

FCC ID TEST REPORT

for

Wireless Microphone

Model: W-708E

FCC ID: S54W-708E

Prepared for: Guangzhou Suohua Electronics Industry Co.,Ltd
Bostion Industry park, Quanxi Industry area, JiangGao Town,
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Report Number: TCS1301002-1

Date of Test: January 15~22, 2013

Date of Report: February 03, 2013

The results detailed in this test report relate only to the specific sample(s) tested. It is the Application's responsibility to ensure that all production units are manufactured with equivalent EMC characteristics. This report is not to be reproduced except in full, without written approval from TCT Testing Technology.

Table of Contents

1.0	Test Summary	3
2.0	General Details	3
2.1	Test Lab Details.....	3
2.2	Applicant Details.....	3
2.3	Description of EUT	4
2.4	Submitted Sample.....	4
2.5	Test Duration.....	4
2.6	Test By.....	4
3.0	List of Measurement Equipment.....	5
3.1	Summary of Test Results.....	5
3.2	Test Standards.....	5
4.0	Technical Details.....	6
5.0	EUT Modification.....	6
6.0	Measurement Uncertainty.....	6
7.0	Test Results.....	7
7.1	Carrier Radiated Power & Radiated Spurious Emissions.....	7
7.2	Occupied Bandwidth.....	9
7.3	Frequency Stability.....	12
7.4	Modulation Characteristics.....	14

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2.0 General Details

2.1 Test Lab Details

Name: Shenzhen Tongce Testing Lab
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Site Listed with Federal Communication Commission

Registration Number: 572331

For 3m chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number IC: 10668A-1

For 3m chamber


2.2 Applicant Details

Applicant: Guangzhou Suohua Electronics Industry Co.,Ltd
Address: Bostion Industry park, Quanxi Industry area, JiangGao Town, Guangzhou, China
Telephone: 020-86602826
Fax: 020-86202475

Manufacturer: Guangzhou Suohua Electronics Industry Co.,Ltd
Address: Bostion Industry park, Quanxi Industry area, JiangGao Town, Guangzhou, China
Telephone: 020-86602826
Fax: 020-86202475

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2.3 Description of EUT

Product: Wireless Microphone
Model No.: W-708E
Additional Model No.: W-1211, W-1011, W-1511, W-1111, W-1673, W-1573, W-1271, W-1171, W-1605D5, W-1505D5
Brand Name: 
Rating: DC 3V (2*AA 1.5V batteries)
Modulation Type: FM
Emission Designator: F3E
Operation Frequency: 203.6MHz

2.4 Statement: These models are identical in interior structure, electrical circuits and components, and just model names, shape and colour are different for the marketing requirement.

2.5 Test Duration

2013-01-15 to 2013-01-22

2.6 Test Engineer

The sample tested by



Printed name: Jack Kang

3.0 Test equipments and Associated Equipment used during the test.

3.1 Test Equipments

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2012-12-03	2013-12-02
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2012-12-03	2013-12-02
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	2012-12-04	2013-12-03
Pre-amplifier	Agilent	8447D	83153007374	2012-12-04	2013-12-03

3.2 AE used during the test

Equipment type	Manufacturer	Model
N/A		
N/A		
N/A		
N/A		

4.0 Technical Details

Summary of test results

Test	Test Requirement	Standard Paragraph	Result
Carrier Radiated Power	FCC Part 2.1046	74.861 e) 1) 174M-216M--50mW	PASS
Modulation Deviation	FCC Part 2.1047	74.861 e) 3) Within 75kHz	PASS
Frequency Stability	FCC Part 2.1055	74.861 e) 4) <0.005%	PASS
Operating Bandwidth	FCC Part 2.1049 c)	74.861 e) 5) Within 200kHz	PASS
Unwanted Radiation	FCC Part 2.1049 c)	74.861 e) 6) within the mask	PASS
Radiated Spurious Emission	FCC Part 2.1053	74.861 d) 3) < 43+10lgP(W) dB 74.861 e) 6) within the mask	PASS

Remark: 1) The EUT has one channel (203.6 MHz), which is located in the range 174.0MHz-216.0MHz. The EUT frequency cannot be adjustable by user.

2) Output power is factory-set, and end-user has no possibility to change the power by himself.

