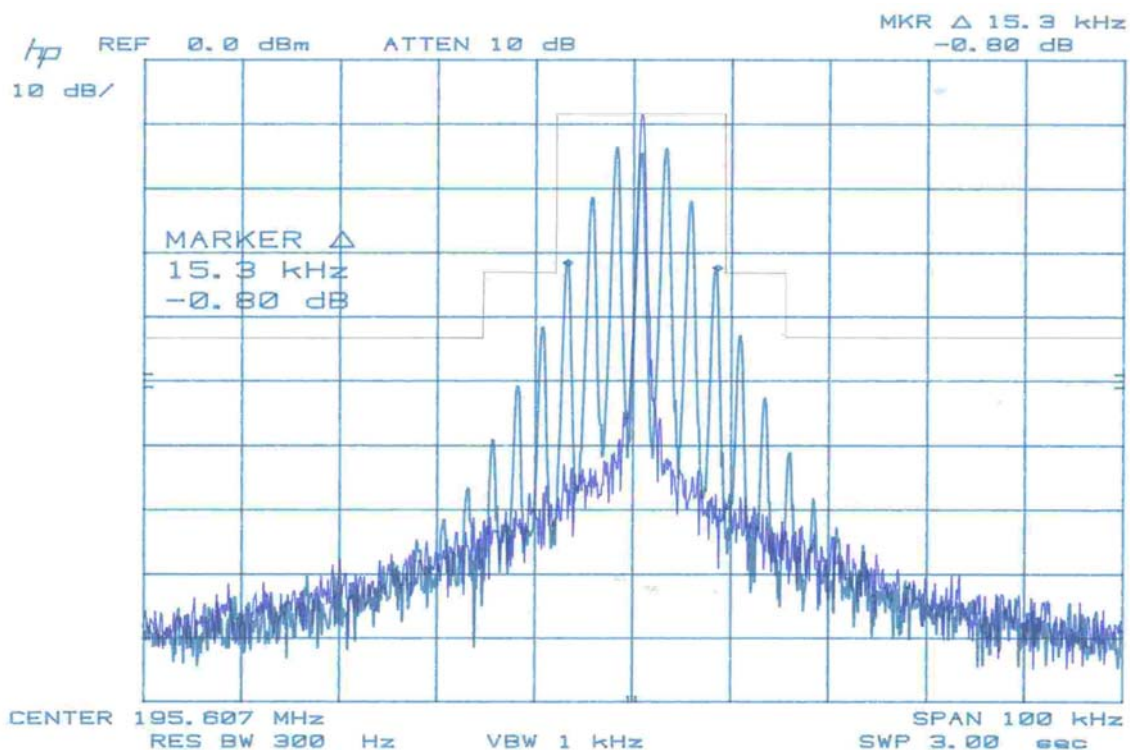
TESTED BY: 
ENGINEER

REVIEWED BY: 
QC

ATTACHMENT B - EMISSIONS BANDWIDTH TEST RESULTS

CLIENT:	ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD.	TEST REFERENCE:	FCC CFR 47 Part 74H
EUT MODEL NAME:	WM-369	PRODUCT NAME:	Wireless Microphone
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	Transmission Equipment Operating in the 174 – 216MHz
TEMPERATURE:	25°C	HUMIDITY:	33%
ATM PRESSURE:	1020 Mbar	GROUNDING:	Floating
TESTED BY:	Ben Jing	DATE OF TEST:	2005, September 15
SETUP METHOD:	CFR 47 Sec. 74.861(e), Sec. 2.1049, & TIA/EIA 603		
TEST PROCEDURE:	<p>The RF output is connected to the input of the spectrum analyzer.</p> <p>Turn on the transmitter, the level of the unmodulated carrier is set as reference line which is used as a 0 dB reference for emission mask measurement.</p> <p>After an input level is derived from a 2.5 KHz tone 16 dB greater than the necessary to produce 50% modulation, this input level is then established at the frequency of maximum response of the modulating circuit. Then the transmitter is modulated with the maximum response frequency. Set RBW = 300Hz, get the emission spectrum.</p>		
TEST VOLTAGE:	9VDC Battery		
TEST RESULTS:	PASS - The EUT meets the reference requirements. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There is no modification installed by EMC Compliance Management Group test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB, Temp: 1°C, Humidity: 5%.		

