



**FCC PART 15 CLASS C REQUIREMENT  
MEASUREMENT AND TEST REPORT  
FOR**

<b>Manufacturer:</b>	<u>Newsources Electronics Co.,Ltd</u>
<b>Address:</b>	<u>No 07, Houyang Rd. Anxi Industrial Zone, Liangzhu.Hangzhou311113, China</u>
<b>Equipment Model:</b>	<u>NFM-304S</u>
<b>Equipment Type:</b>	<u>FM Transmitter</u>
<b>FCC ID:</b>	<u>VKKNFM304S</u>
<b>FCC Rule Part:</b>	<u>Section 15.239</u>
<b>Test Engineer:</b>	<u>John Jiang</u>
<b>Test Date:</b>	<u>July 15 , 2007</u>
<b>Issuance Date:</b>	<u>July 31, 2007</u>
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## TABLE OF CONTENTS

<b>1 - GENERAL INFORMATION.....</b>	<b>3</b>
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
1.2 OBJECTIVE .....	3
1.3 TEST METHODOLOGY .....	3
1.4 TEST FACILITY .....	3
1.5 EQUIPMENT UNDER TEST (EUT) GENERAL DESCRIPTION.....	4
1.6 LOCAL SUPPORT EQUIPMENT LIST AND DETAILS .....	4
<b>2 - SYSTEM TEST CONFIGURATION.....</b>	<b>5</b>
2.1 JUSTIFICATION .....	5
2.2 EUT EXERCISE PROGRAM.....	5
2.3 SPECIAL ACCESSORIES .....	5
2.4 CONFIGURATION OF TEST SYSTEM.....	5
2.5 TEST SETUP BLOCK DIAGRAM .....	6
2.6 SUMMARY OF TEST RESULTS.....	6
2.7. DESCRIPTION OF TEST MODES.....	6
<b>3 - CONDUCTED EMISSIONS TEST (Not applicable in the report) .....</b>	<b>7</b>
3.1 MEASUREMENT UNCERTAINTY .....	7
3.2 EUT SETUP .....	7
3.3 EMI RECEIVER SETUP.....	7
3.4 TEST EQUIPMENT LIST AND DETAILS .....	7
3.5 TEST PROCEDURE (NOT APPLICABLE IN THE REPORT) .....	8
3.6 SUMMARY OF TEST RESULTS .....	8
<b>4 - RADIATED EMISSIONS TEST.....</b>	<b>9</b>
4.1 MEASUREMENT UNCERTAINTY .....	9
4.2 EUT SETUP .....	9
4.3 EMI RECEIVER SETUP.....	10
4.4 TEST EQUIPMENT LIST AND DETAILS .....	10
4.5 TEST PROCEDURE.....	11
4.6 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	11
4.7 SUMMARY OF TEST RESULTS .....	11
<b>5 – Occupied Bandwidth .....</b>	<b>14</b>
5.1 MEASUREMENT PROCEDURE.....	14
5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	14
5.3 MEASUREMENT EQUIPMENT USED:.....	14
5.4 MEASUREMENT RESULTS .....	14

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## 1 - GENERAL INFORMATION

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### 1.1 Product Description For Equipment Under Test (EUT)

The **Newsources Electronics Co.,Ltd.** model **NFM-304S** or the "EUT" as referred to in this report is a short range ,lower power, audio sender, it is designed by way of utilizing FM modulation achieves the system operating

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 87.9 MHz, 88.3 MHz.
- B). Modulation: Frequency Modulation
- C). Antenna Designation: Non-User Replaceable (Fixed)
- D). Power Supply: 12 Vdc

### 1.2 Objective

The following Class C report is intended for FCC ID with Section 15.239 of Part 15, Subpart C Rules of the Federal Communication Commissions.

The objective of the manufacturer is to demonstrate compliance with FCC Part 15 Class C limits.

### 1.3 Test Methodology

All measurements contained in this report are conducted with ANSI C63.4 –2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement is performed at Sichuan Mianyang. The radiated testing is performed at an antenna-to-EUT distance of 3 Meters.

### 1.4 Test Facility

Test Laboratory: West (Sichuan) Ceprei Electronic Compliance Co., Ltd.