5.0 EUT Modification

No modification by Shenzhen TCT Testing Technology Co., Ltd

6.0 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	MU
1.	Radio Frequency	$\pm 1 \times 10^{-9}$
2.	Temperature	$\pm 0.1^{\circ}\text{C}$
3.	Humidity	$\pm 1.0\%$
4.	RF power, conducted	$\pm 0.34\text{dB}$
5.	RF power density, conducted	$\pm 1.45\text{dB}$
6.	Spurious emissions, conducted	$\pm 3.70\text{dB}$
7.	All emissions, radiated	$\pm 4.50\text{dB}$

7.0 Test Results

7.1 Carrier Radiated Power & Radiated Spurious Emissions

7.1.1 Test Equipment

Please refer to the Section 2

7.1.2 Test Specification:

Temperature: 23° C Humidity: 52% Atmospheric pressure: 103kPa

7.1.3 Limit

(d) For low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the following technical requirements are imposed.

(3) The occupied bandwidth shall not be greater than that necessary for satisfactory transmission and, in any event, an emission appearing on any discrete frequency outside the authorized band shall be attenuated, at least, 43+10 log10 (mean output power, in watts) dB below the mean output power of the transmitting unit.

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(1) The power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed the following:

(i) 54–72, 76–88, and 174–216 MHz bands—50 mW

(ii) 470–608 and 614–806 MHz bands—250 mW

7.1.4 Test Procedure:

The procedure used was EIA/TIA 603-C: 2004 section 2.2 and FCC CFR 47 Part 2.1047 & 1053.

The receiver was scanned from 30MHz to 10 times carrier frequency. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor

An initial pre-scan was performed in the 3m chamber using the spectrum analyzer in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bilog antenna with 2 orthogonal polarities

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the Carrier Radiated Power and spurious emissions were measured by the substitution.

Test Result:

Carrier Frequency (MHz)	Factual Level dBm (mW)	Limit in 74.861 e) 1)
203.6	-3.01 dBm (i.e. 0.50 mW)	17 dBm (i.e. 50 mW)

Radiated spurious emissions:

Spurious Emission Frequency (MHz)	Level (Horizontal) (dBm)	Level (Vertical) (dBm)	Limit (dBm)	Min Margin (dB)
407.2	-38.9	-33.5	-13.0	20.5
610.8	-45.7	-41.6	-13.0	28.6
814.4	--	--	-13.0	--
1018.0	--	--	-13.0	--
1221.6	--	--	-13.0	--
1425.2	--	--	-13.0	--
1628.8	--	--	-13.0	--
1832.4	--	--	-13.0	--
2036.0	--	--	-13.0	--

The Level is ERP value.

The peak emission of other frequency in rang from 30MHz up to 10 times carrier were 20dB lower than the limit, hence no data was recorded in the report.

7.2 Occupied Bandwidth

7.2.1 Test Equipment

Please refer to the Section 2

7.2.2 Test Specification:

Temperature: 23° C Humidity: 52% Atmospheric pressure: 103kPa

7.2.3 Limit

FCC CFR 47 Part 74.e) 5) & 6)

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(5) The operating bandwidth shall not exceed 200 kHz.

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25dB;

(ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35dB;

(iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log_{10}$ (mean output power in watts) dB.