Measurement Plot:



Test Result: Meets Requirement.

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Spectrum Analyzer	HP	8566B	2410A00224	07/13/05	07/13/06
Audio Generator	HP	8111A	5071756	N/A	N/A
Milivolt Meter	FLUKE	Fluke75	65600901	03/30/05	03/30/06
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

TESTED BY: Boyan Juy
ENGINEER

REVIEWED BY: Joy Wang
QC

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Prepared by EMC Compliance Management Group

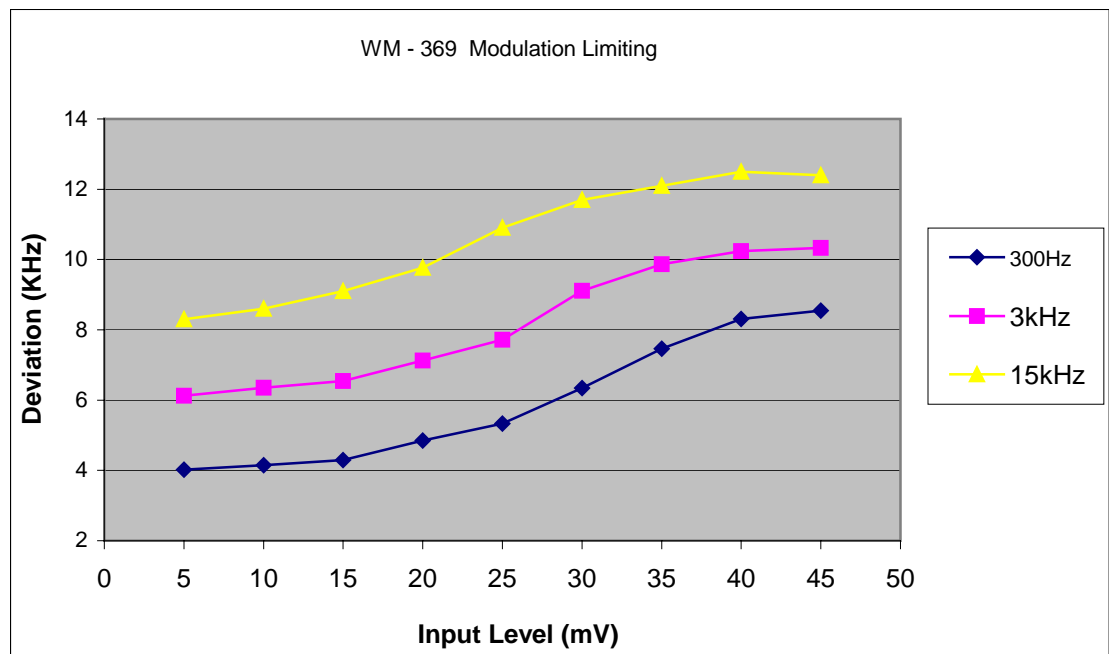
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ATTACHMENT C - MODULATION CHARACTERISTICS MEASUREMENT RESULTS