Address: Room 711, Hongwa Building, No.22, Yihuan Road, Chengdu, Sichuan, P. R. China

Test Location: 35, East Mianxing Road Mianyang 621000, Sichuan, China

Anechoic Chamber (3 meter)Registration Number: 547926

**1.5 Equipment Under Test (EUT) General Description**

Manufacturer: Newsources Electronics Co.,Ltd  
No 07, Houyang Rd. Anxi Industrial Zone, Liangzhu.  
Hangzhou311113, China

Description: FM transmitter

Model: NFM-304S

FCC ID: VKKNFM304S

File Number: 00707011EI

**1.6 Local Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Mark
Jinjiang Huawei Power Source Co.,Ltd	Lead-Acid Batteries	DT4-6	N/A	CE /UL
N/A	N/A	N/A	N/A	N/A

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## 2 - SYSTEM TEST CONFIGURATION

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### 2.1 Justification

The system is configured for testing in a typical fashion (as a normally used by a typical user).

### 2.2 EUT Exercise Program

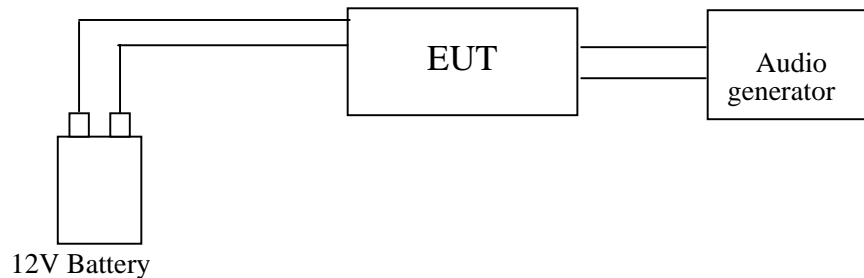
The EUT exercising program used during radiated and conducted testing is designed to exercise the various system components in a manner similar to a typical use.

The Transmitter was operated in the normal operating mode. The Tx frequency was fixed which was for the purpose of the measurements.

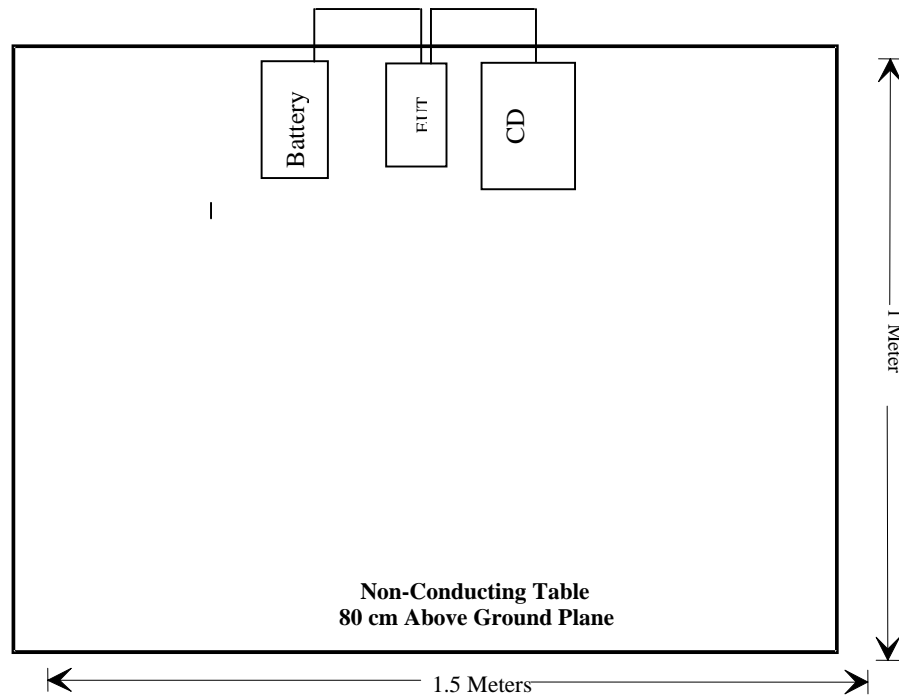
### 2.3 Special Accessories

As shown in clause 2.4 of the report, all interface cables used for compliance testing as normally supplied by Newsources Electronics Co.,Ltd. and their respective support equipment manufacturers.

### 2.4 Configuration of Test System



## 2.5 Test Setup Block Diagram



## 2.6 Summary Of Test Results

FCC Rules	Description Of Test	Result
15.207	Conducted Emission	N/A
15.209	Radiated Emission	Compliant
15.239	26 dB Bandwidth	Compliant

## 2.7. Description of test modes

The frequency 87.9 MHz, 88.3 MHz are chosen for testing. And the EUT stays in continuous transmitting mode.