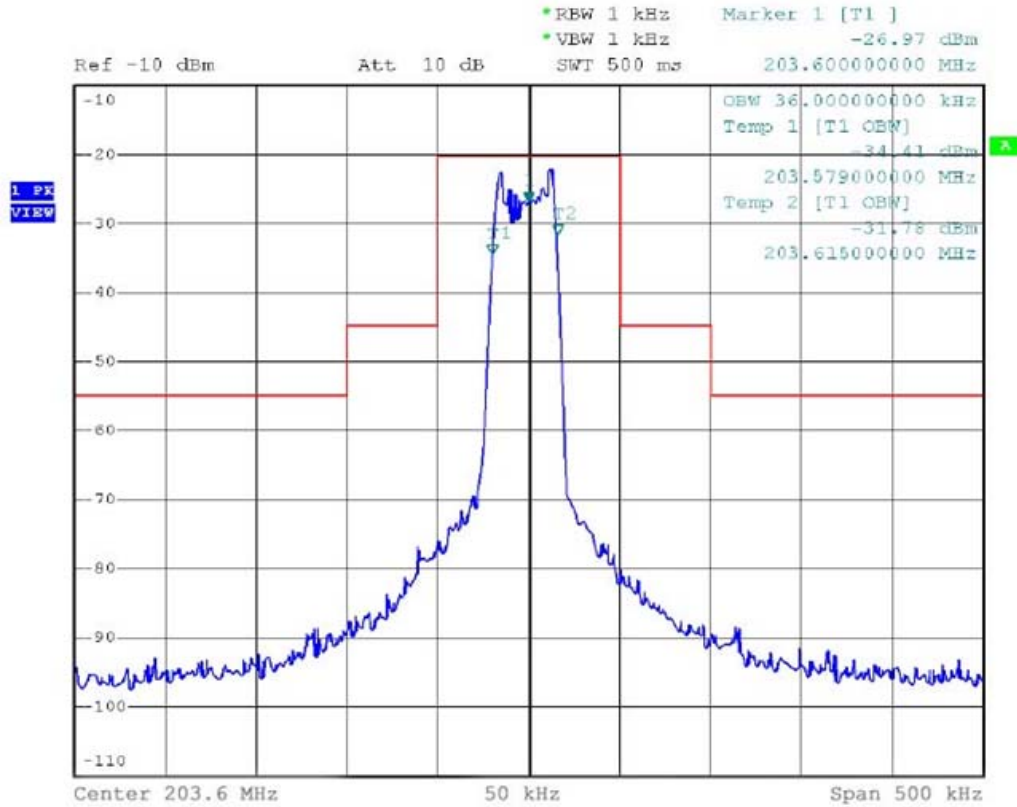
7.2.4 Test method

According to FCC CFR 47 Part 2.1049.

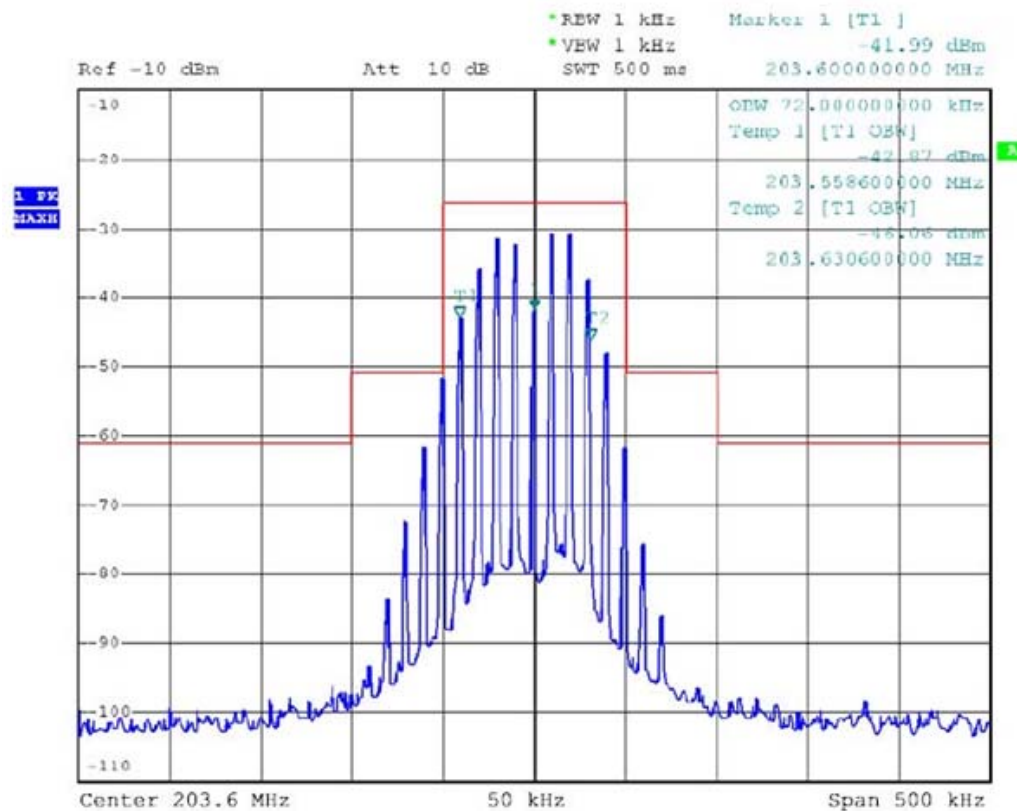
Input 2500Hz signal to the microphone, find the 50% rated deviation, add the level 16dB, test this status the 99% occupied bandwidth and record it.