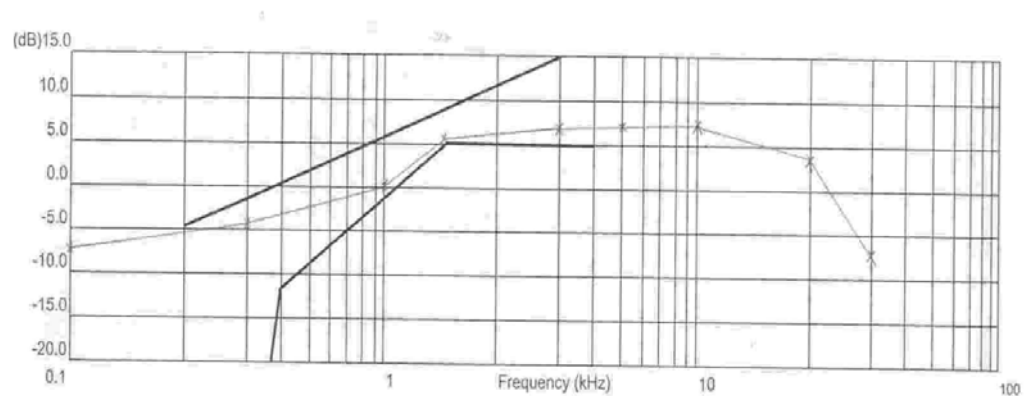
CLIENT:	ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD.	TEST REFERENCE:	FCC CFR 47 Part 74H
EUT MODEL NAME:	WM-369	PRODUCT NAME:	Wireless Microphone
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	Transmission Equipment Operating in the 174 – 216MHz
TEMPERATURE:	25°C	HUMIDITY:	33%
ATM PRESSURE:	1020 Mbar	GROUNDING:	Floating
TESTED BY:	Ben Jing	DATE OF TEST:	2005, September 15
SETUP METHOD:	CFR 47 Sec. 74.861(e) & TIA/EIA 603		
TEST PROCEDURE	<p>1) Modulation characteristics – Modulation limit</p> <p>a) Adjust the audio input frequency to 300Hz and the input level from 0V to maximum permitted input voltage with recording each frequency deviation responding to respective input level.</p> <p>b) Repeat with changing the input frequency for 3KHz and 15KHz</p> <p>2) Modulation characteristics – Audio frequency response</p> <p>a) RFoutput of the transmitter is connected to the modulation analyzer; an audio generator is coupled to the audio input of the EUT.</p> <p>b) The frequency of the audio signal is selected at 1KHz, and its level is adjusted to obtain 20% of the maximum rated system deviation. The deviation is recorded as DEVref.</p> <p>c) With the audio signal level unchange, set the audio frequency respectively at 0.1, 0.3, 0.5, 1, 2, 3, 4, 5, 20KHz, the deviations are recorded as DEVfreq.</p> <p>Audio frequency response in dB is: 20 Log (DEVfreq / DEVref)</p>		
TESTED RANGE:	Audio frequency from 100Hz to 20KHz		
TEST VOLTAGE:	9VDC Battery		
RESULTS:	PASS - The EUT meets the reference requirements. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There is no modification installed by EMC Compliance Management Group test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB, Temp: 1°C, Humidity: 5%.		

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Measurement Plots:
1) Modulation Limit




2) Audio Frequency Response




Test Result: Meets Requirement.

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Modulation Analyzer	HP	8901A	2705A04778	08/03/05	08/03/06
Audio Generator	HP	8111A	5071756	N/A	N/A
Milivolt meter	FLUKE	Fluke75	65600901	03/30/05	03/30/06
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

TESTED BY: 
ENGINEER

REVIEWED BY: 
QC

ATTACHMENT D - TRANSMITTER SPURIOUS EMI MEASUREMENT RESULTS

CLIENT:	ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD.	TEST REFERENCE:	FCC CFR 47 Part 74H
EUT MODEL NAME:	WM-369	PRODUCT NAME:	Wireless Microphone
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	Transmission Equipment Operating in the 174 – 216MHz
TEMPERATURE:	25°C	HUMIDITY:	33%
ATM PRESSURE:	1020 Mbar	GROUNDING:	Floating
TESTED BY:	Ben Jing	DATE OF TEST:	2005, September 15
SETUP METHOD:	CFR 47 Sec. 74.861(e) & TIA/EIA 603		
TEST PROCEDURE:	<p>This measurement is performed in a full anechoic chamber. The factor of the test system is pre-calibrated by substitution method.</p> <p>The EUT is placed on a wooden turntable, and it is transmitting into a non-radiating load, which is also placed on the turntable.</p> <p>The test antenna is placed at a distance of 3 meters from the EUT. During the test, the antenna height and polarization as well as EUT azimuth are varied in order to identify the maximum level of the emissions from the EUT.</p> <p>This test is performed by placing the EUT on three orthogonal axis,</p>		
TESTED RANGE:	From 30MHz to 10 th harmonic frequency		
TEST VOLTAGE:	9VDC Battery		
RESULTS:	PASS - The EUT meets the reference requirements of spurious emission tests. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There is no modification installed by EMC Compliance Management Group test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB, Temp: 1°C, Humidity: 5%.		