### 3 - CONDUCTED EMISSIONS TEST (Not applicable in the report)

#### 3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMI. The factors contributing to uncertainties are Spectrum analyzer, cable loss, and LISN.

The best estimate of the uncertainty of any conducted emissions measurement deviate  $\pm 1.4$  dB.

#### 3.2 EUT Setup

The measurement is performed at the shielded room, using the same setup per ANSI C63.4 - 2000 measurement procedure. The specification used is the Section 15.207 limits.

All auxiliary equipments and the EUT were placed on the test table. The rear of theirs was placed flushed to the rear side of the test tabletop. Then the EUT was being connected to the audio output of CD. Finally provide power to them respectively. Additionally, Power cables and external I/O cables were draped along the test table and bundled when necessary.

#### 3.3 EMI Receiver Setup

During the disturbance voltage test, the EMI receiver was set with the following configurations:

Start Frequency ..... 0.15 MHz  
Stop Frequency ..... 30 MHz  
Sweep Speed ..... Auto  
Video Bandwidth ..... 120 kHz

#### 3.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
R/S	EMI Receiver	ESCS30	08-31-01-0001	09/May/08
R/S	AMN ( LISN)	ESH2-Z5	17-72-01-0001	08/May/08
R/S	AMN ( LISN)	ESH3-Z5	17-72-02-0001	08/May/08

### **3.5 Test Procedure (Not applicable in the report)**

During the conducted emission test, the power cord of the host system is connected to the auxiliary outlet of the first LISN, and the other auxiliary equipments are connected to the relevant outlet of the second LISN.

Maximizing procedure is performed on the eight (8) highest emissions to ensure EUT is compliant with all installation combination.

All data is recorded in the peak detection mode. Quasi-peak readings are only performed when an emission is found to be marginal (within -4 dB $\mu$ V of specified limitations). Quasi-peak readings are distinguished with a "Qp".

The EUT is in the normal (native) operating mode during the final qualification test to represent worst case results.

Additionally, the EUT is tested with its built-in power board to represent the worst case results.

### **3.6 Summary of Test Results**

**N/A**



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## 4 - RADIATED EMISSIONS TEST

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### 4.1 Measurement Uncertainty

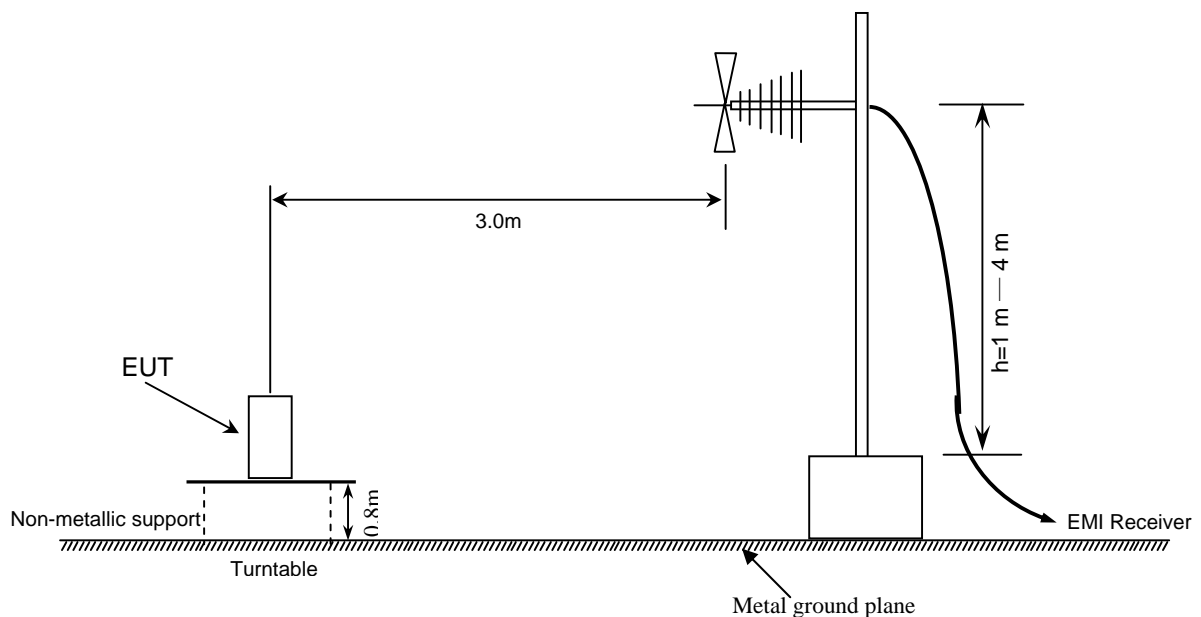
All measurements involve certain levels of uncertainties, especially in the field of EMI. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, the Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 1.4\text{dB}$ .