The graph as below represents the emissions take for this device.

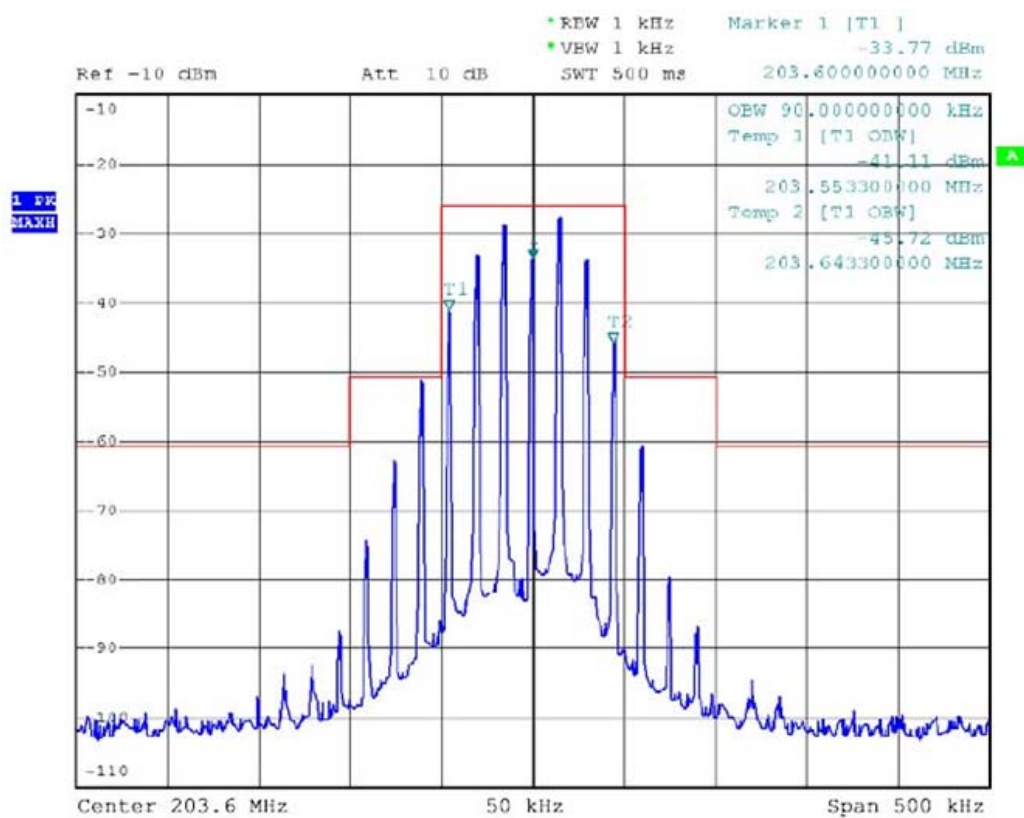
Occupied Bandwidth (99% of total power): 90 kHz.



Emission Mask: input with 10 kHz AF, 50% modulation + 16dB.



Emission Mask: input with 15 kHz AF, 50% modulation + 16dB.



7.3 Frequency Stability

7.3.1 Test Equipment

Please refer to the Section 2

7.3.2 Test Specification:

Temperature: 23°C Humidity: 52% Atmospheric pressure: 103kPa

7.3.3 Limit

FCC CFR 47 Part 74.e) 4):

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(4) The frequency tolerance of the transmitter shall be 0.005 percent.

7.3.4 Test method

FCC CFR 47 Part 2.1055

Frequency stability versus Environmental Temperature

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

Frequency Stability versus Input Voltage

At room temperature ($25 \pm 5^{\circ}\text{C}$), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage. For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

Test Result:

Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within +/- 10.18 kHz
50	3.0	+3.1
40	3.0	+2.4
30	3.0	+1.0
20	3.0	+0.6
10	3.0	-0.4
0	3.0	-2.0
-10	3.0	-2.3
-20	3.0	-3.2
-30	3.0	-3.4
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 10.18 kHz
25	2.5	+0.1
25	2.0	-2.1
25	1.8	-1.4

Remark: 1) Battery end point: 1.8Vdc

2) Limit: $203.6 \text{ MHz} \times 0.005\% = 10.18 \text{ kHz}$

The results: The unit does meet the FCC requirements.