Measurement Data:**Low CH (174.1 MHz)**

Frequency (MHz)	Reading (dBuV/m)	Test Antenna Polar (V / H)	Substitution Reading (dBm)	Limit (dBm)	Margin (dB)
348.2	60.03	V	-23.4	-13	-10.4
348.2	37.42	H	-42.3	-13	-29.3
522.3	53.17	V	-29.1	-13	-16.1
522.3	40.43	H	-40.2	-13	-27.2
696.4	55.36	V	-26.8	-13	-13.8
696.4	51.44	H	-29.5	-13	-16.5
870.5	53.22	V	-30.1	-13	-17.1
870.5	47.64	H	-35.3	-13	-22.3
102.75	53.72	V	-27.2	-13	-14.2
493.05	53.26	V	-28.1	-13	-15.1

Mid CH (195.6 MHz)

Frequency (MHz)	Reading (dBuV/m)	Test Antenna Polar (V / H)	Substitution Reading (dBm)	Limit (dBm)	Margin (dB)
391.2	60.74	V	-22.8	-13	-9.8
391.2	37.93	H	-41.7	-13	-28.7
586.8	53.32	V	-28.9	-13	-15.9
586.8	40.75	H	-39.9	-13	-26.9
782.4	55.27	V	-26.7	-13	-13.7
782.4	51.39	H	-29.3	-13	-16.3
978	53.61	V	-29.9	-13	-16.9
978	47.98	H	-35.1	-13	-22.1
102.75	53.72	V	-27.2	-13	-14.2
493.05	53.26	V	-28.1	-13	-15.1

High CH (215.2 MHz)

Frequency (MHz)	Reading (dBUV/m)	Test Antenna Polar (V / H)	Substitution Reading (dBm)	Limit (dBm)	Margin (dB)
430.4	59.83	V	-23.7	-13	-10.7
430.4	36.79	H	-42.8	-13	-29.8
645.6	52.44	V	-29.8	-13	-16.8
645.6	39.68	H	-40.6	-13	-27.6
860.8	53.25	V	-28.9	-13	-15.9
860.8	49.62	H	-30.1	-13	-17.1
102.75	53.72	V	-27.2	-13	-14.2
493.05	53.26	V	-28.1	-13	-15.1

*Note: 1) The test was performed by placing the EUT on 3 orthogonal axis.
2) It is too low to be tested for level of harmonic and spurious emission above 1GHz.*

Test Result: Meets Requirement.

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EMI Receiver	R&S	ESMI-RF	849937/006	06/27/05	06/27/06
EMI Receiver	R&S	ESAI-D	825035/005	06/27/05	06/27/06
Spectrum Analyzer	HP	8566B	2410A00224	07/13/05	07/13/06
Bi-log Antenna a	Sunol Sciences	JB1	A041604-2	05/23/05	05/23/06
Biconical Antenna	EMCO	3104C	9006-4315	01/16/05	01/16/06
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	969305	03/02/05	03/02/06
Pre-Amplifier	TEC	PA-102	43179	10/24/04	10/24/05
Signal Generator	HP	8648C	3623A03709	08/20/05	08/20/06
Signal Generator	HP	8672A	2426A03723	04/13/05	04/13/06
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

TESTED BY:



ENGINEER

REVIEWED BY:



QC

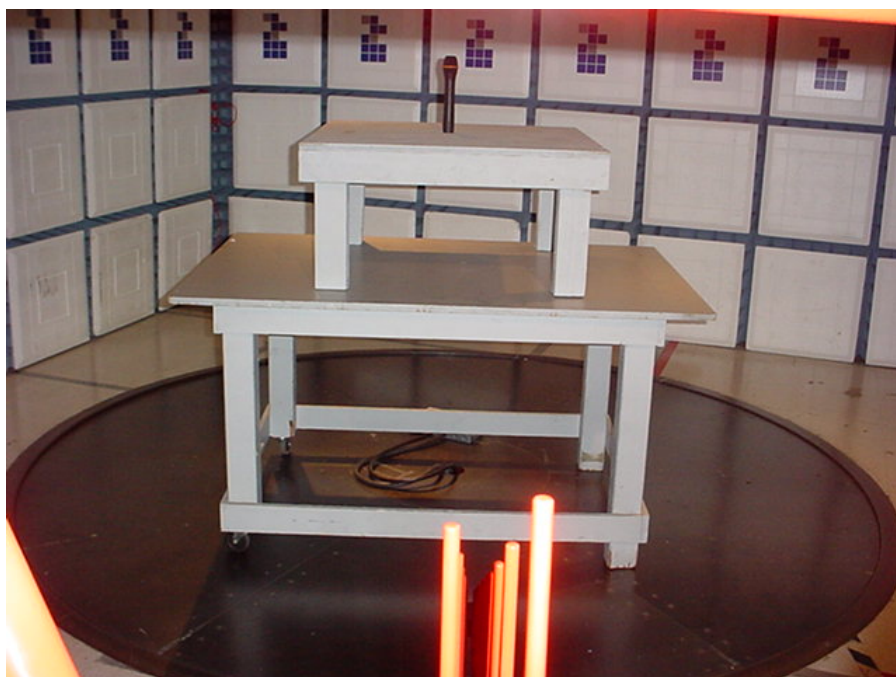
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Prepared by EMC Compliance Management Group

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EUT Model Name: WM-369



Transmitter Spurious EMI Measurement Test Set-up



Transmitter Spurious EMI Measurement Test Set-up

ATTACHMENT E - FREQUENCY TOLERANCE MEASUREMENT RESULTS

CLIENT:	ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD.	TEST REFERENCE:	FCC CFR 47 Part 74H
EUT MODEL NAME:	WM-369	PRODUCT NAME:	Wireless Microphone
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	Transmission Equipment Operating in the 174 – 216MHz
TEMPERATURE:	25°C	HUMIDITY:	33%
ATM PRESSURE:	1020 Mbar	GROUNDING:	Floating
TESTED BY:	Ben Jing	DATE OF TEST:	2005, September 15
SETUP METHOD:	CFR 47 Sec. 74.861(e) & TIA/EIA 603		
TEST PROCEDURE:	<p>1) Frequency stability vs environmental temperature.</p> <p>The EUT is placed inside the temperature chamber, and then powered by a new 9VDC battery. The RF output of the EUT is connected to the frequency counter.</p> <p>After the temperature stabilizes for 20 minutes, record the frequency.</p> <p>Repeat the above from -30 C to +50 C.</p> <p>2) Frequency stability vs battery voltage</p> <p>Under room temperature, the EUT is powered by a battery which operating at the end point 7, 8V, measure the frequency of the EUT output by a frequency counter.</p>		

Measurement Data:

Reference Frequency: 195.6 MHz, Limit*: + / - 0.005%			
Temperature C	Power supplied VDC	Frequency Measure with Time Elapsed	
		MCF (MHz)	Error + / - %
50	9	195.59461	-0.0028
40	9	195.59873	-0.0006
30	9	195.60324	0.0017
20	9	195.60711	0.0036
10	9	195.60711	0.0036
0	9	195.60732	0.0037
-10	9	195.60764	0.0039
-20	9	195.60781	0.0039
-30	9	195.60793	0.0041

Reference Frequency : 195.6 MHz, Limit* : + / - 0.005%		
Power supplied VDC	Frequency Measure with Time Elapsed	
	Frequency (MHz)	Error + / - %
7.8	195.60711	0.0036

Note: The end point is 7.8 Vdc.


Test Result: Meets Requirement.

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Frequency counter	HP	5386A	2704A01508	05/26/05	06/26/06
Temperature Chamber	BLUE M	FR-256PB-1	F2-109	05/17/05	06/17/06

Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).

TESTED BY: 
ENGINEER

REVIEWED BY: 
QC

EMC Test Report #: ENP-0509-1007-TCB

Prepared for ENPING CITY SHUANGYI ELECTRONICS INDUSTRIAL CO., LTD.

Prepared by EMC Compliance Management Group

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EUT Model Name: WM-369



Frequency Tolerance Measurement Test Set-Up