### 4.2 EUT Setup

The radiated emission tests are performed in the 3 meters anechoic chamber, using the setup accordance with the ANSI C63.4 - 2000. The specification used is the Section 15.209 limits.

All auxiliary equipments and the EUT were placed on the test table. The rear of theirs was placed flushed to the rear side of the test tabletop. Then the EUT was being connected to the audio output of CD. Finally provide power to them respectively. Additionally, power cables and external I/O cables were draped along the test table and bundled when necessary.



### 4.3 EMI Receiver Setup

- a, Emission from the intentional radiator shall be confined with a band 200K wide centered on the operation frequency. The 200KHz band shall lie wholly within the frequency range of 88-108MHz
- b, The field strength of any emission within the permitted 200KHz band shall not exceed 250 micro volts/meter (48dBuV) at 3 meters , the emission limit in this paragraph is based on measurement instrumentation employing an average detector, the provisions in section 15.35 limiting peak emissions apply.
- c , 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.

Frequency (MHz)	Field Strength (uV/m )	Distance (meters)	Field Strength (dBuV/m)
30 - 88	100	3	40
88 - 216	150	3	43.5
216 - 960	200	3	46
Above 960	500	3	54

During the radiated electromagnetic disturbance test, the spectrum analyzer was set with the following configurations:

Start Frequency ..... 30 MHz  
 Stop Frequency ..... 1000 MHz  
 Sweep Speed ..... Auto  
 Video Bandwidth ..... 120 kHz

### 4.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
R/S	EMI Receiver	ESCS30	08-31-01-0001	09/May/07
SCHAFFNER	Antenna	GBL6112B	/	08/May/07

#### 4.5 Test Procedure

The EUT was placed on a turntable, which is 0.8m above ground plane.

Maximizing procedure is performed on the four (4) highest emissions to ensure EUT is compliant with all installation combinations.

All data are recorded in the peak detection mode. From 30MHz to 1000MHz, Quasi-peak readings is performed only when an emission is found to be marginal (within -4 dB $\mu$ V of specified limitations), and are distinguished with a "Qp" in the data table. From 1000MHz to 1.7GHz the radiated emission data are based upon the use of measurement instrumentation employing an average detector function, and are distinguished with an "Av" in the data table.

The EUT is in the normal (native) operating mode during the final qualification test to represent the worst case results.

#### 4.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB $\mu$ V means the emission is 7dB $\mu$ V below the maximum limit for FCC Class B. The equation for margin calculation is as follows:

$$\text{a, Margin} = \text{Corr. Ampl.} - 15.239(\text{b}) \text{ Limit}$$

$$\text{b, Margin} = \text{Corr. Ampl.} - 15.209(\text{a}) \text{ Limit}$$

#### 4.7 Summary of Test Results

According to the data in section 4.8, the EUT complied with the 15.209(a) limit and has the worst margin of:

##### AT 87.9MHz

**-2.2 dB at 176.625000 MHz** in the **VERTICAL** polarization, 30 MHz to 1.0GHz, 3meters

##### AT 88.3MHz

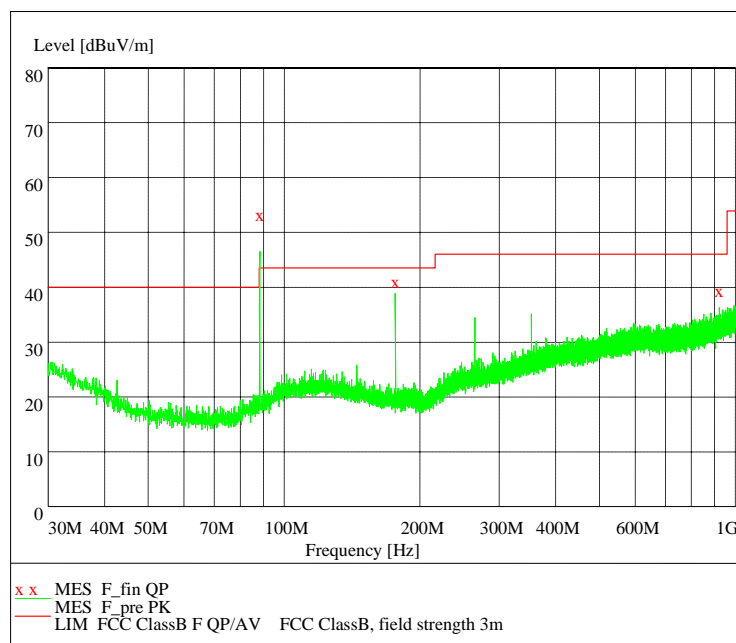
**-4.4 dB at 175.81000 MHz** in the **VERTICAL** polarization, 30 MHz to 1.0GHz, 3meters

## 4.8 Radiated Emissions Test Data

### a. At 87.9MHz

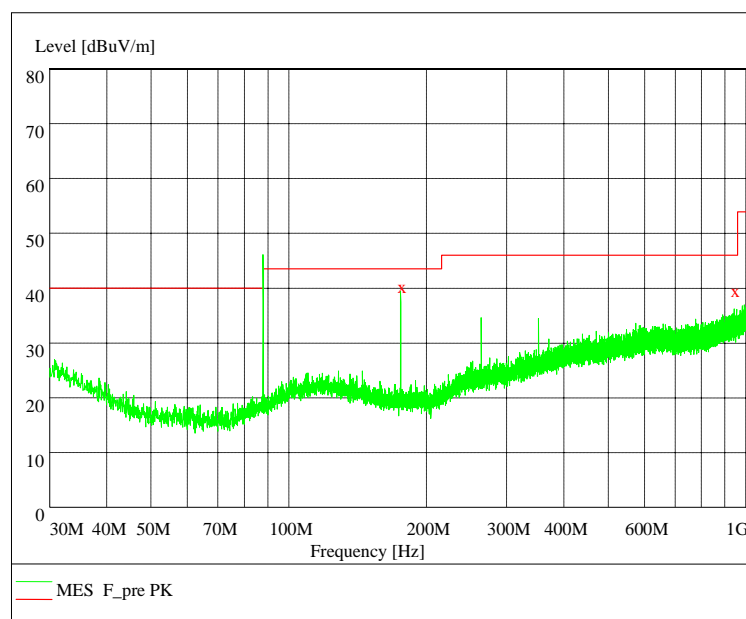
Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Detector QP/Peak	Margin dB	Height cm	Azimuth deg	Polarisation H/V
Fundamental Frequency Emission								
87.875	60.4	10.0	68	Peak	-7.6	100	83	H
87.875	45.2	10.0	48	AV	-2.8	171	100	H
Spurious Frequency Emission								
176.625000	40.20	11.6	43.5	QP	-2.2	140.0	77.00	H
922.250000	39.10	26.2	46.0	QP	-6.9	100.0	179.00	H

### Curve of Radiated Emissions Test



**b, At 88.3MHz**

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Detector QP/Peak	Margin dB	Height cm	Azimuth deg	Polarisation H/V
Fundamental Frequency Emission								
88.375	56.4	10.0	68	Peak	-11.7	100	119	H
88.375	40.1	10.1	48	AV	-7.9	100	120	H
Spurious Frequency Emission								
175.81000	39.1	12.7	43.5	QP	-4.4	100.0	118.00	V
942.94000	39.5	20.4	46.0	QP	-6.5	100.0	179.00	H

**Curve of Radiated Emissions Test**

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## 5 – Occupied Bandwidth

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### 5.1 Measurement Procedure

1. The EUT was placed on a turntable, which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10KHz, Span =500KHz.
4. Set SPA Max hold. Mark peak, -26dB.

### 5.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

### 5.3 Measurement Equipment Used:

Manufacturer	Description	Model	Serial Number	Cal. Due Date
ANRITSU	Spectrum Analyzer	MS2661C	MT51683	2008-09-21
/	/	/	/	/

### 5.4 Measurement Results

26dB bandwidth (87.9MHz)= 96.00 kHz

26dB bandwidth (88.3MHz)= 92.00 kHz

**a. 26dB Band Width Test Data (87.9MHz)****b. 26dB Band Width Test Data (88.3MHz)**