7.4 Modulation Characteristics

7.4.1 Test Equipment

Please refer to the Section 2

7.4.2 Test Specification:

Temperature: 23°C Humidity: 52% Atmospheric pressure: 103kPa

7.4.3 Limit

FCC CFR 47 Part 74.e) 3)

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(3) Any form of modulation may be used. A maximum deviation of ± 75 kHz is permitted when frequency modulation is employed.

7.4.4 Test Procedure:

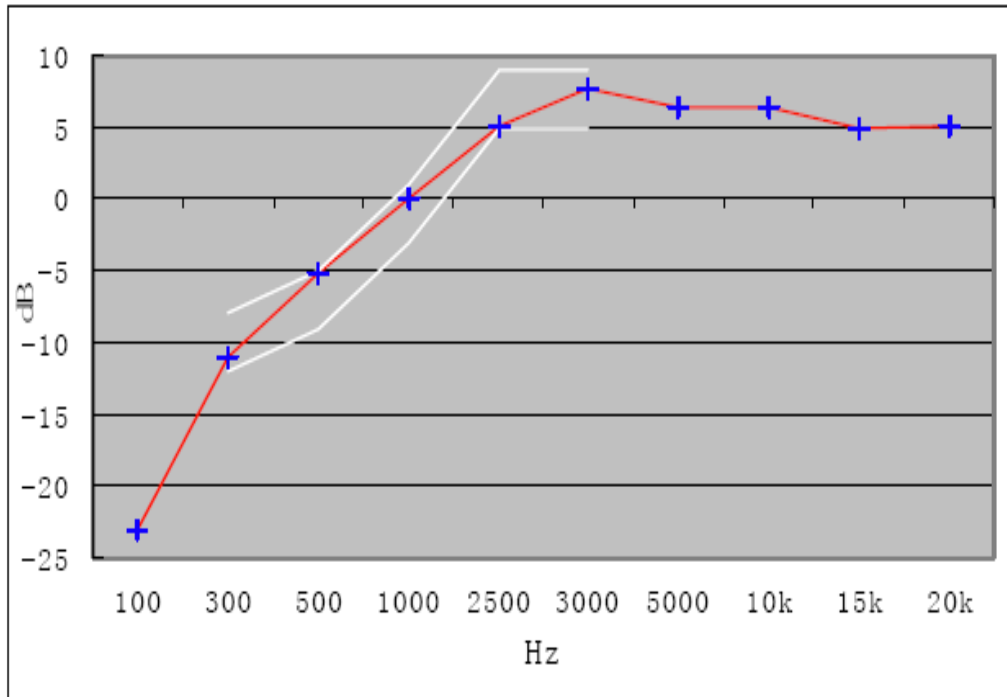
FCC CFR 47 Part 2.1047 & TIA/EIA 603 clause 2.2.3, 2.2.6

Audio Frequency Response

The RF output of the transceiver was connected to the input of FSP 30 with FM deviation module through sufficient attenuation so as not to overload the meter or distort the reading. An audio signal generator was connected to the audio input of microphone.

The audio signal input level was adjusted to obtain 20% of the maximum rated system deviation at 1 kHz, and recorded as DEV REF. With the audio signal generator level unchanged, set the generator frequency between 100 to 5000 Hz. The transmitter deviations (DEV FREQ) were measured and the audio frequency response was calculated as $20\log_{10} [\text{DEV FREQ} / \text{DEV REF}]$

The plot(s) of Audio Frequency Response is presented hereinafter as reference.



0dB=10mV at 1kHz (20% of the maximum rated system deviation).

Modulation Limiting

- Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
- Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤ 0.25 Hz to $\geq 15,000$ Hz. Turn the de-emphasis function off.
- Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation.
- Increase the level from the audio frequency generator by 20 dB in one step (rise time between the 10% and 90% points shall be 0.1 second maximum).
- Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.
- With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 100 to 15k Hz and observe the steady-state deviation. Record the maximum deviation.

Test at eight different modulating frequencies (100Hz, 300Hz, 500Hz, 1KHz, 2.5kHz, 5kHz, 10kHz, 15kHz), the output level of the audio generator was varied up to 1V and the FM deviation level was recorded.

Positive peak deviation

